FORT BLISS
TEXAS AND NEW MEXICO
INTEGRATED NATURAL RESOURCES
MANAGEMENT PLAN

PREPARED FOR:

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Directorate of Public Works Environmental Division
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EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) is for Fort Bliss and the United States Department of the Army (U.S. Army) in accordance with the Sikes Act Improvement Act, Department of Defense Instruction and Manual 4715.03 *Natural Resources Conservation Program*, U.S. Army Regulation 200-1, *Environmental Protection and Enhancement*, *U.S. Army Strategy for the Environment: Sustain the Mission-Secure the Future*. INRMP direction is by a recent series of Department of Defense and Department of the Army guidance memoranda on the Sikes Act and INRMPs. The purpose of this INRMP is to provide guidance for the implementation and management of natural resources on Fort Bliss during the 5-year period from 2015 through 2019. This INRMP uses an integrated, adaptive, ecosystem management approach for sustainability and consistency with the military missions on Fort Bliss. The DoD with the assistance of the U.S. Fish and Wildlife Service (USFWS) and the states of New Mexico and Texas are responsible under the Sikes Act (16 U.S.C. 670a-670f, as amended) for carrying out programs and implementing management strategies to conserve and protect biological resources on Fort Bliss lands. Implementation of this INRMP is imperative for increasing mission capabilities, minimizing military training constraints and maintaining maximum flexibility.

Integrated natural resources management in an ecosystem framework promotes water quality, soil productivity and recreational uses of natural resources and protection of biological diversity across Fort Bliss while allowing military training access to the resources needed to maintain a high degree of combat readiness. Effective sustainable use of natural resources accomplishes no net loss in the capability of the installation to support the military mission.

Fort Bliss is a multi-mission U.S. Army installation situated on approximately 1.12 million acres in Texas and New Mexico. Of that total land area, 11 percent of the installation is in El Paso County in west Texas, and the remaining 89 percent is in south-central New Mexico in Doña Ana and Otero counties. Fort Bliss consists of the Main Cantonment Area, which is composed of the Main Post, William Beaumont U.S. Army Medical Center, Logan Heights, and Biggs U.S. Army Airfield; Castner Range; and the Fort Bliss Training Center, which is composed of three large geographic segments: the South Training Areas, Doña Ana Range-North Training Areas and McGregor Range.

This INRMP provides Fort Bliss with a description of the installation and its surrounding environments and presents various management practices designed to mitigate negative impacts and enhance the positive effects of the installation's mission on regional ecosystems. These practices complement the requirements of Fort Bliss to accomplish its mission at the highest possible level of efficiency. To obtain an accurate assessment of Fort Bliss's environmental impact, environmental analyses were completed first to determine the physical and biotic nature of the installation and its surroundings and then to determine the impacts of the operational activities taking place upon the natural environment.

This INRMP is a practical guide for the management, sustainment and stewardship of all natural resources present on Fort Bliss thus helping to insure no net loss in mission capabilities. This INRMP uses an interdisciplinary approach whereby scientific information compiles from a variety of sources.

This INRMP represents a revision of the 2001 INRMP, reviews the natural resources activities undertaken at Fort Bliss since implementation of the 2001 INRMP and proposes new projects and initiatives for the years 2015 through 2019. This revised INRMP includes the guidelines provided by the Office of the Secretary of Defense (OSD) in August 2006 (Table 2.3-6), procedural requirements of the National Environmental Policy Act (NEPA) and the Department of Defense Manual, Number 4715.03 (DoD 2013) and strives to fully integrate and coordinate the natural resources program with other Fort Bliss plans and activities.

This INRMP establishes goals that represent a long-term vision for the health and quality of Fort Bliss natural resources. From these goals, objectives and management actions have been identified that follow DoD and USFWS guidance. The INRMP goals and management actions revise over time to reflect changing missions and environmental conditions. Actions proposed in this INRMP are subject to NEPA compliance. Fort Bliss has completed several recent EISs as the Army mission for Fort Bliss has evolved and these programmatic documents include analyses of natural resources management actions proposed herein. Recent EIS documents that affect Fort Bliss include: Fort Bliss Texas and New Mexico Mission and Master Plan Programmatic Environmental Impact Statement, 2000; Fort Bliss Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement, 2007; and the Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement, 2010.

The Fort Bliss INRMP is a source of environmental and natural resources information for preparers of new EISs and EAs. Any future changes in mission, training activities or technology must follow NEPA guidance for analyzing impacts on natural resources and would likely require new EAs or EISs.

The management strategies described in this INRMP are monitored so that modifications can be made as conditions change. This INRMP undergoes internal, NEPA and interagency review on a regular basis to ensure compliance and integration with other installation management plans including Army guidance and regulations and state and federal natural resources conservation plans.

This INRMP was developed in cooperation with the U.S. Fish and Wildlife Service, the New Mexico Department of Game and Fish, and the Texas Parks and Wildlife Department. These agencies are partners with the US Army and Fort Bliss for the conservation of endangered, threatened, sensitive plant, and animal species that occur on Fort Bliss. These agencies are stakeholders and signators for this INRMP along with Installation Command and indicate their consent for the natural resources management program as outlined herein on Fort Bliss.

FORT BLISS
TEXAS AND NEW MEXICO
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

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1 OVERVIEW

1.1 Authority

This INRMP is prepared and implemented under the authority of the Sikes Act Improvement Act (SAIA) (16 U.S.C. 670a et seq.), U.S. Department of Defense (DoD) Directive 4700.4 (Natural Resources Management Programs), DoD Instruction and Manual 4715.03 (Natural Resources Conservation Program), AR 200-1 (Environmental Protection and Enhancement), 32 CFR 651 (Environmental Effects of Army Actions) and AR 210-20 (Master Planning for Army Installations). This plan complies with memoranda of understanding (MOU) and memoranda of agreement (MOA) between DoD and U.S. Department of Agriculture (USDA) and Department Of Interior (DOI) (USDA 1971, DOI 1990a, DOI 1997, DOI 2006a). This INRMP aids Fort Bliss in complying with federal and state laws associated with natural resources.

DoD, with the assistance of the U.S. Fish and Wildlife Service (USFWS) and the states of New Mexico and Texas, is responsible under the Sikes Act Improvement Act (16 U.S.C. 670a-670f, as amended) for carrying out programs and implementing management strategies to conserve and protect biological resources on Fort Bliss lands. A tripartite Memorandum of Understanding (MOU) was signed in 2013 by DoD, U.S. Fish and Wildlife Service, and the states for a Cooperative Integrated Natural Resource Management Program on Military Installations. This MOU renews the commitment of these agencies to work together to manage the natural resources entrusted to DoD across the country. Among other provisions, the MOU creates a streamlined review process for updating DoD's integrated natural resources management plans (INRMPs) with minor changes. This will facilitate coordination among the three parties to the MOU and make the critical habitat exemption more readily available to military installations (DoD 2013a).

1.2 Purpose

The Fort Bliss Integrated Natural Resources Management Plan (INRMP) is a primary tool for implementing the goals of the United States Department of the Army’s environmental vision statement:

The U.S. Army will be a national leader in environmental and natural resource stewardship for present and future generations as an integral part of our mission.

The primary goal of the Fort Bliss natural resources program is to support the military training mission by ensuring the conservation and sustainability of natural resources on Fort Bliss, as well as compliance with environmental laws and regulations while maintaining quality lands upon which to accomplish training and testing missions.

Because military lands and waters are protected from excessive public access and impact, they contain some of our nation’s most significant remaining large tracts of land with valuable natural resources. Congress established the Sikes Act in 1960 to manage these lands for wildlife conservation and human access. The Sikes Act was amended in 1997(now called the Sikes Act Improvement Act or SAIA) to develop and implement mutually agreed upon Integrated Natural Resource Management Plans (INRMPs) through voluntary cooperative agreements between the DoD installation, USFWS, and the respective state fish and wildlife agencies (DoD and USFWS 2004).

INRMPs are planning documents that allow DoD installations to implement landscape-level management of their natural resources while coordinating with various stakeholders. They are extremely important management tools that ensure military operations and natural resources conservation are integrated and consistent with stewardship and legal requirements (DoD and USFWS 2004).

This INRMP provides guidance for the implementation and management of natural resources on Fort Bliss during the 5-year period from 2015 through 2018. The Fort Bliss Directorate of Public Works-Environmental Division (DPW-E) writes updates and maintains this INRMP. DPW-E, Integrated Training Area Management (ITAM) and Range Operations Branches of the Directorate of Plans, Training Mobilization and Security (DPTMS) use the Fort Bliss INRMP for integrating and implementing best management practices for natural resources benefits within military mission requirements.

1.3 Scope

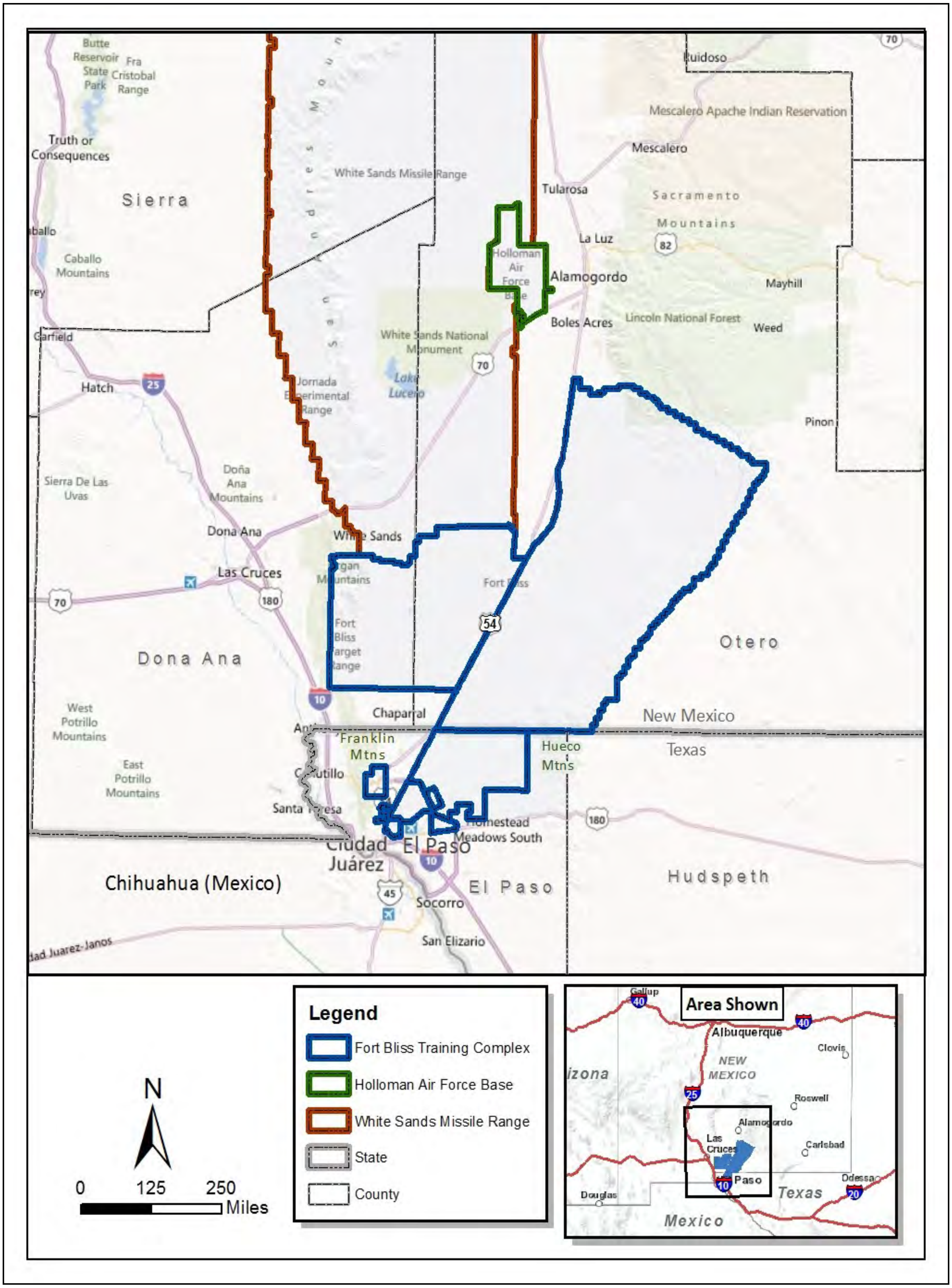
Fort Bliss is located in Texas and New Mexico. Eleven percent of the installation's land area is in El Paso County in far west Texas, and the remaining 89 percent is in south-central New Mexico within Doña Ana and Otero counties. The installation is bounded by mountain ranges on three sides: the Organ, Franklin, Hueco, and Sacramento Mountains (Figure 1.3-1).

Fort Bliss currently encompasses approximately 1.12 million acres and contains five major areas: Doña Ana Range–North Training Areas, McGregor Range, South Training Areas, Castner Range and the Main Cantonment Area (cantonment). The cantonment, located in El Paso County, Texas (Figure 1.3-2) represents the heaviest concentration of facilities and mission support activities on Fort Bliss, and is the location of the post headquarters, as well as the primary housing area for troops and accompanying equipment. Table 1.3-1 compares the relative area of the major components of the installation, including the main cantonment area. The cantonment area covers just over 1 percent of the total acreage of Fort Bliss. The bulk of the installation is composed of three areas used primarily for training and testing. McGregor Range covers about 62 percent of the installation (approximately 697,000 acres); the Doña Ana Range–North Training Areas covers about 27 percent (approximately 297,000 acres) and the South Training Areas cover about 9 percent (approximately 100,000 acres) of the total acreage occupied by Fort Bliss.

Table 1.3-1 Fort Bliss Installation Components

Area	Acres
McGregor Range*	**697,472**
Doña Ana Range-North Training Areas	**297,006**
South Training Areas (aka Division Training Areas)	**99,813**
Main Cantonment Area including Biggs U.S. Army Air Field (AAF)	**15,194**
Castner Range	**7,054**
Installation Total	**1,116,539**

Note:*Includes 19,364 acres in USFS Lincoln National Forest
Source: DPW-E Conservation Branch

571 

572 **Figure 1.3-1 Fort Bliss Regional Context**

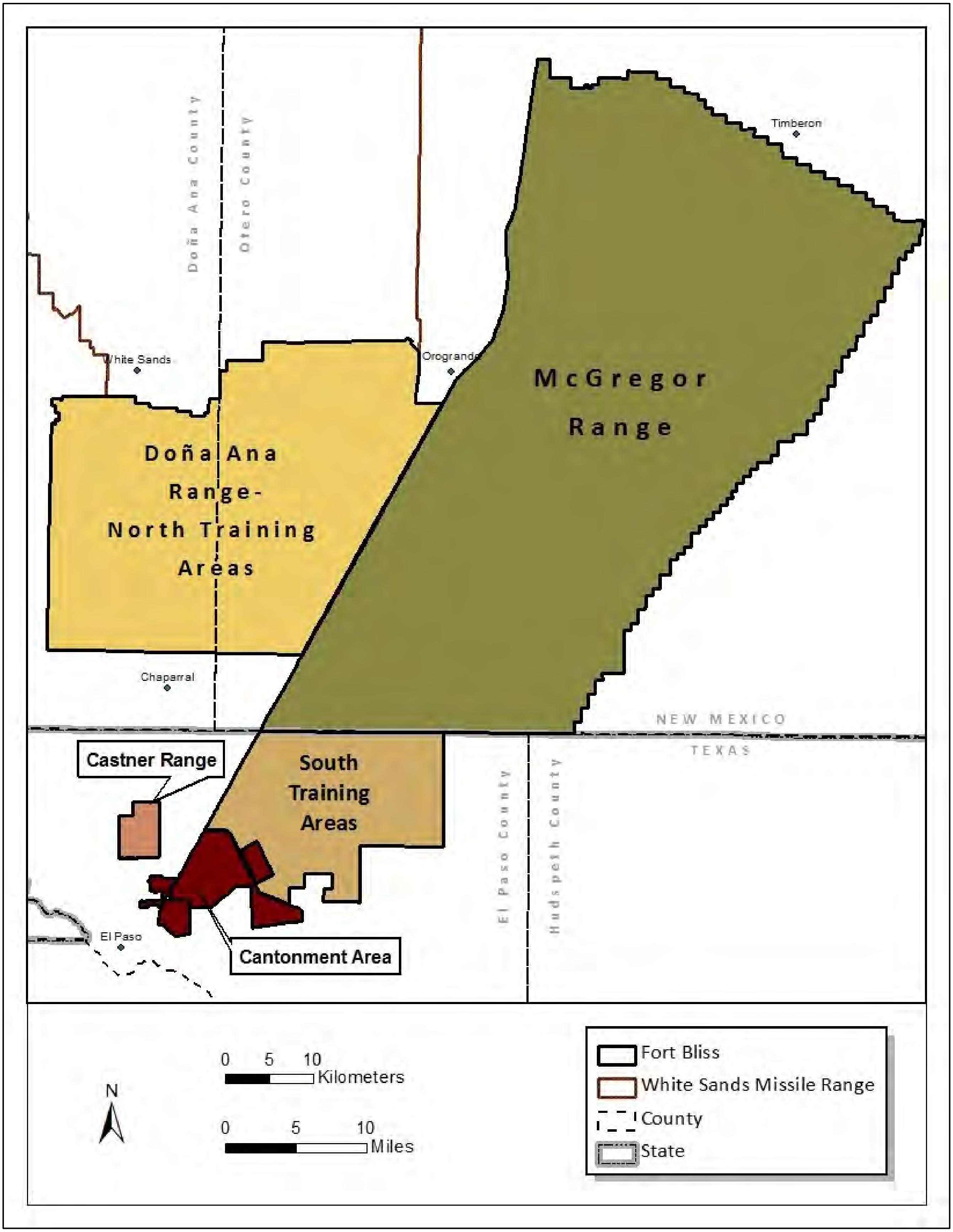


Figure 1.3-2 Fort Bliss Installation Components

1.4 Stewardship and Compliance

The U.S. Army recognizes that a strict compliance-based approach to natural resources management is not sufficient to sustain the U.S. Army's mission. It acknowledges the importance of sustainability of natural resources as well as the interdependence between the mission, the environment and the community (U.S. Army 2004c). The *Army's Strategy for the Environment* (U.S. Army 2004c) represents a shift in the U.S. Army's environmental philosophy from a compliance-based to a more holistic approach that integrates both stewardship and compliance on a landscape level.

Fort Bliss has an active environmental management program aimed at ensuring that operations, physical development and training activities comply with applicable laws and regulations. The Fort Bliss Directorate of Public Works-Environmental Division (DPW-E) oversees the Multimedia Compliance Branch and the Conservation Branch. The Compliance Branch program at Fort Bliss focuses on compliance of current operations with all relevant federal, state and local environmental laws and regulations (Benton et al. 2008). The Conservation Branch program focuses on management of natural resources within the installation. Both the Compliance and Conservation programs are integrated within the Department of the Army's Environmental Management System (EMS) based on International Organization for Standardization (IOS) 1400-1 Standards. The EMS program incorporates environmental requirements into the installation's management processes and establishes a systematic approach for assessing mission impacts upon the environment (USAEC 2007).

The National Enviironmental Policy Act (NEPA) is the United States environmental law that established a U.S. national policy promoting the enhancement of the environment and also established the President's Council on Environmental Quality (CEQ). NEPA's most significant effect was to set up procedural requirements for all federal government agencies to prepare environmental assessments (EAs) and environmental impact statements (EISs). EAs and EISs contain statements of the environmental effects of proposed federal agency actions. The EIS is a more detailed evaluation of the environmental impacts when compared to the content of an EA. An EIS has many components including public, outside party and other federal agency input concerning the preparation of the EIS. EAs and EISs ultimately help public officials make informed decisions that are a reflection of an understanding of environmental consequences and the alternatives available (DoD 1994a).

This INRMP establishes goals that represent a long-term vision for the health and quality of Fort Bliss natural resources. From these goals, objectives and management actions have been identified that follow DoD, NEPA and USFWS guidance. The INRMP goals and management actions revise over time to reflect changing missions and environmental conditions. Any future changes in mission, training activities or technology must follow NEPA guidance for analyzing impacts on natural resources.

Natural resources management is integrated into the daily operations of Fort Bliss as per guidelines established in the Fort Bliss land use planning decisions found in the following documents:

- Fort Bliss Texas and New Mexico Mission and Master Plan Programmatic Environmental Impact Statement (2000),
- Fort Bliss Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement (2007),

- Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement (2010).

1.5 Review and Revision Process

Section 101(b) (2) of the SAIA states: “each INRMP must be reviewed as to operation and effect by the parties thereto on a regular basis, but no less often than every 5 years.”

The requirement to “review” the INRMP “on a regular basis, but not less often than every 5 years” does not mean that every INRMP necessarily needs revised. The SAIA specifically directs that the INRMP be reviewed “as to operation and effect,” emphasizing that the review is intended to determine whether the existing INRMP is being successfully implemented to meet the requirements of the SAIA and is contributing to the conservation and rehabilitation of natural resources. Although the SAIA does require a formal review no less than every 5 years, DoD policy requires installations to review INRMPs annually in cooperation with the other parties to the INRMP. Annual reviews facilitate adaptive management by providing an opportunity for the parties to review the goals and objectives of the plan (DoD 2006a). In addition, the SAIA states that the INRMP must be prepared in collaboration with the USFWS and state fish and wildlife agencies, which for Fort Bliss includes the Texas Parks and Wildlife Department (TPWD) and the New Mexico Department of Game and Fish (NMDGF). Each of the agencies is in turn a signatory cooperator for implementation of this INRMP.

Multiple DoD and U.S. Army Memorandum provide further guidance for the implementation, coordination, review and revision of the INRMP including Guidance for Implementation of the SAIA, DAIM-ED, 25 May, 2006 (DoD 2006a), DoD Instruction Number 4715.03 (DoD 2011), DoD Manual Number 4715.03 (DoD 2013) and INRMP Template, DAIM-EDT, 24 October, 2006 (DoD 2006b). Table 1.5-1 lists the state and federal laws, regulations and guidance that apply to implementing this INRMP.

Table 1.5-1 Major Federal and State Environmental Regulations and Policies Applicable to Implementation of this INRMP

General
26 U.S.C. 4611-4682, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
32 Code of Federal Regulations (CFR) 651, Environmental Effects of Army Actions
AR 200-1, Environmental Protection and Enhancement
Conservation Technical Assistance Program (PL 74-46, 49 Stat. 163, 16 U.S.C. 590a-f, q)
DoD Instruction 4715.03, Natural Resources Conservation Program
DoD Manual Number 4715.03, Integrated Natural Resources Management Plan Implementation Manual (2013)
Executive Order (EO) 13148, Greening the Government Through Leadership in Environmental Management (2000)
EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance (October 5, 2009)
EO 13352, Facilitation of Cooperative Conservation (August 26, 2004)

INRMP Strategic Action Plan (DoD, USFWS, International Association of Fish and Wildlife Agencies) (February 3, 2005)
Memorandum of Understanding among DoD, USFWS, and International Association of Fish and Wildlife Agencies for a Cooperative Integrated Natural Resources Management Program on Military Installations (January 31, 2006)
Memorandum from Deputy Under Secretary of Defense on Implementation of Ecosystem Management in the DoD (August 8, 1994) (DoD 1994a)
Memorandum from Deputy Under Secretary of Defense on Support of a Biodiversity Initiative for the Formulation of Policy Recommendations and Practical Guidance for Installation Commanders and Natural Resources Managers (May 3, 1994) (DoD 1994b)
National Environmental Policy Act (NEPA) (U.S.C. 4321-4347)
President's Council on Environmental Quality (CEQ) Regulations, 40 CFR 1500-1508
Resource Conservation and Recovery Act (RCRA), (PL 94-580)
Sikes Act as amended in 1997 under the SAIA, 16 U.S.C. 2901 et seq.
Biological Resources
AR 200-1, Chapter 5, Pest Management
U.S. Army Policy Guidance on MBTA (DAIM-ED-N, 17 August 2001)
Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668-668d; 54 stat. 250)
ESA of 1973 (PL 93-205) and Amendments of 1988 (PL 100-478)
EO 13112, Invasive Species (1999)
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (2001)
Federal Noxious Weed Act of 1974 (7 U.S.C. 2801)
Fish and Wildlife Act of 1956 (16 U.S.C. 742f; 70 stat. 1112)
Fish and Wildlife Coordination Act of 1958 (PL 79-732)
Fish and Wildlife Conservation Act of 1980 (PL 96-366)
Lacey Act and Amendments of 1981 (PL 97-79)
MBTA of 1918 (16 U.S.C. 703-712; 40 stat. 755)
MBTA Interim Management Guidance (Instruction Memorandum No. 2008-500), December 18, 2007
50 Code of Federal Regulation (CFR) Part 21B, Authorization of Take Incidental to Military Readiness Activities
Memorandum From U.S. Army Environmental Command on Interim Guidance-Unintentional Take of Migratory Birds for Actions Other than Military Readiness Activities
Memorandum of Understanding Between the DoD and the USFWS to Promote the Conservation of Migratory Birds (July 31, 2006)
Endangered Species
New Mexico Endangered Plant Species Act (9-10-10 New Mexico Statutes Annotated [NMSA]) and attendant regulation NMFRCD Rule No. 91-1

New Mexico Wildlife Conservation Act of 1974 (NMSA 17-2-37 through 17-2-46, 1978 compilation)
Texas Parks and Wildlife Code, Chapter 67: Nongame Species, Chapter 68: Endangered Species, Chapter 88: Endangered Plants, Chapter 61: Uniform Wildlife Regulatory Act
State and Tribal Wildlife Grants Program (SWG) – Created under the Department of the Interior and Related Agencies Appropriations Act of 2002 (PL 107-63) this proactive program provides funding for wildlife conservation in order to prevent listing of species. In order for states to have received funds they had to develop and submit a Comprehensive Wildlife Conservation Strategy (CWCS) by October 1, 2005
New Mexico Department of Game and Fish, 2006. A Comprehensive Wildlife Conservation Strategy (CWCS) for New Mexico
Wetlands
Emergency Wetlands Resources Act (EWRA) of 1986 (PL 99-645)
EO 11988, Floodplain Management (1977)
EO 11990, Protection of Wetlands (1977)
North American Wetlands Conservation Act of 1989 (PL 101-233)
Section 10 of River and Harbor Act (RHA) of 1989 (33 U.S.C. 403; 52 Stat. 802)
Section 404 of Federal Water Pollution Control Act (FWPCA) of 1972 (PL 92-500), commonly known as the Clean Water Act (CWA)
Cultural/Native American Resources
American Indian Religious Freedom Act (AIRFA) of 1978 (PL 95-341)
AR 420-40, Historic Preservation
Archeological and Historic Preservation Act (AHPA) of 1974 (PL 93-291)
Archeological Resources Protection Act (ARPA) of 1979 (PL 96-95)
DoD 4710.1, Archaeological and Historic Resource Management
EO 11593, Protection and Enhancement of the Cultural Environment (1971)
Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 (PL 101-601)
National Historic Preservation Act (NHPA) of 1966 (PL 89-665), Amendments through 1992 (PL 96-515)
Department of Defense Indian and Alaska Native Policy, 20 October 1998
Soils and Erosion
FWPCA of 1972 (PL 92-500) and Amendments, commonly known as the CWA
Preparation and distribution of soil surveys (16 U.S.C. 590a-f, and q; 42 U.S.C. 3271-3274)
Soil and Water Resources Conservation Act of 1977 (16 U.S.C. 2001-2009)
Land
43 CFR 3000 Series

AR 350-19, The U.S. Army Sustainable Range Program (2005)
Federal Land Policy and Management Act (FLPMA) of 1976 (PL 94-579)
MLWA of 1999 (Title XXX of PL 106-65)
Wilderness Act of 1964 (PL 88-577)
Water Resources
EO 12088, Federal Compliance with Pollution Control Standards (1978)
FWPCA of 1972 (PL 92-500) and Amendments, commonly known as the CWA and Water Quality Act (WQA) of 1987 (PL 100-4)
New Mexico WQA of 1967 (74-6-1 et seq., NMSA 1978)
Safe Drinking Water Act (SDWA) of 1974 (PL 95-523) and Amendments of 1986 (PL 99-339)
Texas Water Code
Fire Management
AR 420-1, Chapter 25, Fire and Emergency Services (1997)
DoD Instruction 6055.06, DoD Fire and Emergency Services Program
Federal Wildland Fire Management Policy, 2001
Army Wildland Fire Policy Guidance, August 2002

1.6 Plan Integration

This INRMP is a reference for other installation planning documents, including the following:

Range Complex Master Plan (RCMP) The Fort Bliss RCMP supports the installation's integrated sustainable range planning process. It details the land requirements for range and maneuver training, as well as constraints that affect range and training land assets. The RCMP in turn provides information that is necessary for the development of the installation's Real Property Master Plan (RPMP). The RCMP identifies encroachment issues that impact the use of FBTC and provides for the future development of FBTC to ensure that Fort Bliss can meet its current and future Training and Testing missions. The RCMP is reviewed annually for the installation Senior Commander's Issues and Needs (SCINI) submission to Installation Management Command (IMCOM) (U.S. Army 2010m).

Real Property Master Plan (RPMP) The Fort Bliss RPMP complies with AR 210-20, "Real Property Master Planning for U.S. Army Installations" (DA 1993). The RPMP describes the current physical composition of Fort Bliss and the plans for an orderly long-range development of facilities, especially those in the Main Cantonment Area. There are three components to the RPMP: the Long Range Component (LRC), Capital Investment Strategy (CIS), and Short Range Component (SRC). The LRC establishes goals and objectives for future development of the installation, while the CIS and SRC are continuously evolving mechanisms for implementing the overall objectives of the LRC.

Programmatic Agreement (PA) and the Integrated Cultural Resource Management Plan (ICRMP) The PA is a formal and legal agreement between the United States Army Garrison Fort Bliss, the State Historic Preservation Officers (SHPOs) of Texas and New Mexico and the Advisory Council on Historic Preservation. The PA establishes a process for consultation, review, and compliance with the National Historic Preservation Act (NHPA), and applies to all entities conducting activities that could affect those properties. The ICRMP establishes procedures for compliance with Federal laws, regulations, and executive orders requiring the protection and/or management of cultural resources with the least possible effect on military training and mission support activities.

The ICRMP primarily contains Standard Operating Procedures (SOPs) for cultural resource management activities conducted on Fort Bliss and outlines the legal foundation and methodology on how to implement the plan, ensuring compliance with cultural resource laws. The Fort Bliss DPW-E Historic Preservation Officer (HPO) maintains the PA and ICRMP documents.

Integrated Training Area Management (ITAM) Plan ITAM is part of the U.S. Army's Sustainable Range Program (SRP) and its primary function is to establish policies and procedures to achieve optimal, sustainable use of military training and testing lands. Key components of this program are detailed further in Chapter 3 and in the Range Complex Master Plan.

Integrated Pest Management Plan (IPMP) The IPMP is the primary mechanism for identifying actions to prevent and manage invasive species. Working in conjunction with the INRMP, the IPMP preserves, protects and enhances natural vegetation and habitat. Implementation of the IPMP is the responsibility of the Fort Bliss DPW-E Conservation Branch.

Pollution Prevention Plan (P2) The Fort Bliss P2 Plan outlines the installation's approach to the P2 process, provides summary of the current program and goals and guides management actions necessary for identifying and implementing projects to meet federal, state, U.S. Army, and installation pollution prevention goals. The P2 Plan also contains listings of hazardous waste generating activities and Toxic Release Inventory (TRI) activities at Fort Bliss along with current inventories. The P2 Plan provides a mechanism for identifying processes and procedures integral for reducing the use of hazardous substances, risks of accidental hazardous substance releases and generation of hazardous waste. Implementation of the P2 is the responsibility of Fort Bliss DPW-E Compliance Branch.

Integrated Solid Waste Management Plan (ISWM) The ISWM purpose is to minimize input into the waste stream. The Fort Bliss DPW-E coordinates solid waste management and planning with DPW, Directorate of Community Activities (DCA), Defense Reutilization and Marketing Office (DRMO), Residential Communities Initiative (RCI), and other installation organizations, tenants, and activities as required.

Storm Water Management Plan (SWMP) The Fort Bliss SWMP incorporates specific Texas Pollutant Discharge Elimination System permit rules as they apply to Municipal Separate Storm Sewer System (MS4) operations within the Texas portion of Fort Bliss.

Mitigation and Monitoring Plan The Mitigation and Monitoring Plan identifies measures to be undertaken by the U.S. Army to mitigate impacts associated with land use modifications adopted pursuant to the Record of Decision (ROD) for the *Fort Bliss, Texas and New Mexico, Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement* (SEIS) (U.S. Army 2007c). The Fort Bliss Mitigation and Monitoring Plan provides program-level guidance for implementing mitigation measures based on scientific information and proven methods, principles and standards.

1.7 Shared Responsibilities

Implementation of the INRMP requires collaboration between both internal stakeholders (within the installation) and external stakeholders (agencies located off the installation). This section describes the responsibilities of each of the major stakeholders in relation to the implementation of the INRMP.

1.7.1 Internal Stakeholders

Commanding General, First Armored Division and Fort Bliss

The Commanding General has overall responsibility for the Soldiers, the military mission (also known as Forces Command or FORSCOM) and the facilities, functions and programs located on Fort Bliss (also known as Installation Command or INCOM).

Garrison Commander

The Garrison Commander (GC) at Fort Bliss is responsible for the administration of numerous ongoing functions for the entire installation, including administration, human resources, public works, natural resources management, and planning and infrastructure maintenance. The GC is also responsible for maintaining compliance with military requirements in areas including equal opportunity employment, on-range law enforcement/fire services, religious services and legal services. In addition, the GC is responsible for providing funding, staffing, and other functions necessary for the management of Fort Bliss natural resources.

Directorate of Plans, Training, Mobilizations, and Security (DPTMS)

DPTMS is responsible for the management of military training and includes the branch of Range Operations and the implementation of the Integrated Training Area Management (ITAM) program.

ITAM provides the Army with the capabilities to manage and maintain training and testing lands by integrating mission requirements with environmental and land management practices. The four major components of the ITAM program are Training Requirements Integration (TRI); Range and Training Land Assessment (RTLA); Land Rehabilitation and Maintenance (LRAM); and Sustainable Range Awareness (SRA). The components combine to provide the means to understand how the Army's training requirements impact land management practices, what the impact of training is on the land, how to mitigate and repair the impact and communicate the ITAM message to Soldiers and the public.

Range Operations is a branch of the Training Division of DPTMS and provides management, control, maintenance and operation of the Fort Bliss Training Center (FBTC). Range Operations is responsible for all Fort Bliss training areas, firing ranges, restricted airspace and base camps. All activities on the FBTC must be coordinated with Range Operations to ensure proper integration and prevent conflict among the various land uses. Range Operations manages access to the training ranges including access required to accomplish natural resource management and recreation opportunities.

Directorate of Public Works (DPW)

Fort Bliss DPW falls under the GC and is composed of six divisions: Business Operations/Integration, Engineering Services, Master Planning, Housing, Operations and Maintenance, and Environmental.

Directorate of Public Works Environmental Division (DPW-E)

The Fort Bliss DPW-E is composed of the Multimedia Compliance Branch and the Conservation Branch. DPW-E assists in managing land to support training, conserving flora and fauna and ensuring that the installation complies with federal and state environmental laws and regulations. Fort Bliss DPW-E reviews all Range and Maneuver Area Requests for military activities to ensure that the activity is consistent with existing land use plans and to avoid or mitigate potential impacts on protected or sensitive resources.

DPW-E Multimedia Compliance Branch manages, coordinates, and monitors a variety of environmental plans and programs, requests and maintains certain state and federal operating permits or exemptions for solid waste, hazardous waste, air emissions, water use, and storm water and wastewater discharges.

DPW-E Conservation Branch:

- manages all aspects of this INRMP, including the review of information, the addition of data as required, and the collection of comments from other agencies and directorates, both on and off post;
- manages and monitors natural resources including fish and wildlife, land, and pests;
- protects and improves wildlife habitats;
- establishes and recommends protective measures and practices in construction and maintenance activities to avoid air and water pollution and unnecessary destruction of habitat;
- monitors, investigates, and recommends management and procedures related to game animals, birds, and vegetation;
- surveys and recommends improvements for food, cover, and water sources for wildlife;
- develops and monitors wildlife inventories and population surveys;
- maintains liaison with state land grant colleges and other local, state, and federal wildlife management agencies;
- recommends, implements, and inspects contracted wildlife-related projects;
- prepares reports, interagency agreements, and long-range plans related to program development and future planning;
- coordinates with the Directorate of Family, Morale, Welfare, and Recreation (DFMWR), and other elements to ensure safe and efficient conduct of hunting activities;
- collects and analyzes biological data during annual deer, elk, antelope, javelina, Barbary sheep and oryx hunts;
- manages the funds and budget for fish and wildlife activities;
- performs the functions of agronomist, botanist, biologist and entomologist;
- develops, prepares, and monitors long-range plans for the use and improvement of natural resources programs;
- develops, manages, and coordinates agricultural out-lease programs and pest management plans;
- prepares and reviews plans for service projects and in-house landscape, natural resources, and pest control projects;
- operates a geographic information system for the collection and analysis of automated natural resources databases;
- coordinates and consults with the U. S. Fish and Wildlife Service (USFWS) to ensure compliance with the Endangered Species Act;
- conducts contractual agreements for endangered and sensitive species research and provides oversight and approval for all endangered and sensitive species research conducted by university personnel, students or other researchers;
- coordinates the clearance of machine-assisted excavations on unimproved grounds of the FBTC;
- provides environmental sustainment classroom training to appointed Unit Environmental Officers (EOs);
- provides field liasons to monitor and educate Soldiers training on FBTC in environmental compliance

Directorate of Family Morale, Welfare, and Recreation (FMWR)

FMWR promotes family organizations and development of clubs, as well as the development of recreational facilities such as picnic areas, bowling alleys, gymnasiums and swimming pools. This directorate is also responsible for the management of Fort Bliss' George V. Underwood golf complex and the Fort Bliss Rod and Gun Club. FMWR also promotes healthy outdoor activities such as hiking, biking, climbing and hunting in areas open to these pursuits.

Unit Environmental Officer (EO)

The EO serves as the point-of-contact for environmental compliance and has day-to-day oversight responsibilities at the unit level. The Unit EO is appointed by the Unit Commander and is trained and certified by DPW-E per Fort Bliss policy J-1, dated January 1, 1999 and by other Commanding General memoranda.

Biggs Army Air Field (AAF)

Biggs AAF provides full airfield services for all U.S. military branches, Department of Justice and other government flight detachments. As an integral part of the ability of Fort Bliss to support national power projection, Biggs AAF is an aerial departure point for all deployable units at Fort Bliss as well as for approximately 115 U.S. Army Reserve and National Guard units.

William Beaumont Army Medical Center

The William Beaumont Army Medical Center (WBAMC), a part of the U.S. Army Medical Command, provides full-service (inpatient and outpatient) medical treatment for all military branches in Arizona, New Mexico and west Texas. Regional medical air evacuation services also utilize Biggs AAF.

Directorate of Emergency Services (DES)

DES is composed of the Fort Bliss Fire and Emergency Services (FES) and Provost Marshall's Office (PMO).

Other Tenant Organizations

All tenants proposing to conduct testing and training on Fort Bliss are to exert all reasonable efforts to ensure that Fort Bliss DPW-E briefs their personnel on environmental and cultural resource requirements before any activity begins. All tenants must ensure that mission activities cause minimal damage to natural and cultural resources. Commanders of units proposing to conduct Field Training Exercises (FTX) are required to consult with Fort Bliss DPW-E as early as possible to determine if their proposed training may require either an environmental assessment (EA) or environmental impact statement (EIS), especially if an area outside pre-approved areas is required for training (U.S. Army 2005). Such early consultation will help preclude delays in the proposed training resulting from regulatory requirements.

Other Installation Organizations

Implementation of this INRMP requires the assistance of other directorates and organizations on the installation. Such support organizations include Directorate of Resource Management (DRM) for budget, personnel and equipment authorizations, Mission and Installation Contracting Command (MICC), Public Affairs Office (PAO) for public awareness programs and Office of the Staff Judge Advocate for legal assistance.

1.7.2 External Stakeholders

U.S. Fish and Wildlife Service (USFWS)

The USFWS is a signatory for implementation of this INRMP as required by the Sikes Act amendments of 1997 (16 United States Code [U.S.C.] 2901 et seq.), otherwise known as the

Sikes Act Improvement Act *(*SAIA). A tripartite Memorandum of Understanding (MOU) was signed in 2013 for a Cooperative Integrated Natural Resource Management Program on Military Installations. This MOU renews the commitment of DoD, U.S. Fish and Wildlife Service, and the states to work together to manage the natural resources entrusted to DoD across the country (DoD 2013a). Among other provisions, the MOU creates a streamlined review process for updating DoD's integrated natural resource management plans (INRMPs) with minor changes. This will facilitate coordination among the three parties to the MOU and make the critical habitat exemption more readily available to military installations.

The USFWS is also the agency responsible for regulating compliance with the *Endangered Species Act* (ESA), *Migratory Bird Treaty Act (MBTA)* and *Bald Eagle Protection Act*.

New Mexico Department of Game and Fish (NMDGF)

NMDGF is a signatory cooperator for implementation of this plan in accordance with the SAIA. NMDGF is the primary state agency responsible for fish and wildlife management and the enforcement of state hunting regulations on Fort Bliss lands located in New Mexico. NMDGF also publishes state listings for threatened and endangered animal and plant species in New Mexico.

Texas Parks and Wildlife Department (TPWD)

TPWD is a signatory cooperator for implementation of this plan in accordance with the SAIA. This agency is the primary state agency regarding fish and wildlife management, including enforcement of state hunting regulations on Fort Bliss lands in Texas. TPWD establishes state listings for endangered and threatened plants and animals in Texas.

Native American Tribes

The United States has a unique legal relationship with Indian tribal governments as set forth in the Constitution of the United States, treaties, statutes, executive orders, and court decisions. Since the formation of the Union, the United States has recognized Indian tribes as domestic dependent nations under its protection. AR 200-1, DoDI 4710.02*: DoD Interactions with Federally-recognized Tribes,* and Executive Order 13175, *American Indian and Alaska Native Policy* require regular and meaningful consultation and collaboration with Indian tribal governments.

Fort Bliss follows a process established by Department of Defense policy, pursuant to Section 106 of the National Historic Preservation Act (NHPA) as amended that permits elected officials and other representatives of Indian tribal governments to provide meaningful and timely input on actions or policies that might be of tribal interest. These interests may be those that affect Indian sacred sites or traditional cultural properties (TCPs). In addition, consultation is conducted as necessary under the National Environmental Policy Act (NEPA), the Native American Graves Protection and Repatriation Act (NAGPRA), and other laws and situations implicating concerns of the Native American community. Fort Bliss has also collaborated with local Tribes by conducting surveys to locate plant species that are of religious and cultural significance to the Tribes.

Local Tribes that are consulted in regards to Native American cultural issues and for input into the development of this INRMP for Fort Bliss include:

- ***Kiowa Tribe of Oklahoma,*** Carnegie, OK
- ***Comanche Nation***, Lawton, OK,
- ***Mescalero Apache Tribe***, Mescalero, NM
- ***Ysleta del Sur Pueblo (Tigua)*** El Paso, TX

1.7.3 External Cooperators

New Mexico Energy, Minerals and Natural Resources Department (NMEMNRD)
The Forestry and Resources Conservation Division of the NMEMNRD provides input regarding state listings of sensitive flora for the New Mexico portion of Fort Bliss.

Bureau of Land Management (BLM)
This agency has natural resources management responsibilities on withdrawn public lands on McGregor Range under guidance of the Military Lands Withdrawal Act (MLWA) of 1999 (Public Law [PL] 106-65, 113 Stat. 512, 885 [Oct. 5, 1999]) and a Memorandum of Agreement (MOA) between the U.S Department of the Interior (DOI) and the DA (DOI 1990b). The BLM has management goals and is responsible for the following resources found on McGregor Range: minerals, livestock grazing, wildlife habitat, recreation (limited), visual resources, wilderness and wildland fire management. Fort Bliss' coordination with the BLM is ongoing and necessary for implementation of this INRMP.

U.S. Forest Service (USFS)
Fort Bliss utilizes approximately 19,000 acres of the Lincoln National Forest for training purposes and as a secondary safety zone. This land is managed under guidance from a Memorandum of Understanding (MOU) between the USFS and the DA (U.S. Army 2001). The MOU establishes the USFS as the administering agency for all non-defense land uses and further, that these lands will be open to all forest users when not in use by the military. However, the use of these lands will be coordinated with Fort Bliss.

1.8 Goals and Objectives

1.8.1 U.S Army Goals

Successful implementation of this INRMP depends upon the ability of Fort Bliss to manage natural resources while maintaining a sustainable landscape for military activities. Through conservation and restoration of biological diversity and ecosystem health, the constraints placed on the mission become minimal. Mission flexibility is enhanced by improving range sustainability and reducing the likelihood of a species becoming federally listed (Department of Army [DA] 2007). U.S. Army Regulation (AR) 200-1, *Environmental Protection and Enhancement* states, "the Army is committed to environmental stewardship in all actions as an integral part of its mission and to ensure sustainability." This regulation supports the *U.S. Army Strategy for the Environment: Sustain the Mission-Secure the Future* (U.S. Army 2004c) which recognizes the obligation of the U.S. Army to ensure a healthy environment. This strategy establishes a foundation for ecosystem sustainability and acknowledges the importance of implementing effective policies and practices to safeguard the environment. Under this strategy, the Army's environmental mission is to sustain the environment in order to enable the Army mission and secure the future. In doing so, all Army organizations and activities will:

- Foster an ethic within the U.S. Army that takes us beyond environmental compliance to sustainability.
- Strengthen U.S. Army operational capability by reducing our environmental footprint through more sustainable practices.
- Meet current and future training, testing, and other mission requirements by sustaining land, air, and water resources.
- Minimize impacts and total ownership costs of U.S. Army systems, materiel, facilities, and operations by integrating the principles and practices of sustainability.

- Enhance the well-being of our Soldiers, civilians, families, neighbors, and communities through leadership in sustainability.
- Use innovative technology and the principles of sustainability to meet user needs and anticipate future U.S. Army challenges (US Army 2004a).

1.8.2 Fort Bliss Goals

Fort Bliss has adopted installation-specific natural resource management goals and objectives consistent with Department of Defense (DoD), SAIA and U.S. Army policy and guidance. Objectives related to these goals and individual management programs are included in Chapter 4, Sections 2 through19.

Threatened and Endangered Species (TES)

TE Goal 3	Fort Bliss TES benefit from active management of habitat.
TE Goal 2	Fort Bliss remains in compliance with the Endangered Species Act and with appropriate state regulations.
TE Goal 1	Fort Bliss uses an ecosystem-based approach that manages TES and their associated ecosystems while protecting the operational functionality of the military mission.

Wetlands and Deepwater Habitats

WD Goal 1	Fort Bliss remains in compliance with USACE and states of New Mexico and Texas wetlands regulations.
WD Goal 2	Fort Bliss minimizes the operational impact of missions on wetlands and deepwater habitats.
WD Goal 3	Functioning ecosystems enhance the wetlands of Fort Bliss.
WD Goal 4	Fort Bliss has no net loss of wetland and floodplain acreage, functions, and values.

Fish and Wildlife Management

FW Goal 1.	Fort Bliss wildlife is managed with an ecosystem-based approach, rather than single-species management.
FW Goal 2.	Fort Bliss has negligible wildlife-related health and safety risks to humans.
FW Goal 3.	Fort Bliss maintains the species diversity and habitat requirements for all native wildlife.
FW Goal 4.	Fort Bliss maintains and promotes partnerships with stakeholders, agencies and groups involved in wildlife management.

Forestry Management

FM Goal 1	Fort Bliss has a diverse system of forest stands that benefit ecosystems and wildlife habitat.
FM Goal 2	Fort Bliss forest stands are resilient to destructive wildfires and improve water-holding capacity.

Vegetative Management

VM Goal 1	Fort Bliss maintains the diversity of native vegetative communities.
VM Goal 2	Fort Bliss minimizes adverse effects of training activities on vegetation.
VM Goal 3	Fort Bliss maintains the integrity and abundance of sensitive plant species.

Migratory Bird Management

MB Goal 1	Fort Bliss employs an adaptive management approach to managing migratory birds within the framework of the Migratory Bird Treaty Act (MBTA), by using a process that includes inventory, monitoring, management, assessment and evaluation.
MB Goal 2	Fort Bliss promotes partnerships with other agencies and groups involved in migratory bird conservation management.

Invasive Species Management

IS Goal 1	Fort Bliss makes maximum use of native plant species and avoids introduction of invasive or exotic species in revegetation and landscaping activities.
IS Goal 2	Fort Bliss complies with environmental legislation, regulations, and guidelines that address the control of non-native and nuisance plant species.
IS Goal 3	Fort Bliss actively controls invasive species.

Pest Management

PM Goal 1	Fort Bliss minimizes pest-related habitat damage and health risks to natural resources and people
PM Goal 2	Fort Bliss complies with environmental legislation, regulations, and guidelines that address pest management.

Land Management

LM Goal 1	Fort Bliss sustains and enhances its training lands by integrating sustainable land and resource management techniques amongst all users of the FBTC.

Soil Resources Management

SR Goal 1	Fort Bliss keeps soil erosion from water and within tolerance limits as defined in soil surveys prepared by the U.S. Department of Agriculture (USDA), NRCS.
SR Goal 2	Fort Bliss minimizes nonpoint source pollution of surface and groundwater.
SR Goal 3	Fort Bliss minimizes impacts of land uses to reduce soil erosion and sedimentation when and where possible.

Agricultural Outleasing

AG Goal 1	Fort Bliss manages grasslands for the sustainability of ecosystem components and for the economic benefits derived from grazing leases.

Geographic Information Systems

GIS Goal 1	Fort Bliss augments management of natural resources on the FBTC through the management of spatial information within a GIS database.

Outdoor Recreation

OR Goal 1	Fort Bliss provides sustainable natural resources-related outdoor recreation opportunities.

OR Goal 2 Fort Bliss ensures that outdoor recreation activities are not in conflict with mission priorities.

Bird/Wildlife Aircraft Strike Hazard (BASH/WASH)

BH Goal 1 Fort Bliss minimizes BASH/WASH-related health risks, safety risks, and environmental damage.

BH Goal 2 Fort Bliss complies with applicable laws and regulations.

Wildland Fire Management

WM Goal1 Fort Bliss maintains existing vegetative communities and their biodiversity by managing wildfires to burn as needed to protect or restore at-risk environments.

WM Goal 2 Fort Bliss implements a prescribed fire program that restores native habitats and reduces the effects of destructive wildfires on sensitive and endangered species.

Training

TR Goal 1 Fort Bliss provides continual training for DPW-E staff regarding sustainable ecosystem-based land management principles and practices for military lands.

Outreach and Education

OE Goal1 Fort Bliss ensures that environmental policy and stewardship principles are implemented, maintained and communicated to all military, civilian and contracted employees.

OE Goal 2 Fort Bliss Integrates its natural resources program with local, state, and regional environmental programs and initiatives to the maximum extent practical.

1.9 Natural Resources Management Strategy

The Fort Bliss INRMP utilizes an approach designed to sustain and be consistent with military missions on Fort Bliss, while simultaneously protecting and enhancing natural resources for multiple use, sustainable yield and biological integrity (USAEC 1997). This INRMP promotes the integration of various principles of ecosystem-based management, biodiversity management and adaptive management. The goals described in Section 1.8 were established based on this management philosophy.

1.9.1 Ecosystem-Based Management

An August 1994 DoD memorandum, *Implementation of Ecosystem Management in the DoD* provided guidance for the implementation of an ecosystem-based approach for management of DoD lands (DoD 1994a). In contrast to traditional resource management, ecosystem-based management focuses on maintaining habitat or ecosystem quality, including ecological processes important for maintaining the characteristic biodiversity of an area, rather than focusing on individual species or resources. Under this approach, management would occur at regional scales large enough to accommodate natural disturbances (e.g., fire, wind) and planning would consider the context of centuries rather than years or decades (Grumbine 1994). Over the long term, this approach should maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies and communities (USAEC 1997).

1.9.2 Biodiversity Management

A goal of the Army is to conserve biological diversity on Army lands within the context of its mission (DA 1995). The conservation of natural resources, maintaining biodiversity and the military and nonmilitary use of resources are based on an understanding of the ecological properties of the system (Meffe and Carrol 1994). Therefore, the Army recognizes that habitat management, the protection of listed, proposed, and candidate species and a focus on distributions of native species is the key to effective conservation of biological diversity (DA 1995). Conserving and restoring biological diversity can potentially minimize the constraints placed on mission requirements and increase mission flexibility by improving range sustainability and reducing the likelihood of a species becoming listed as threatened or endangered.

1.9.3 Adaptive Management

Adaptive management involves integrating project design, management and monitoring to provide a framework for testing assumptions, adaptation and learning (Margoluis and Salafsky 1998). Simply put, adaptive management is learning by doing-albeit in a systematic and purposeful way. Properly employed, this approach produces reliable knowledge from experience instead of the slow, random knowledge gleaned from unexamined error. To a degree, adaptive management is a normal part of any monitoring program, as procedures adjust as needed to respond to changing conditions. Likewise, both the legal and conservation status of species change (listing and delisting of species as threatened or endangered), demands on harvesting resources change, our understanding of the relationship among resources improves, natural stochastic events occur (fires, floods, drought, disease infestations), and resources respond to mitigation measures and conservation actions in ways other than intended or expected.

The management measures and strategies that are implemented at Fort Bliss have been developed with consideration for the interrelationships between the components of the ecosystem, the requirements of the military mission, and other land use activities. The focus is on maintaining the structure, diversity, and integrity of the biological communities, while recognizing that the Soldiers and military mission are a vital component of the ecosystem. An adaptive management strategy is integral to FBTC management in order to monitor the temporal and spatial dynamics of ecosystems and to adjust the management measures and strategies based on improved knowledge and data. The monitoring programs will generate the data needed to determine whether the management measures and strategies are effective in achieving their intended goals and objectives. This management approach will preserve and enhance the natural resources while providing the optimum environmental conditions for sustaining Fort Bliss's military training mission.

2 CURRENT CONDITIONS AND USE

2.1 Installation Overview

2.1.1 Location and Area

Fort Bliss is a multi-mission U.S. Army installation located on approximately 1.12 million acres in El Paso County, Texas and in Doña Ana and Otero counties, New Mexico. The Main Cantonment Area of Fort Bliss is adjacent to El Paso, Texas, near the international boundary with Chihuahua, Mexico. The remainder of the installation extends to the north and is bounded on three sides by the Organ, Franklin, Hueco, and Sacramento Mountain ranges (Figure 1.3-1). Fort Bliss consists of the Main Cantonment Area, Castner Range and the FBTC, which is composed of three large geographic segments: (1) South Training Areas (aka Division Training Areas), (2) Doña Ana Range-North Training Areas and (3) McGregor Range (Figure 1.3-2).

2.1.2 Regional Land Use

The regional land ownership surrounding Fort Bliss includes private, state and federal lands. Most of the surrounding region in Texas is private land; with some state-owned land in the Franklin Mountains State Park. Other DoD land includes White Sands Missile Range (WSMR) and Holloman Air Force Base (AFB) north of Fort Bliss in New Mexico. McGregor Range is mostly surrounded by public lands administered by the BLM, USFS, and State of New Mexico (Figure 2.1-1).

White Sands Missile Range

WSMR consists of approximately 2.2 million acres and is an installation dedicated to testing, evaluation, development and research of military weapon systems and commercial products (WSMR 2006). WSMR adjoins Fort Bliss and comprises the majority of the northern boundary of Doña Ana Range-North Training areas. Units stationed at WSMR currently use Fort Bliss training areas, firing ranges and airspace for tactical training and military tests (U.S. Army 1998i, Federal Register 2008). In combination, WSMR and Fort Bliss create a vast arena of more than 3 million contiguous acres of dedicated DoD land and exclusive-use airspace.

Holloman AFB

Holloman AFB near Alamogordo, New Mexico does not border Fort Bliss, but utilizes Fort Bliss airspace and the Centennial Bombing Range on Otero Mesa within McGregor Range. The Centennial Bombing Range occupies about 5,200 acres and is used for air-to-ground target training. Additionally, the USAF uses a small Class-C bombing range north of NM Highway 506 on McGregor Range.

Bureau of Land Management

Federal lands managed by the BLM dominate the lands surrounding Fort Bliss (Figure 2.1-1). The BLM manages lands for multiple uses, in accordance with the Federal Land Policy and Management Act (FLPMA); thus, grazing, recreation, mining, oil and gas development can occur as appropriate. Recreation and grazing are the major uses in the areas surrounding Fort Bliss. The BLM also disposes of land to facilitate needs of local communities.

The Organ Mountains Recreation Area, managed by the BLM under the *Mimbres Resource Area Resource Management Plan* (USDI 1993), comprises the western and part of the northern boundaries of Doña Ana Range-North Training Areas. Inside this recreation area are three

Wilderness Study Areas (WSAs): the Organ Needles, Peña Blanca, and the Organ Mountains WSA. Specific management for the Organ Mountains Recreation Area is found in the *Organ Mountains Coordinated Resource Management Plan* (DOI 1989),

BLM also established the Red Sands Recreation Area for off-highway vehicles. This recreation area is west of US 54 near McGregor Range. In addition to recreation, BLM lands between US 54 and WSMR are used for grazing and recreation such as hiking and hunting. The BLM lands east of Fort Bliss are primarily used for grazing and recreation. Much of this BLM land east of Fort Bliss is Otero Mesa, recognized as regionally important desert grasslands (BLM 2005).

U.S. Forest Service

North of McGregor Range is the Lincoln National Forest, managed by the U.S. Forest Service (USFS) and is just over 1.1 million acres. The USFS manages lands for multiple uses such as quality water, timber, livestock forage, wildlife, wood and recreation. Approximately 19,000 acres of the Lincoln National Forest lie within the Grapevine Canyon portion of McGregor Range (Figure 2.1-1). These lands are under a cooperative agreement between the USFS and the Army that permits military use with concurrence of the USFS. These lands are for ground unit training and are part of the secondary safety zone of the primary firing fans on McGregor Range (U.S. Army 1996b).

State Lands in New Mexico and Texas

The New Mexico State land adjacent to Fort Bliss, including many areas on Otero Mesa, are primarily used for grazing leases, although some leases are for mining or materials. The New Mexico State Land Office (NMSLO) manages State Trust lands. In Texas, the Texas Parks and Wildlife manages state parks and state historic sites, while the Texas General Land Office (TGLO) manages the remaining state lands in Texas. The Franklin Mountains State Park is adjacent to Castner Range and the Hueco Tanks State Historic Park is just east of El Paso and the South Training Areas.

Municipalities

The City of El Paso and the El Paso International Airport (EPIA) surround the Main Cantonment Area on three sides. Currently, no conflicts exist between military activities at Fort Bliss and the planning and growth of the city or the airport. However, the eastern and northeastern areas of El Paso are prime areas for new developments. In particular, there are initiatives under way that could set the stage for rapid development in the northeastern area of El Paso between Fort Bliss and the Franklin Mountains and north to the Texas-New Mexico state line. Due to increased development on the eastside of the city of El Paso along Montana Ave/Hwy 62, land exchange agreements are underway between TGLO and Fort Bliss to close off the ‘keyhole’ area of land located in the southeastern boundary adjacent to Training Area 2E (Figure 2.1-3). There has also been some residential infill and some industrial-type development along the railroad and the US Highway 54 corridor.

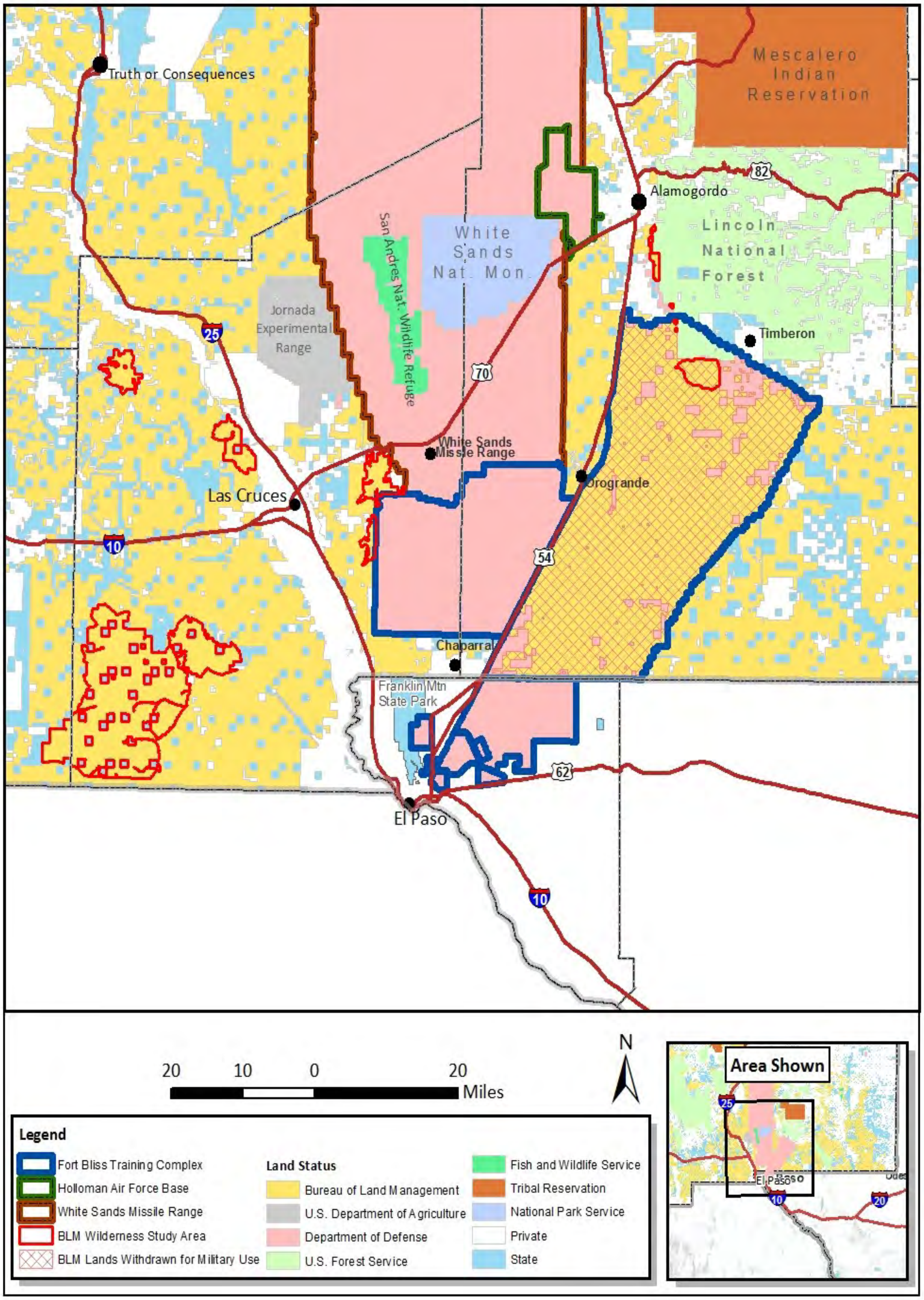
Doña Ana County, New Mexico has been experiencing rapid growth, particularly around Las Cruces, Sunland Park, Anthony and Santa Teresa. The county has prepared an Extraterritorial Zone (ETZ) Comprehensive Plan (2000 to 2020) that provides a land use framework for almost 342 square miles most of which is owned by the State of New Mexico and the BLM.

The community of Chaparral is unincorporated and spreads through portions of Doña Ana and Otero Counties south of Doña Ana Range/North Trainings Areas. Chaparral also has potential for noticeable growth. Other communities near Fort Bliss include Timberon, New Mexico, in the

Sacramento Mountains, Orogrande on US Highway 54, and Ciudad Juárez, Chihuahua, Mexico, adjacent to El Paso (Figure 2.1-1).

Private Lands

Several private ranches and residences are adjacent to Fort Bliss. Private land usage surrounding Fort Bliss is ranching, land investments and residential subdivisions.



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1233 **Figure 2.1-1 Regional Land Use**

2.1.3 Installation History

On November 7, 1848, the War Department issued General Order Number 58 that established a post at El Paso in an attempt to protect area residents. In 1849, six companies of the 3rd U.S. Infantry arrived at the post to become the first Soldiers stationed in the Fort Bliss area and this post remained until 1851 (Jamieson 1993). The post was abandoned until 1854 when Indian raids prompted reestablishment of the El Paso post at Magoffinsville. In the same year, the post was renamed Fort Bliss in honor of William Wallace Smith Bliss, the adjutant general of the Western Division. Fort Bliss prospered for the next few years until the start of the Civil War. Major General David E. Twiggs, commander of the Department of Texas, surrendered the fort to the Confederacy in March 1861 until August 1862 (Jamieson 1993).

From 1862 to 1893, Fort Bliss moved several times for various reasons. In 1893 the City of El Paso donated 1,000 acres for construction of a new site for Fort Bliss (Faunce 1997) and a tract of land on La Noria Mesa was purchased; on this site Fort Bliss was established and has remained to the present day (Jamieson 1993). Following several years as a cavalry post, in 1911 the U.S. Army acquired area including the southern Organ Mountains in the Boulder Canyon area and the land around Doña Ana Range-North Training Areas, primarily for artillery practice (Faunce 1997).

During World War I, Fort Bliss became a major training center for the National Guard and thousands of guardsmen were at Fort Bliss to help protect the border. After World War I, Fort Bliss was still primarily a cavalry post and acted as the center for border control in the Southwest. Fort Bliss expanded in 1925 and 1926 with the combined purchases of 1,058 acres for Biggs AAF and 3,473 acres for Castner Range. 2,700 acres of municipal land was acquired in 1931 to expand the cantonment area (Faunce 1997). The remainder of the cantonment area and Castner Range was acquired from ranchers and the City of El Paso. Additional ranchland was acquired in 1940 for antiaircraft training (primarily Doña Ana Range-North Training Areas). A portion of this leased land base was deemed surplus and is now under private ownership or managed by the BLM (Faunce 1997). Some of this land is now included in WSMR (Faunce 1997).

During World War II, the installation saw rapid growth and Fort Bliss acquired much needed land by lease, purchase or in some cases by condemnation. The three main areas acquired were portions of Doña Ana Range-North Training Areas, McGregor Range and the South Training Areas. The U.S. Army's Antiaircraft Training Center started in 1940 at Fort Bliss to train Soldiers in the operation of antiaircraft weapons for World War II (Faunce 1997).

In April 1944, Fort Bliss became the U.S. Army's Antiaircraft Replacement Training Center. In November 1945, the Antiaircraft Replacement Training Center was replaced with the Antiaircraft and Guide Missile Battalion. In 1948, the need for another antiaircraft artillery firing range was clear and land subsequently leased in a transaction that required DOI approval since the majority of the land was public domain. During the following 8 years, McGregor Range expanded as land was purchased from various ranchers through negotiations or condemnation proceedings (Faunce 1997). In 1986 PL 99-606, the Military Lands Withdrawal Act of 1986 (MLWA) withdrew 608,385 acres of public land for military use on McGregor Range. Renewal occurred under the MLWA of 1999. An additional 69,723 acres of U.S. Army fee-owned land are within McGregor Range (USACE 1999).

From 1957 to 2009, the installation was home to the U.S. Army Air Defense Artillery Center (USAADACENFB). Through June 2009, Fort Bliss was one of 16 installations under the management of the U.S. Army Training and Doctrine Command (TRADOC). However, in accordance with the recommendations of the Base Realignment and Closure (BRAC) commission, the Air Defense Artillery (ADA) School, 6th ADA Brigade, and 31st ADA Brigade relocated to Fort Sill. Effective July 2009, Fort Bliss transitioned its Major Army Command (MACOM) from U.S. Army Training and Doctrine Command (TRADOC) to U.S. Army Forces Command (FORSCOM) (U.S. Army 2010m). Effective May 24, 2011 Fort Bliss is the new home to the 1st Armored Division “Old Ironsides” which includes four Heavy Brigade Combat Teams (HBCT), two Infantry Brigade Combat Teams (IBCT) and one Combat Aviation Brigade (CAB) (U.S. Army 2010m).

2.1.4 Military Mission

Fort Bliss is the largest U.S. Army training installation and the only troop training installation in the continental United States capable of supporting long-range overland missile firings. Fort Bliss composes 4.4 percent of all DoD lands and 9 percent of U.S. Army lands (U.S. Army 2010m).

The Senior Commander Mission for Fort Bliss is as follows:

> *Team Bliss trains, sustains, mobilizes, and deploys members of the joint team to conduct global, full spectrum operations in support of the national military strategy, while providing for the well-being of the regional military community (US Army 2010a).*

Fort Bliss is one of DOD’s power projection platforms. Fort Bliss maintains state-of-the-art training areas, ranges and facilities enabling the readiness of our forces to win our nation’s wars; infused with a culture of innovation; and, led by adaptive, disciplined, and warrior focused professionals concentrated on individual and unit readiness, leader development, deployment, security, and the overall well-being of Team Bliss (US Army 2010a).

In order to accomplish these missions Fort Bliss requires modern, state-of-the-art training ranges and sufficient training lands that support all units training on the installation. Fort Bliss supports mechanized maneuver training, numerous live-fire and qualification ranges, unit tactical exercises (active and reserve components) and air defense and air-to-ground training required to be combat ready. Missions carried out on Fort Bliss training areas include joint training exercises (JTX), unified command training, unit training, combat support, combat service support, weapons testing, joint training with allied nations and training activities conducted by other services (U.S. Army 2007d). The Air Defense mission at Fort Bliss includes Patriot, Stinger and other missile firings, Theater High Altitude Air Defense (THAAD) radar battery testing and training and Joint Land Attack Cruise Missile Defense Elevated Sensor System (JLENS) training (U.S. Army, 2010b).

2.1.4.1 Mission Development

Three major DoD initiatives have shaped the current composition of Fort Bliss: U.S. Army Transformation, BRAC and the Integrated Global Basing and Posturing Strategy (IGBPS), also known as Global Defense Posture Realignment (GDPR).

In April 2002, the Deputy Chief of Staff of the U.S. Army for Operations and Plans announced the decision to proceed with the proposed 30-year, phased implementation of U.S. Army Transformation. Fort Bliss is one of 25 U.S. Army “force projection” installations described and analyzed in the U.S. Army Transformation Programmatic Environmental Impact Statement (PEIS) (USACE 2002). The U.S. Army Campaign Plan (ACP) to support U.S. Army Transformation, approved in April 2004, restructured the U.S. Army from a division-oriented force to a "brigade-based" or modular force. This enables the Army to efficiently respond to Regional Combatant Commanders, support joint operations and facilitate force packaging (grouping units and equipment to accomplish a specific mission or achieve a desired capability) and rapid deployment and fight as self-contained units. IGBPS is the U.S. Army initiative that relocated various overseas-based units to the continental United States (CONUS). Both BRAC and IGBPS involved relocating troops, as some installations downsized or closed and other installations became home to new and relocating units (U.S. Army 2010m).

In April 2007, the U.S. Army signed the Record Of Decision (ROD) for the *Fort Bliss, Texas and New Mexico Mission and Master Plan Supplemental Programmatic Environmental Impact Statement* (2007 SEIS). The 2007 SEIS sought to more fully realize the training opportunities at Fort Bliss through land use changes and range construction to support the stationing of six Heavy Brigade Combat Teams (HBCTs) at Fort Bliss based on the 2005 BRAC Commission and the GDPR decisions (U.S. Army 2010m).

In December 2007, the U.S. Army signed the ROD for the Final Programmatic Environmental Impact Statement for U.S. Army Growth and Force Structure Realignment [Grow the U.S. Army (GTA) PEIS], directing the stationing of four HBCTs and two Infantry Brigade Combat Teams (IBCTs) at Fort Bliss (USACE 2007). This stationing decision, in combination with current U.S. Army Transformation, BRAC, National Defense Strategy, National Security Strategy, Quadrennial Defense Review, U.S. Army Campaign Plan, GDPR decisions and other national defense policy documents expanded the known missions at Fort Bliss to include near-term training requirements for terrain availability and training infrastructure improvements (U.S. Army 2010m).

In June 2010, the U.S. Army signed the ROD for the Fort Bliss Army Growth and Force Structure Realignment Environmental Impact Statement (GFS EIS) to modify the land use designations and the training infrastructure improvements adopted by the ROD in the 2007 SEIS to support the evolving operations, infrastructure, training and testing requirements of the U.S. Army. The 2010 ROD supports the installation's continued mobilization mission, the continued pre-deployment training mission and the anticipated future stationing and military training decisions at Fort Bliss. The ROD allows for future stationing decisions, land use changes, training, and infrastructure improvements that take advantage of Fort Bliss' varied terrain; full suite of training ranges; collocation of heavy, light and aviation combat units; and collation of various support units (U.S. Army 2010j).

The BRAC, IGPBS and GTA re-stationing actions will occur through fiscal year (FY) 2015 (U.S.Army 2010a).

2.1.4.2 Current Military Organization

In addition to the Garrison Command, major organizations currently located on the installation include the following:

- The 1st Armored Division "Old Ironsides", including the 1/1 (SBCT), 3/1 (EIBCT), 4/1 (HBCT), 1st AD CAB, 212th Fires Brigade, and the 15th Sustainment Brigade.
- Brigade Modernization Command, including the 2/1 AD BCT
- 32nd Army Air and Missile Defense Command (AADCOM)

- 93rd Military Police Battalion
- El Paso Military Entrance Processing Station
- 7th Air Support Operations Squadron
- 31st Combat Support Hospital
- German Air Defense Center and Training Command
- 402nd Field Artillery Brigade and 5th Armored Brigade, Division West, First Army
- 86th Expetionary Signal Battalion
- Joint Task Force North (JTF-N)
- U.S. Army Sergeants Major Academy (USASMA)
- 11th Air Defense Artillery Brigade (11ADA)
- 204th Security Forces Squadron, Texas Air National Guard
- 204th Military Intelligence Battalion

2.1.5 Military Land Use and Operations

2.1.5.1 Cantonment

The cantonment area, totaling 15,194 acres and slightly more than 1 percent of the total Fort Bliss land area is located in Texas adjacent to the City of El Paso. The cantonment area contains the heaviest concentration of facilities and mission support activities on Fort Bliss, and is divided into two distinct areas, East Bliss and West Bliss. West Bliss includes the Main Post, Logan Heights and William Beaumont Army Medical Center (WBAMC). East Bliss contains Biggs AAF/East Biggs Area and the headquarters for the 1st Armored Division (Johnson, 2012). Figure 2.1-2 presents the existing Fort Bliss Cantonment Area (U.S. Army 2010i).

In accordance with the 2007 SEIS, the East Bliss area has expanded to encompass all of the installation south and west of Loop 375 and a small portion of Training Area 1B east of Loop 375. Major development is occurring on approximately 4,000 acres within the East Bliss area to provide needed mission and support facilities for new troops, their dependents and additional civilian personnel. In addition, about 1,500 acres east of Loop 375 are now housing and support facilities (Johnson, 2012).

As directed by the Fort Bliss Real Property Master Plan Long Range Component, Fort Bliss has moved the Cantonment's land use categories from 12 specific land use designations to broader, more flexible categories. The seven new land use designations reflect an Army-wide planning direction toward fewer, broader designations for flexibility for land use decisions. The seven land use designations are as follows:

- Garrison Operations
- Medical
- Open Space/Recreation
- Residential/Commercial
- School/Research
- Tactical
- Transportation/Supply/Storage/Maintenance

Main Post The Main Post is composed of a variety of support services including administration, maintenance, service, storage and supply buildings, housing, and medical and community facilities. The Main Post also contains the oldest buildings on post, many of which are eligible for inclusion in a historic district and the installation's parade grounds.

Biggs Army Airfield/East Bliss Area Biggs AAF is the largest active army airfield in the world and the center of air operations for Fort Bliss. It provides full airfield services for all U.S. military services, Department of Justice, and other government flight detachments. Biggs AAF is an aerial departure point for all deployable units at Fort Bliss and 115 U.S. Army Reserve and National Guard units. This is an integral part of the ability of Fort Bliss to support Army mobilizations worldwide.

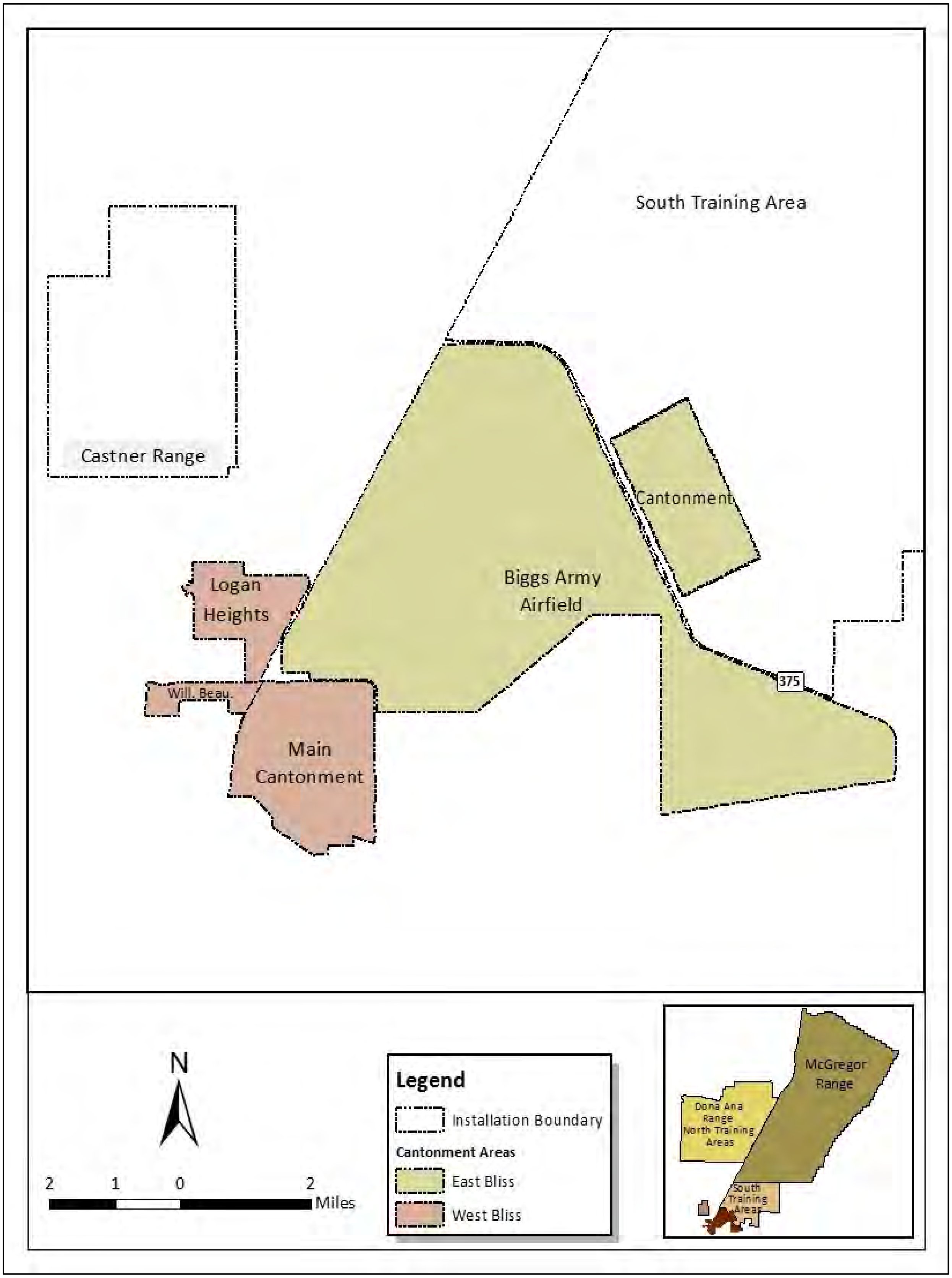
Because of its size, geographic location, and proximity to major training areas and refueling capabilities, Biggs AAF handles a large portion of military air traffic in the southwestern United States. It has a 13,572-ft-long, Class B, concrete runway that is capable of accommodating the largest civilian and military aircraft, including the C-5A and 747 aircraft. Ancillary services include various airfield operations, maintenance, fueling and direct support facilities.

Biggs AAF is home to the U.S. Army Sergeants Major Academy, the Air Deployment Center, a minimum-security prison associated with La Tuna Federal Penitentiary, Drug Enforcement Agency, JTF-N and several smaller agencies and tenants. Additionally, the East Bliss Area contains the tactical campuses of units relocated to Fort Bliss under the GTA PEIS stationing decision (U.S. Army 2010i).

Logan Heights Logan Heights is located just north of the Main Post and is for troop and family housing, community facilities and recreation.

William Beaumont Army Medical Center (WBAMC). WBAMC is a DoD medical facility providing comprehensive care to all active duty military, their family members and retirees. Other facilities on the WBAMC include family housing and community services.

Castner Range Castner Range is located in El Paso County north of Logan Heights and adjoins the Franklin Mountains. Castner Range is a former training and weapons firing area. Previous military training use resulted in the accumulation of unexploded ordnance (UXO) throughout the range and therefore is closed to public access. Facilities at Castner Range include a Border Patrol facility located on a small parcel off Hondo Pass Drive. The U.S. Army has no current plans for future use or disposition of this 7,054-acre parcel.



1439
1440 **Figure 2.1-2 Fort Bliss Cantonment and Castner Range**

2.1.5.2 Fort Bliss Training Center (FBTC)

FBTC contains 1,094,291 acres of land, composed of three segments: the South Training Areas, now often refered to as the Division Training Area, in El Paso County, Texas; the Doña Ana Range-North Training Areas in Doña Ana and Otero Counties, New Mexico; and the McGregor Range in Otero County, New Mexico. FBTC is divided into numbered Training Areas (TAs) to help manage and schedule the different training missions (Figure 2.1-3). The smaller, more manageable TA units provide greater flexibility in management of land uses and help ensure safety. TAs are used for the firing of guided missiles, automatic weapons, tank weapons, conventional artillery, aerial gunnery and small arms; launch and control of aerial targets; and explosive ordnance activities at the Orogrande, McGregor/Meyer and Doña Ana Range Complexes. The collection of military land uses as shown in Table 2.1-1 that occur on any particular FBTC subdivision and/or TA results in a Land Use Category. The FBTC Land Use Categories and the military uses that occur within each category are in Table 2.1-3. This color-coded table shows 10 mapped land use categories and the permitted activities compatible with each category. Depending upon the activity, military activities may take place concurrently. The color-coded land use categories listed in Table 2.1-3 define the land use designations in the FBTC shown in Figure 2.1-4.

Two major joint use (Army & Air Force) assets are located at Fort Bliss, the Wilde Benton Airfield and the Centennial Bombing Range. The U.S Air Force and Air Force (AF) allies from Germany and Canada use the Centennial Bombing Range. Additionally, AF and Army units use the Wilde Benton assault airstrip (7300 ft.) to conduct air load/land operations.

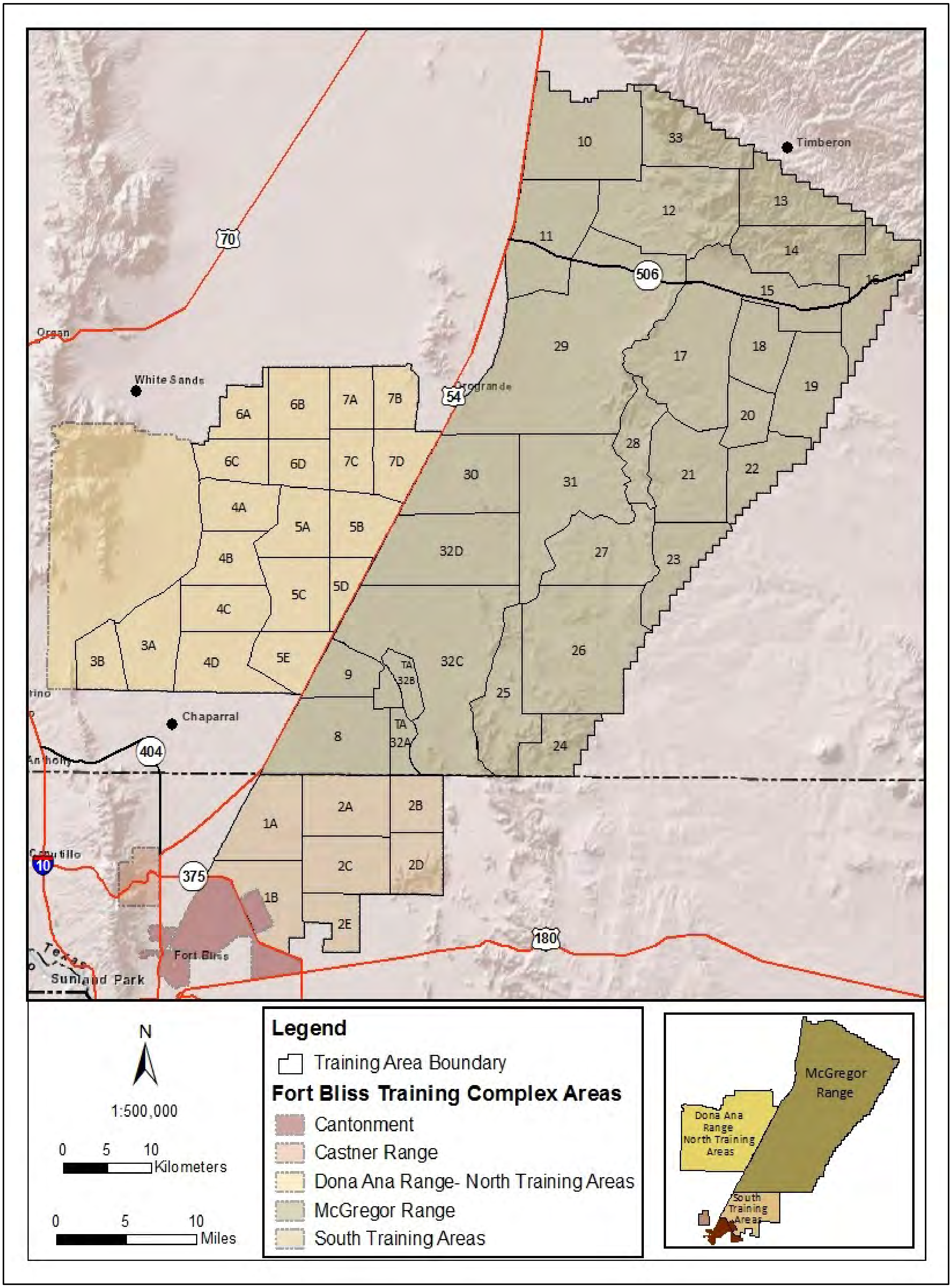
The Japanese, German and Dutch Air Defense units utilize many of the Fort Bliss missile firing points during annual service practice to launch their Hawk and Patriot missiles (US Army 2010a).

Fort Bliss has a large mobilization mission. In FY11, approximately 10,000 troops mobilized through Fort Bliss. In FY12, nearly 29,000 troops mobilized through Fort Bliss.

Fort Bliss is a dedicated Pre-mission Training Site (PMT-S) for all Special Forces personnel deploying in support of Operation Enduring Freedom. In FY11, 2200 personnel trained at Fort Bliss. That number grew to 3,000 personnel in FY12. The Air Force Security Force trained 2,741 personnel at Fort Bliss in FY11. Bliss is one of three locations considered for a consolidated AF Security Force training site within CONUS (US Army 2010a).

Additional activities that take place on FBTC include dismounted maneuvers and on- and off-road vehicle maneuvering. Other activities take place at smaller sites and ranges such as training in use of weapons and firearms, mortar and artillery, demolition and urban tactics.

The FBTC supports a wide variety of military and non-military uses (Table 2.1-1). The approximate acreage of land available on the FBTC for the different military uses is in Table 2.1-2. Figure 2.1-4 correlates to the colors shown in Table 2.1-3 and shows available public access areas within the FBTC. Outdoor recreational use, including hunting, hiking, camping, and off-road recreational biking, must be compatible with ongoing military activities. Range, safety and natural resources managers determine recreational use area boundaries according to Fort Bliss AR 385-63, *Fort Bliss Training Complex Range Operations* (U.S. Army 2010n), as well as AR 200-1 *Environmental Protection and Enhancement*, AR 385-63, *Range Safety*, and AR 350-19 *Army Sustainable Range Program*. Pending the ongoing military activity, controlled and scheduled public access is allowed in the South Training Areas (TAs 1A, 1B, 2A – 2E), TAs 3-7 of Doña Ana Range, TAs 10-28 and the northern portions of TA 29 on McGregor Range. Military training events have priority over recreational hunting events.



1494
1495 **Figure 2.1-3 Fort Bliss Training Center Divisions**

1496 **Table 2.1-1 Fort Bliss Training Center Military Uses**

Military Use	Description
Off-Road Vehicle Maneuver: Heavy	This is an area for mounted units to practice movements and tactics. Different unit types may work in support of one another (combined arms), or a unit may operate on its own to practice a specific set of tasks. The "Heavy" designation refers to areas where maneuver may consist of all types of vehicles and equipment, including both tracked and wheeled vehicles. This category includes fixed sites (e.g., bivouac, assembly, command, logistic support), limited digging (e.g., fighting positions), and other miscellaneous training activities.
Off-Road Vehicle Maneuver: Light	Same definition as above, except that the "Light" designation refers to areas where vehicle maneuver is restricted to light, wheeled vehicles (e.g., Humvee). This category includes fixed sites (e.g., bivouac, assembly, command, logistic support), limited digging (e.g., fighting positions), and other miscellaneous training activities.
Dismounted Maneuver	Same definition as above, except that the "Dismounted" designation refers to areas where foot traffic occurs and vehicle maneuver is restricted to roads only. This category includes fixed sites (e.g., bivouac, assembly, command, logistic support), limited digging (e.g., fighting positions), and other miscellaneous training activities.
On-Road Vehicle Maneuver	Use of wheeled or tracked vehicles is restricted to existing roads.
Aircraft Operations	Fixed-wing and rotary-wing overflights and air-to-air training
Controlled Field Training Exercise (FTX)	Fixed sites (e.g., bivouac, assembly, command, logistic support), limited digging (e.g., fighting positions), and concentration of troops and vehicles may occur only at designated locations. Controlled FTX allow for fixed sites and specified activities described in this military use at designated locations regardless of the underlying maneuver use.
Mission Support Facilities	Ranges (including live-fire); test facilities; landing zones/pads/strips; drop zones; radar facilities; etc.
Live-Fire	This is a restricted area for firing of individual and crew-served weapons systems (surface-to-surface, surface-to-air, and air-to-surface); launch sites and firing points; laser certified ranges; etc. These activities occur under controlled conditions.
Surface Danger Zone (SDZ)/Safety Footprint	Target debris areas and safety footprints for weapons and laser use.
Surface Impact	Areas in which range activities produce UXO

Military Use	Description
Base Camps	Man-made environment providing limited administrative, living, quality of life and other support services in close proximity to training locations.
Environmental Management	Environmental management and training area maintenance activities

Source: U.S. Army 2010i

Table 2.1-2 Approximate Size of Each Military Use on the FBTC

Military Uses	Acres	Percentage of FBTC
Off-Road Vehicle Maneuver	745,199	67%
On-Road Vehicle & Dismounted Maneuver	1,022,023	91%
Aircraft Operations[1]	1,116,539	100%
Controlled FTX[2]	15,949	1%
Mission Support Facilities	828,080	74%
Live-Fire	854,462	76%
SDZ/Safety Footprint[1]	1,116,539	100%
Surface Impact	57,806	5%
Base Camps[3]	2,160	<1%
Cantonment	23,929	2%
TOTAL	1,116,539	100%

Source: DPW-E Data

Notes:

1. Includes Cantonment and Castner Range
2. Includes Sacramento Mountains portion north of 506 and existing and proposed, 1 square kilometer controlled FTX sites on Otero Mesa.
3. Includes Doña Ana, McGregor and Orogrande Base Camps

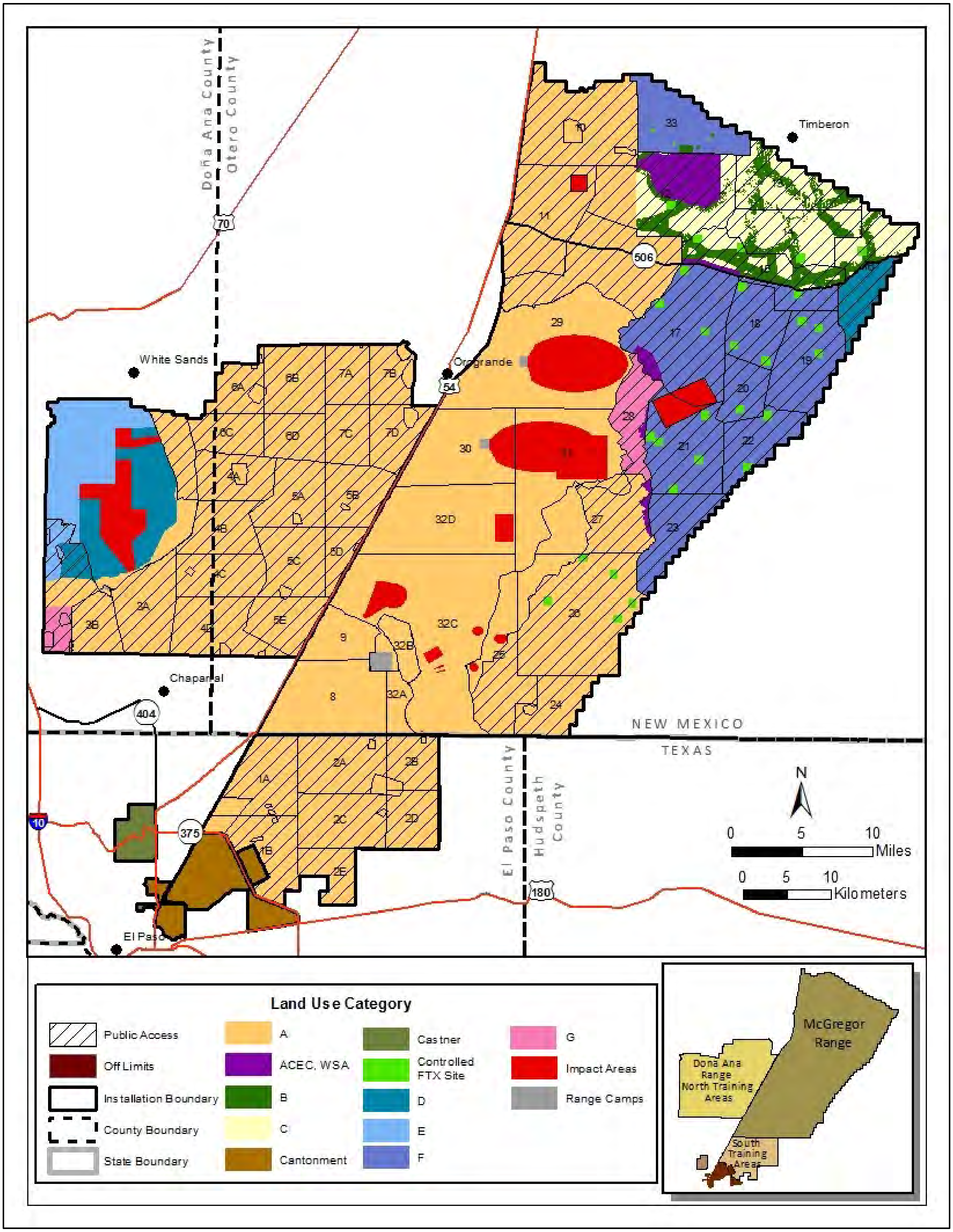


Figure 2.1-4 Fort Bliss Training Center Land Use (Refer to Table 2.1-3)

Table 2.1-3 Fort Bliss Training Center Land Use Categories

FBTC Land Use Category	Military Uses											
	Off-Road Vehicle Maneuver: Heavy	Off-Road Vehicle Maneuver: Light	On-Road Vehicle Maneuver	Dismounted Maneuver	Aircraft Operations	Controlled FTX	Mission Support Facilities	Live-Fire	SDZ/Safety Footpring	Surface Impact	Range Camps	Environmental Management
A	●	●	●	●	●	●	●	●	●			●
B		●	●	●	●	●	●	●	●			●
C			●	●	●	●	●	●	●			●
D			●	●	●		●	●	●			●
E			●	●	●			●	●			●
F			●	●	●	●			●			●
G			●	●	●				●			●
WSA/ACEC*				●	●				●			●
Impact Areas					●				●	●		
Range Camps					●		●		●		●	●

Source: 2010 SEIS

* ACEC = Area of Critical Environmental Concern

2.1.5.2.1 South Training Areas (Division Training Area)

Military Land Use The South Training Areas are dedicated for on- and off-road vehicle maneuvers and close-in military training activities. TAs 1A and 1B are live fire ranges and are off limits for all other training (U.S. Army 2010n). The South Training Areas support individual weapons zero, IED-Defeat facility, search house and three non-instrumented urban training facilities. Considered a local training area because of its proximity to the Cantonment Area, the South Training Areas also support small unit tactical training, Expert Infantry Badge/Expert Field Medical Badge (EIB/EFMB) training/testing, land navigation training and Tank/Bradley/Stryker Crew Proficiency Course training (U.S. Army 2010m).

Non-Military Land Use Non-military land uses in the South Training Areas includes public utility infrastructure and recreational uses. Public utility infrastructure includes water treatment facilities, deep-well injection sites, water wells, and gas and water pipelines. The Fred Hervey Water Reclamation Plant is located in TA 1A and the Kay Bailey Hutchinson Desalination Plant is on the cantonment south of TA 1B.. Natural gas and petroleum pipelines and high-wire electrical transmission lines cross the South Training Areas (U.S. Army 2010i). Some public recreational use occurs in the South Training Areas, in particular, at the Fort Bliss Rod and Gun Club, which is located in TA 1B and is open to the public by membership.

2.1.5.2.2 Doña Ana Range-North Training Areas

Military Land Use The North Training Areas are dedicated primarily for on- and off-road vehicle maneuvering. Aerial drop zones and artillery firing areas are located in the western part of the North Training Areas. The War Highway divides the North Training Areas from Doña Ana Range. Doña Ana Range contains a complex of weapons firing ranges, located to the west of War Highway with impact areas located in the foothills of the Organ Mountains. Doña Ana Base Camp provides mission support facilities to units using its firing ranges and training areas. The firing ranges on Doña Ana Range /North Training Areas focus on crew qualifications and squad/platoon battle task training. They provide individual weapons qualification ranges, crew qualification with Digital Multi-Purpose Training Ranges (DMPTR), Scout/RECCE ranges, light demolition range and infantry squad/platoon battle courses (U.S. Army 2010m).

Non-Military Land Use Non-military land use in the Doña Ana Range is limited to utility easements only**.** Utility easements crossing portions of the Doña Ana Range/North Training Areas include aboveground electric lines and underground natural gas and petroleum pipelines (U.S. Army 2010j). Recreational use of the North Training Areas and the southwestern portion of Doña Ana Range is permitted mainly for game bird and oryx hunting.

2.1.5.2.3 McGregor Range

Military Land Use McGregor Range is utilized for a variety of military training, including heavy, light, and dismounted maneuver, individual and collective firing ranges and missile training and testing programs. Approximately half of McGregor Range is for heavy off-road vehicle maneuvers. Military activities within the Culp Canyon WSA and the Black Grama Grassland ACEC areas are limited to dismounted maneuvers. Military activities in Northeast McGregor Range north of Highway NM 506 include a Controlled FTX zone and off-road light-wheeled vehicle uses within 500 meters (m) of existing roads on slopes of less than 30 percent. Under an MOU between the USFS and the Army, the military uses TA 33 with the concurrence of the USFS (U.S. Army 1999). Military activities on TA 33 include on-road vehicle maneuver, dismounted maneuver and a limited number of Controlled FTX sites.

Two complexes of firing ranges exist on McGregor Range: Orogrande Range Complex east of Orogrande and McGregor/Meyer Range Complex adjacent to the McGregor Base Camp north of the Texas/New Mexico border. The Orogrande Range Complex is a multi-echelon training complex focused on platoon qualification and Company/Battalion Level Collective task training. It allows units to conduct platoon or larger gunnery exercises on a Digital Multi-Purpose Range Complex (DMPRC) and a Digital Air/Ground Integration Range (DAGIR). Additionally, Orogrande Range Complex has a Combined Arms Collective Training Facility (CACTF), urban assault course, machine gun range, light demolition range, and a live-fire shoot house. Adequate space supports combining maneuver and gunnery on the DMPRC and the DAGIR (U.S. Army 2010m). Orogrande Range Complex is used by U.S. Army Operational Test Command (USAOTC) Air Defense Artillery (ADA) Test Directorate to conduct operational tests and experiments and has the capability to instrument aerial and ground systems, collect precise system performance data, process these data, and provide comprehensive analytical reports (U.S. Army 2009a). The Orogrande Base Camp is located to the west of the complex to support units using the range complex.

The McGregor/Meyer Range Complex supports individual qualification and basic skills training for crews and squad drills and Overseas Contingency Operations Mobilization task training. It provides individual weapons training, small arms weapons qualification ranges, convoy live-fire courses, live-fire/breach facility, shoot houses and an urban assault course. The McGregor/Meyer Range Complex consists of 18 firing ranges for small arms familiarization and qualification. Two of these ranges are equipped with the Remote Electronic Target System. The McGregor/Meyer Range Complex also contains grenade ranges, a Nuclear, Biological and Chemical (NBC) gas chamber, a light anti-tank range, an individual tactical training range and a pistol qualification range. Short Range Air Defense (SHORAD) Range has 16 firing points for forward area air defense and laser weapons systems and supports combined arms operational testing. Detainee operation training occurs within the training Detention Facility located within the McGregor/Meyer Complex (U.S. Army 2010m). The McGregor Base Camp is located within the complex to support units using the range complex.

Two major U.S. Army and Air Force joint-use assets are located on McGregor Range. Holloman AFB and Fort Bliss use the Centennial Bombing Range, consisting of approximately 5,200 acres (21 square kilometers) on Otero Mesa South of Highway NM 506 for air-to-ground target training. The Wilde Benton airstrip, located in the northern area of McGregor Range, is a 7,800-ft hard-packed surfaced dirt airstrip capable of handling aircraft up to and including the C-130 and the C-17.

Non-Military Land Use The primary non-military land uses on McGregor Range are livestock grazing and recreation (U.S. Army 2010i). Other non-military uses include utility corridors consisting of an oil and gas pipeline, a power transmission line and right-of-way corridors. Highway NM 506 is an important road for access across McGregor Range and for connecting ranchers to the City of Alamogordo. U.S. Highway 54 connects El Paso and Alamogordo (as well as divides McGregor Range and the Doña Ana/North Training Areas). Additionally, the Union Pacific Railroad parallels US 54.

Of the 697,472 acres which comprise McGregor Range, approximately 87 percent (608,385 acres) is withdrawn public land administered by the BLM and co-managed by Fort Bliss and the BLM under an MOA, as per the Congressional withdrawal of public lands for military use (PL 106-65). Approximately 10 percent (71,083 acres) is land owned-in-fee by the U.S. Army. Per the MOA between BLM and Fort Bliss, Fort Bliss controls construction and maintenance of improvements in hazardous and U.S. Army fee-owned areas, including maintaining the boundary fence for McGregor Range. Further, on the BLM-managed portions of McGregor Range, the U.S. Army first must concur with the public's use of these lands in accordance with PL 106-65. The remainder of McGregor Range, approximately 3 percent (19,000 acres) is public land managed by the USFS and is part of the Lincoln National Forest. USFS land is utilized by Fort Bliss in accordance with an MOU with the USFS. Public access to non-military uses of McGregor Range is controlled by Fort Bliss to ensure safety. Non-military uses are also managed by the BLM and the USFS on its respective lands.

2.2 Physical Environment

2.2.1 Climate

Fort Bliss is located in the northern Chihuahuan Desert eco-region and has a semi-arid to arid, subtropical desert climate characterized by low rainfall, relatively low humidity, hot summers, moderate winters, wide temperature variations and an abundance of sunshine throughout the year. Average annual precipitation is 8.8 inches (22.4 centimeters [cm]), (U.S. Army 2000c) with extremes of 2.22 inches and 18.29 inches (5.64 and 46.46 cm). More than half of the total average annual precipitation occurs during the months of July, August and September. During these months, brief but heavy rainstorms frequently cause localized flooding. A small percentage of annual precipitation falls in the form of snow. Periods of extreme dryness lasting up to several months are normal seasonal events on Fort Bliss (U.S. Army 2000c).

Fort Bliss has a frost-free season that averages 248 days a year. Temperatures are generally warm, ranging from highs in the mid-50 degrees Fahrenheit (°F) (mid-10 degrees Celsius [°C]) during the winter months to highs well above 90 °F (30 °C) during the summer. The annual average temperature is 63.3 °F (17.4 °C) with a record low of -13°F (-25 °C) and a record high of 114 °F (46 °C). Daytime relative humidity ranges from 6 to 14 percent during the dry season (U.S. Army 2000c). Because of the mountainous terrain and the Rio Grande Valley, there are significant diurnal and regional fluctuations in humidity. Typical of desert climates, rapid cooling from nighttime radiational cooling causes increases in relative humidity. Average daily relative humidity increases to about 40 percent at midnight and to 51 percent by 6:00 a.m. (WRCC 2007).

Wind speeds in the El Paso area are moderate, with an annual average of 9.0 miles per hour (mph) (14.5 kilometers per hour [km/h]). The combination of relatively strong sustained winds and low precipitation in the spring contributes considerably to the occurrence of dust and sand storms. During the summer months, average wind speeds drop to their lowest levels of the year. The predominant wind direction most of the year is from the southwest (U.S. Army 2000c).

A combination of abundant sunshine, high temperatures, low relative humidity and continuous winds results in an evaporation rate that is more than 10 times the amount of annual precipitation. The annual evaporation rate for shallow water bodies in the area is about 105 inches (267 cm) and the average annual evaporation rate from small lakes in the region ranges from 72 to 80 inches (182 to 203 cm) (WRCC 2007).

2.2.2 Topography

Topographic relief on Fort Bliss is substantial and provides a diverse array of physical environments. Elevations range from about 3,900 feet (ft) (1,189 m] above mean sea level (MSL) to approximately 8,900 ft (2,790 m) above MSL (Figure 2.2-1, 2.2-2). Otero Mesa, on the east side of Fort Bliss features broad, gently rolling grasslands. The Sacramento Mountains, bordering Fort Bliss to the northeast, are composed of steep terrain ascending from the lower slopes to an altitude of more than 7,600 ft (2,316 m) above MSL within the Fort Bliss boundary. The Organ Mountains are also composed of steep terrain and reach the highest altitudes within the Fort Bliss boundary at 8,900 ft (2,790 m). The northernmost reaches of the Franklin Mountains that extend into Fort Bliss are composed mostly of lower slopes and alluvial fans and range from 4,265 ft to slightly over 5,000 ft (1,300 to 1,524 m). Portions of the Hueco Mountains included within Fort Bliss range from 4,500 ft to approximately 6,000 ft (1,372 to 1,829 m) above MSL. The lower slopes of the mountains contain the transition zone between the higher elevations and the Tularosa Basin and feature steep slopes that eventually flatten out into alluvial fans and outwashes. Similarly, the escarpment for Otero Mesa rises from 4,900’ on the Tularosa Basin desert floor to 5,400’ on the edge of the mesa and consists of steep slopes that grade into alluvial fans (US Army 2000).

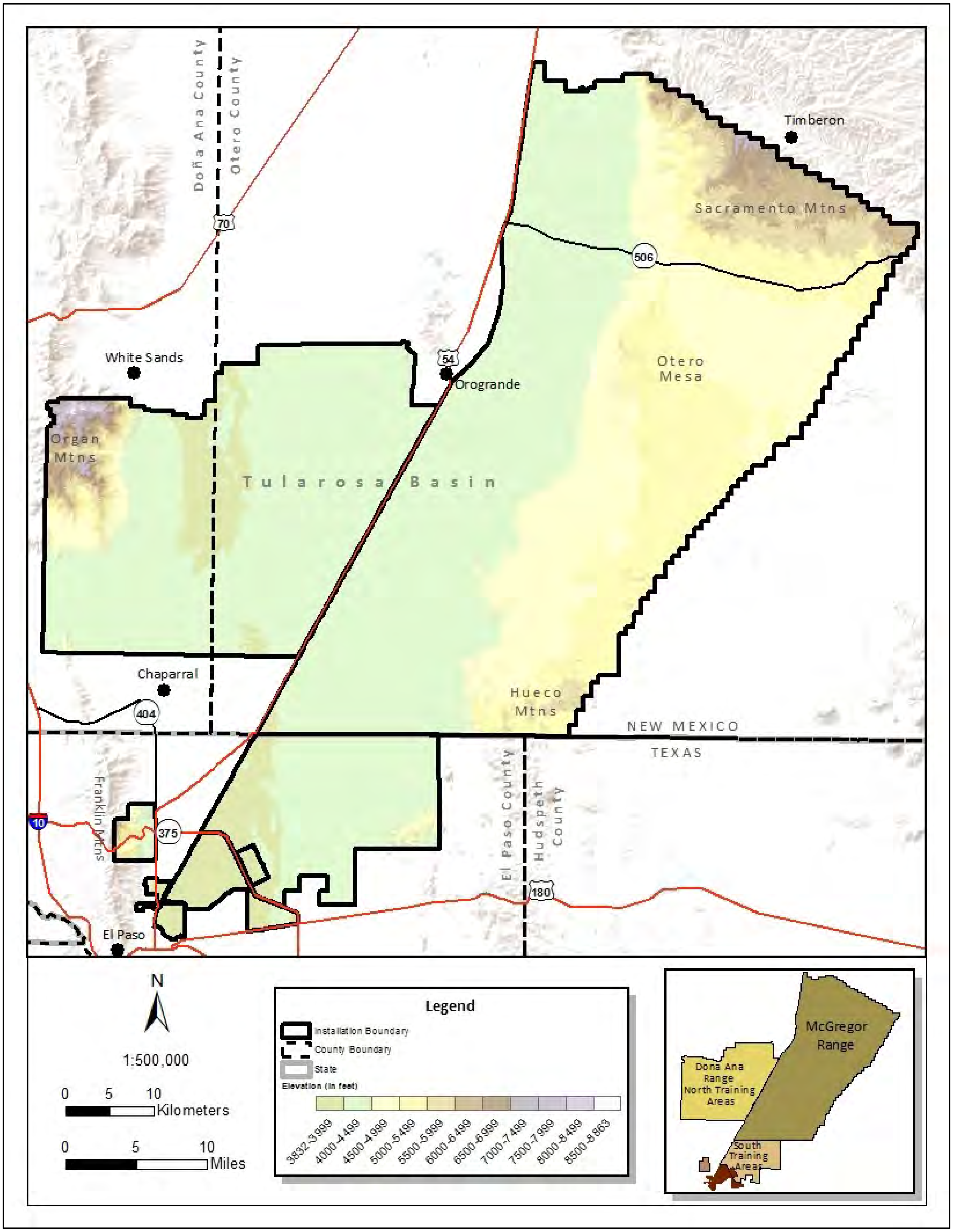


Figure 2.2-1 General Elevations of Fort Bliss

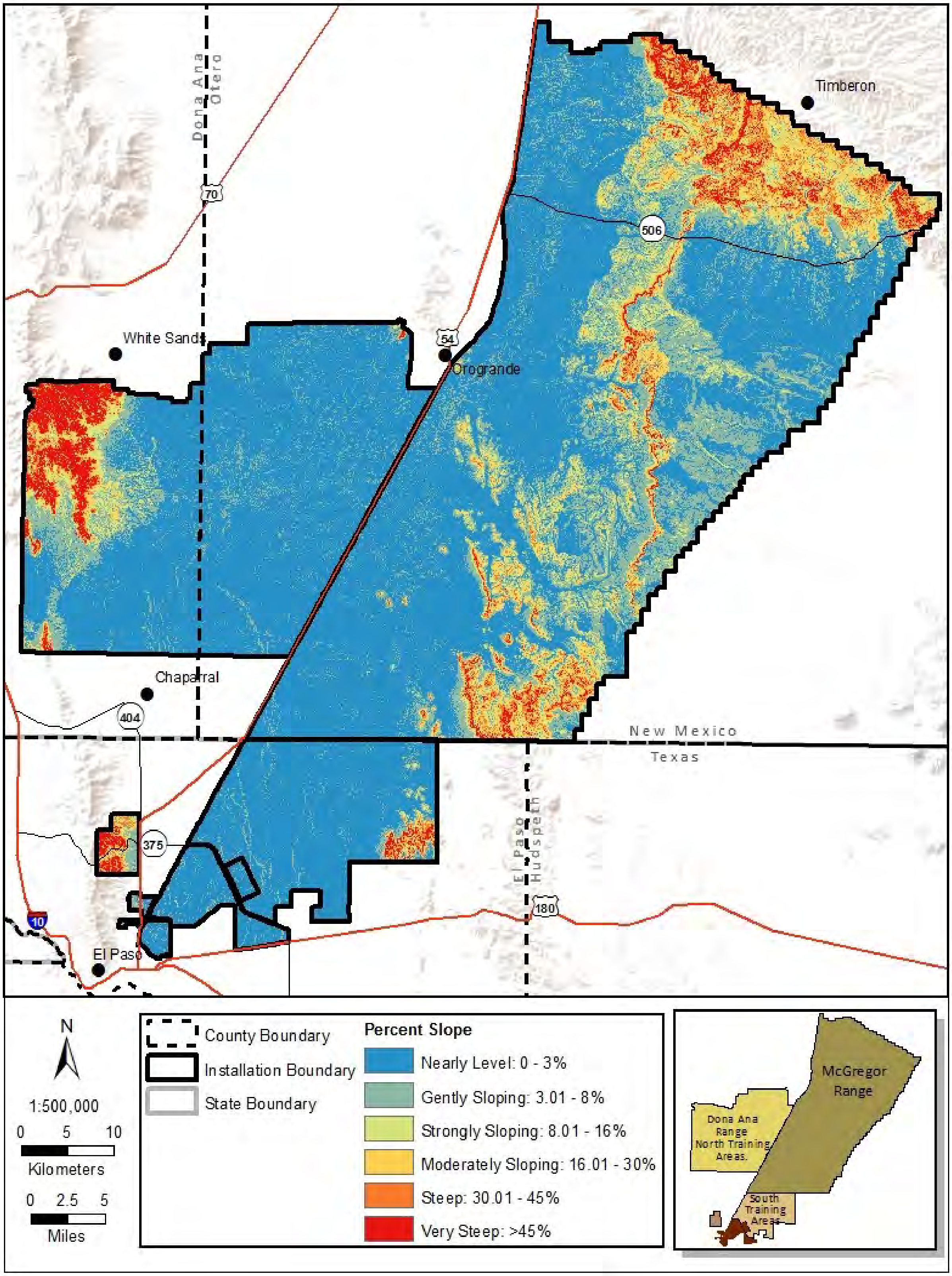


Figure 2.2-2 Slope Gradient Classes on Fort Bliss

2.2.3 Geology

Fort Bliss and the surrounding area were essentially a stable, relatively shallow marine shelf from late Cambrian (570 to 500 million years before present [Ma]) through early Pennsylvanian (320 to 290 Ma) time. The oldest sedimentary deposits in this area are approximately 400 Ma, and they consist chiefly of dolomite beds ranging in age from late Cambrian to late Ordovician (510 to 440 Ma) (U.S. Army 2000c). Deposition during Devonian (410 to 360 Ma) time consisted mainly of marine shales and shaly limestones. A relatively thin disconformable sequence of upper Mississippian age limestone and shale overlies the Devonian rocks. Overlying the Mississippian deposits are approximately 3,000 ft (914 m) of Pennsylvanian age sediments. These strata consist of limestone, sandstone, dolomite, and shale, deposited in a shallow marine environment. Tectonic disturbances in Virgilian time (late Pennsylvanian) altered the depositional environment from marine to terrestrial. The tectonic movement resulted in the area becoming a large depression with higher elevation landmasses located to the east, west, and southwest. In later Pennsylvanian and early Permian time (290 to 280 Ma) the Tularosa Basin received an influx of land-derived sediments. Most sedimentary rocks in the area consist of limestone strata of the San Andres formation. These sediments mark the return of marine shelf deposition in the area (U.S. Army 2000c).

By middle Cenozoic time (65 Ma to present) the Hueco and the Mesilla bolsons respectively, to the east and west of the Franklin Mountains were the prominent depositional basins. Broad regional uplift that occurred in the Cenozoic Era and differential drift within the North American Plate, which occurred in the Miocene (~ 20 Ma), created fault patterns in the region. The result was a physiographic province characterized by down-dropped basins (grabens) bounded by tilted fault block mountains. The grabens have subsequently filled with heterogeneous, unconsolidated to poorly consolidated sediments (Seager 1981).

Eroded petrocalcic horizons, braided stream deposits alternating with poorly sorted mudflows, relic and Paleozoic horizons, topographic expressions of old sediment surfaces and terrace-strand lines, and multiple superimposed petrocalcic (caliche) horizons demonstrate several periods of alternatively wetter and drier climatic trends during and since the Pleistocene (2 to 0.012 Ma). These are related to pluvial-interpluvial episodes and post-Pleistocene climatic instability (Wells 1977).

The southern portion of the Tularosa Basin contains more than 6,000 ft (1,829 m) of valley fill, stream sand and gravel, alluvial fan material from mountains on both sides, and lake deposits rich in salt and gypsum derived from sedimentary rocks of the adjacent mountain ranges. Any rainfall or melted snowfall that occurs in the valley either seeps into the porous valley deposits or evaporates from small pools leaving behind deposits of gypsum, salt or other minerals. Fault lines along the edge of the Tularosa Basin may still be active, although no movement has occurred in recent times (U.S. Army 2000c).

The mountain ranges adjacent to Fort Bliss developed during separate geologic time periods and comprise a variety of minerals and soils. These geologically different mountain ranges contain site-specific substrates, creating areas of unique communities. The Organ Mountains formed as light-colored, craggy outcrops of vertically jointed Tertiary granite, 23 Ma (Miocene). The southern portions of these mountains are made of tilted blocks of stratified, mostly Paleozoic rock. The Sacramento Mountains contain Paleozoic sedimentary rocks underlain by Precambrian granite. The Hueco Mountains are made of marine limestones deposited in the Pennsylvanian and Permian periods. These Paleozoic limestones dip steeply along chevrons on ridges (U.S. Army 2000c).

A large portion of the Fort Bliss region lies inside the Rio Grande Rift, an area considered to be of moderate seismic activity (Sanford et al. 2002). Earthquake data estimate that the strongest earthquakes in a 100-year period lie between a magnitude of 4.5 and 5.8 on the Richter Scale with an area of elevated seismic activity (the Socorro Seismic Anomaly) located roughly 100 miles (161 km) to the north of the installation (Sanford et al. 2002).

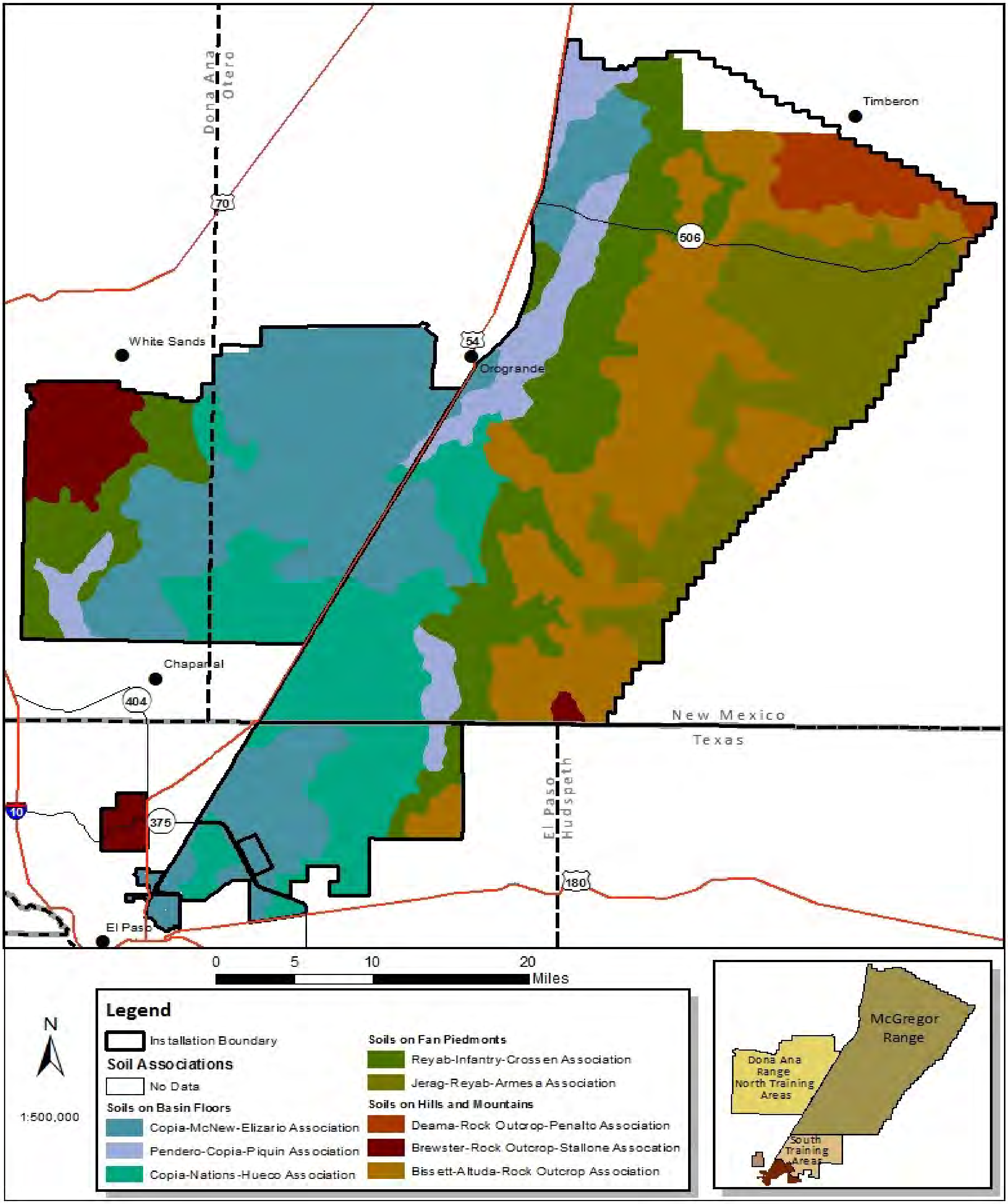
2.2.4 Soils

The soil surveys prepared by the Natural Resources Conservation Service (NRCS), an agency of the USDA, and their associated spatial and tabular databases provide soils information in a single data source for the Fort Bliss area, including physical, chemical, and engineering properties, as well as the hazards and limitations relevant for many different types of land use. The most recent soil survey completed on Fort Bliss in 2003 (USDA 2003) provides descriptions of general soil associations and are suitable for characterizing soils over a large area. A soil association is a form of map unit used in soil surveys composed of delineations, each of which shows the size, shape, and location of a landscape unit composed of two or more kinds of component soils (SSSA 2009). There are eight soil associations mapped on Ft. Bliss (Figure 2.2-3). Basic characteristics of each of these soil associations are in Table 2.2-1. Each soil association shown in Figure 2.2-3 is an aggregation of more detailed soil map units. There are 63 individual soil series described for Fort Bliss, distributed into approximately 3,100 distinct mapped polygons (USDA 2003).

The majority of soils in the Fort Bliss area are broadly classified as either poorly developed rocky desert soils (aridisols) or unconsolidated sediment of sand and/or very fine gravel (entisols), although a few areas do have more developed soils with an organic layer (mollisols) and are usually associated with grassland areas. Desert soils or aridisols, have a very low concentration of organic matter and developed under conditions of low moisture, reflecting the scantiness of vegetative production on these dry soils. Because of the lack of water there is little leaching of soil mineral (i.e. silicate clays, sodium, calcium carbonate, gypsum, or soluble salts) in the upper soils layers and these often accumulate to become cemented together to form “desert cement” or hardpans (caliche) or crusty salt flats (salinization). In areas with unconsolidated sediment, where blown soils and sands accumulate (alluvial fans, floodplains, and/or sand dunes) or there are actively eroding soils are young soils or entisols. These are often unstable soils and generally support only the most drought-tolerant plant species since there is little water retention. In locations where there is enough shallow water (uplands and mountains) to have allowed for grasses and forb growth, the organic content of the soil will have increased to form mollisols. These soils contain a deep, dark-colored surface horizon, rich in organic matter with a relatively high water holding capacity. For arid environments, these soils represent areas with the highest biodiversity per unit area of land and are of high importance to many plant and animal species on Fort Bliss (US Army 2000).

A specific soils vulnerability to erosion, including its suitability for roads or for building construction, and use by military vehicles are a function of many physical and chemical properties of that soil, in combination with climate, topography, and vegetation. Wind and water erosion are currently the most significant processes affecting soils in the Fort Bliss area. Soils unprotected by vegetation are susceptible to erosion from wind and water runoff. Gullying is the most visible form of erosion, but sheet and rill erosion from water and wind erosion are the processes that most significantly affect soil movement. Most soils on the North and South Training Areas are highly susceptible to wind erosion, while McGregor Range contains soils that are highly susceptible to both water and wind erosion (USDA 2005). Soils in the coppice dunes area of the Tularosa Basin are subject to wind erosion. The acceleration of these erodible dunes is caused by a breakdown of surface crusts on the soils between dunes, caused in part by the maneuvering of tracked vehicles (Marston, 1984). Most of the soil movement in this area is localized from dune to dune, but on windy days blowing dust particles rise to the atmosphere (BLM, 1988). This process can significantly lower air quality. On ranges within the Tularosa Basin, roads were built and maintained in such a manner that they have become channels for rainwater runoff. This has caused a considerable amount of erosion (BLM, 1988). A similar problem has occurred on roads leading up to Otero Mesa (USAF, 1998). On Otero Mesa, grazing by livestock has reduced the vegetative cover and exposed the soil surface to wind and water erosion in heavily used localized areas such as holding pens, watering points, and mineral licks.

See **Appendix B, Soil Erosion and Sediment Control Component to the INRMP 2015** for further information about soils management and soil properties on Fort Bliss.



1773
1774 **Figure 2.2-3 Soils on Fort Bliss**

Table 2.2-1 Characteristics of General Soil Map Units

Landscape Position	Soil Association	Percent of Fort Bliss[1]	Physical Properties
Basin Floors	Copia-Mcnew-Elizario	22%	2–5% slopes, very deep, well-drained to excessively drained, high proportion of sand on surface
	Pendero-Copia-Piquin	6%	2–15% slopes, very deep, excessively drained, loamy fine sand to very gravelly sandy loam surface texture
	Copia-Nations-Hueco	15%	0–5% slopes, very deep to moderately deep, loamy fine sand surface texture
Subtotal	Basin Floors	43%	Elevation 3,900 to 4,200 ft. Annual precipitation averages 9 inches.
Fan Piedmonts	Reyab-Infantry-Crossen	20%	0–10% slopes, well-drained, very deep to very shallow, surface texture mixed (silt loam, very gravelly loam, gravelly fine sandy loam)
	Jerag-Reyab-Armesa	14%	0–5% slopes, well-drained, very deep to shallow, very fine sandy loam and silt loam surface texture
Subtotal	Fan Piedmonts	34%	Elevation 4,200 to 6,000 ft. Annual precipitation averages 12 inches.
Hills and Mountains	Deama-Rock Outcrop-Penalto	3%	5–65% slopes, well-drained, shallow and very shallow, very cobbly or gravelly loam surface texture
	Brewster-Rock Outcrop-Stallone	4%	5–90% slopes, well-drained, very deep to very shallow, very gravelly loam to extremely bouldery sandy loam surface texture and rock outcrop
	Bissett-Altuda-Rock Outcrop	16%	5–65% slopes, well-drained, shallow and very shallow, very gravelly or very cobbly loam surface texture
Subtotal	Hills and Mountains	23%	Elevation 4,200 to 8,100 ft. Annual precipitation averages 15 inches.

Source: USDA 2003

Note: 1. Excluding Castner Range and TA 33 (USFS)

2.2.4.1 Ecological Sites

The Fort Bliss Soil Survey (USDA 2003, USDA 2005) assigns an ecological site name and alphanumeric ID to each detailed soil mapping unit. The ecological site descriptions include a state and transition model of the vegetation communities typically found within a site. The state and transition model provides a framework for understanding vegetation dynamics and incorporates current ecological knowledge from many different sources. A potential reference plant community and the existing plant community are described for each ecological site. The reference plant community is termed the "historic climax plant community." The transition model for each site describes potential mechanisms that may modify plant communities (or "states") toward or away from the reference plant community and suggests possible causes for transition within each site, such as overgrazing, drought or surface-disturbing activities.

The dominant ecological sites occurring on Fort Bliss are listed in Table 2.2-2, along with a brief description and the current transition state. These ecological sites have been further grouped into areas of similar vegetation communities and ecological conditions by research scientists from the USDA Agricultural Research Service's Jornada Experimental Range (Table 2.2-3) (Mehlhop et al. 1997, USDA 2005). The single most abundant ecological site is Sandy 8 to 10.5 inches, covering approximately 37 percent of Fort Bliss. Similarly, the broad classification for this site, the Sand group, accounts for almost half of Fort Bliss, 46 percent. The locations of the ecological site groups on Fort Bliss are in Figure 2.2-4.

Table 2.2-2 Dominant Ecological Sites Occurring on Fort Bliss

Ecological Site Name*	Ecological Site ID	Current Estimated Primary Transition State[1]	Description
Deep Sand	R042XB011NM	Mesquite Dune State	This ecological site often intergrades with either the Sandy or Gravelly Sand ecological sites. The historic plant community for this site is sand and mesa dropseeds with a significant cover of black grama and bush muhly. Coppice dunes are similar to the mesquite-dominated state in the Sandy site. This site is often associated with dunes in the soil survey data, primarily on either Copia or Nations soil map units. Causes of the transition from the historic plant community are unknown, but may relate to destruction of plants by trampling with consequent erosion.

Gravelly	R042XC001NM	Shrubland	This ecological site is associated with Limestone Hills, Draw, Loamy, and Sandy sites. Grasses dominate the historic plant community, with shrubs scattered and evenly distributed. Black grama is the dominant grass species; winterfat, fourwing saltbush, and creosotebush are common shrubs. Overgrazing, damage to vegetation or drought can reduce grass cover, effect a change in grass species dominance, and may result in a shrub-dominated state.
Limestone Hills	R042XC020NM R042XE001NM R070XD151NM	Grass-Succulent Mix	This ecological site is associated with both Draw and Gravelly sites, but in a higher topographic position. The historic plant community is a grass/succulent mix, with grasses dominant, followed by succulents and shrubs. Forbs are a minor component. Transitions from Grass-Succulent mix to a Succulent-Dominated state may occur from surface disturbance.
Limestone Hill & Mountain (Desert Grassland)	R042XY249TX	Grass-Succulent Mix	The historic plant community includes mid- and short-grasses with an abundance of perennial forbs and woody shrubs. Transitions from Grass-Succulent mix to a Succulent-dominated state may occur from surface disturbance.

Loamy 8 to 10.5 inches	R042XC007NM	Shrub-Dominated	This ecological site is associated with the Gyp Upland, Gravelly, and Shallow ecological sites. Grasses with shrubs sparse and evenly distributed dominate the historic plant community. Continuous damage to grass cover reduces surface water infiltration and may eventually effect a change to more shrub-dominated states from which it is extremely difficult to recover. Survey data and vegetation mapping indicate relatively low perennial grass cover, high percentages of bare ground, and the beginning of mesquite invasion.
Sandy 8 to 10.5 inches	R042XB012NM	Mesquite Shrubland	This ecological site is often associated with the Shallow Sandy ecological site depending on the depth of caliche and intergrades with Deep Sand and Gravelly Sand. Black grama and other grasses, especially dropseeds, dominate the historic plant community. Shrub invasion is very common. The mesquite canopy cover on 27 study plots documents the trend of increasing shrub invasions. The causes for transition to coppice dunes are attributed to drought and surface disturbance, including grazing.
Limey 12 to 14 inches	R042XD004NM	Shrub-Invaded Grasslands	This ecological site is associated with the Gyp Upland ecological site. Grasses with shrubs and half-shrubs sparse and evenly distributed dominate the historic plant community. Tobosa, black grama, and blue grama are the dominant species. Retrogression within this state means a decrease in black and blue grama and an increase in burrograss, initiated by a transition to a Burrograss-Grassland state. Continued reductions in grass cover and resulting infiltration problems may eventually effect a change to a Bare State, with very little or no remaining grass cover. Alternatively, creosotebush, tarbush, or mesquite may expand or invade. Transitions back to a Grassland State from a Bare or Shrub-Dominated state may not be economically feasible.

Shallow Sandy 12 to 14 inches	R042XD006NM	Grass-Succulent Mix	This ecological site occurs adjacent to or as a component associated with both the Gravelly and Limey sites. The historic community is open grassland sparsely dotted with shrubs with black grama and blue grama as the dominant species. Forb production and composition fluctuates both seasonally and from year to year. This site is subject to invasion by creosotebush.
Loamy 12 to 14 inches	R042XD001NM	Shrub-Invaded Grasslands	This ecological site typically receives surface water flows from adjacent Gravelly and Shallow Sandy sites. The historic plant community is open prairie grassland with short grasses (blue grama and tobosa) dominant. Occasional forbs and woody shrubs occur in association with the grasses. The transition to a shrub-invaded state occurs due to the loss of grass cover due to drought or surface disturbance. Continued reduction in grass cover and increased erosion may eventually lead to a shrub-dominated state subject to erosion and unlikely to recover.
Loamy 8 to 10.5 inches	R042XB014NM	Shrub-Dominated	This site intergrades with Sandy, Clayey, and Gravelly or Gravelly Loam sites, without sharp boundaries. The presumed historic plant community is dominated by black grama and tobosa with some alkali sacaton. Survey data and vegetation mapping indicate relatively low perennial grass cover, high percentages of bare ground, and the beginning of mesquite invasion with some coppice dune formation.
Igneous Hills	R042XE002N	Grassland-Succulent Mix	The historic plant community is black grama, bush muhly, and sideoats grama as dominants. Tobosa may be abundant where soil moisture is higher. Shrubs and succulents are common, especially on south-facing slopes where there is low grass cover. Where there is increased bare ground, there is evidence of sheet flow by surface water. The presence of creosotebush may increase with surface disturbance.

Draw 12 to 14 inches	R042XD003NM	Grass-Shrub Mix	This ecological site is associated with Limestone Hills, Igneous Hills, and Gravelly ecological sites from which it receives and transports runoff water. It consists of two separate elements, the arroyo channel and its associated floodplain, with an ephemeral stream floodplain and gently sloping surface. Along the channel, it has the appearance of an elongated sinuous savannah with shrubs and trees dominant and high production from grasses and an abundant variety of forbs in the understory. Vegetation is variable and is dependent on flood events, distance from the channel, parent material, and amount of gravel and cobble in the soil profile. Sideoats grama is the dominant grass in the historic plant community, in addition to cane bluestem, bush muhly, blue grama, and plains bristlegrass. Desert willow, Apache plume, brickellbush, littleleaf sumac, mariola, and mesquite are common woody species. Retrogression is a decrease in the dominant grasses. Transition to a creosotebush-dominated state may occur because of continued loss of grass cover and increased erosion.

Source: Mehlhop et al. 1997; USDA 2005

Notes:

1. Applies to those sites with Ecological Site Descriptions that have information associated with Fort Bliss GIS vegetation data.

* The final 6% of the Fort Bliss installation is composed of 22 other ecological sites that are not listed since each is a minor component (<1%).

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1798 **Table 2.2-3 Ecological Site Groups on Fort Bliss, in Order of Abundance**

Group	Ecological Site	Ecological Sites #	% of Total	Acreage
Sand			**46%**	**511,601**
	Sandy 8 to 10.5 inches	R042XB012NM	37%	418,364
	Shallow Sandy 12 to 14 inches	R042XD006NM	5%	54,525
	Deep Sand 8 to 10.5 inches	R042XB011NM	3%	31,497
	Sandy Loam (Desert Grassland)	R042XY256TX	<1%	4,865
	Loamy Sand 12 to 14 inches	R042XD008NM	<1%	747
	Sandhills 10 to12 inches	R042XC022NM	<1%	657
	Deep Sand 10 to 12 inches	R042XC005NM	<1%	624
	No Data		<1%	322
Lithic			**23%**	**260,720**
	Limestone Hill & Mt (Desert Grassland)	R042XY249TX	8%	89,296
	Limestone Hills 12 to 14 inches	R042XE001NM	6%	66,330
	Limestone Hills 14 to 16 inches	R070XD151NM	3%	30,016
	No Data		2%	19,226
	Igneous Hills 13 to 15 inches	R042XE002NM	1%	16,054
	Limestone Hills 10 to 12 inches	R042XC020NM	1%	14,644
	Igneous Mountains 14 to 16 inches	R042XF001NM	1%	7,391
	Foothill Slope (Mixed Prairie)	R042XY274TX	1%	7,295
	Igneous Hill & Mt (Desert Grassland)	R042XY247TX	<1%	4,794
	Sandstone Hill & Mt (Desert Grassland)	R042XY255TX	<1%	3,164
	Limestone Hills 8 to 10.5 inches	R042XB021NM	<1%	2,512

Group	Ecological Site	Ecological Sites #	% of Total	Acreage
Loam			**18%**	**203,623**
	Loamy 10 to 12 inches	R042XC007NM	9%	102,682
	Limey 12 to 14 inches	R042XD004NM	4%	43,290
	Loamy 12 to 14 inches	R042XD001NM	3%	37,122
	Loamy 8 to 10.5 inches	R042XB014NM	1%	14,173
	Gyp Upland 10 to 12 inches	R042XC006NM	<1%	5,172
	Loamy 14 to16 inches	R070XD153NM	<1%	1,073
	No Data		<1%	110
Gravelly			**10%**	**112,113**
	Gravelly 10 to 12 inches	R042XC001NM	9%	101,278
	Gravelly Sand 8 to 10.5 inches	R042XB024NM	1%	7,582
	No Data		<1%	1,759
	Gravelly 8 to 10.5 inches	R042XB010NM	<1%	1,234
	Gravelly (Mixed Prairie)	R042XY275TX	<1%	260
Run-in*			**2%**	**21,566**
	Draw 12 to 14 inches	R042XD003NM	1%	12,758
	Draw (Desert Grassland)	R042XY242TX	<1%	3,330
	Draw 8 to 10.5 inches	R042XB016NM	<1%	3,171
	Draw (Mixed Prairie)	R042XY273TX	<1%	904
	Loamy Bottom 12 to 14 inches	R042XD002NM	<1%	801
	No Data		<1%	602
Clayey			**<1%**	**5,387**
	Clay Loam Upland 12 to 14 inches	R042XD005NM	<1%	4,579
	Clayey 8 to 10.5 inches	R042XB023NM	<1%	808
	No Data		<1%	1,529
TOTAL			**100%**	**1,116,539**

Note: *Run-in: defined as water-influenced or run-off influenced areas.

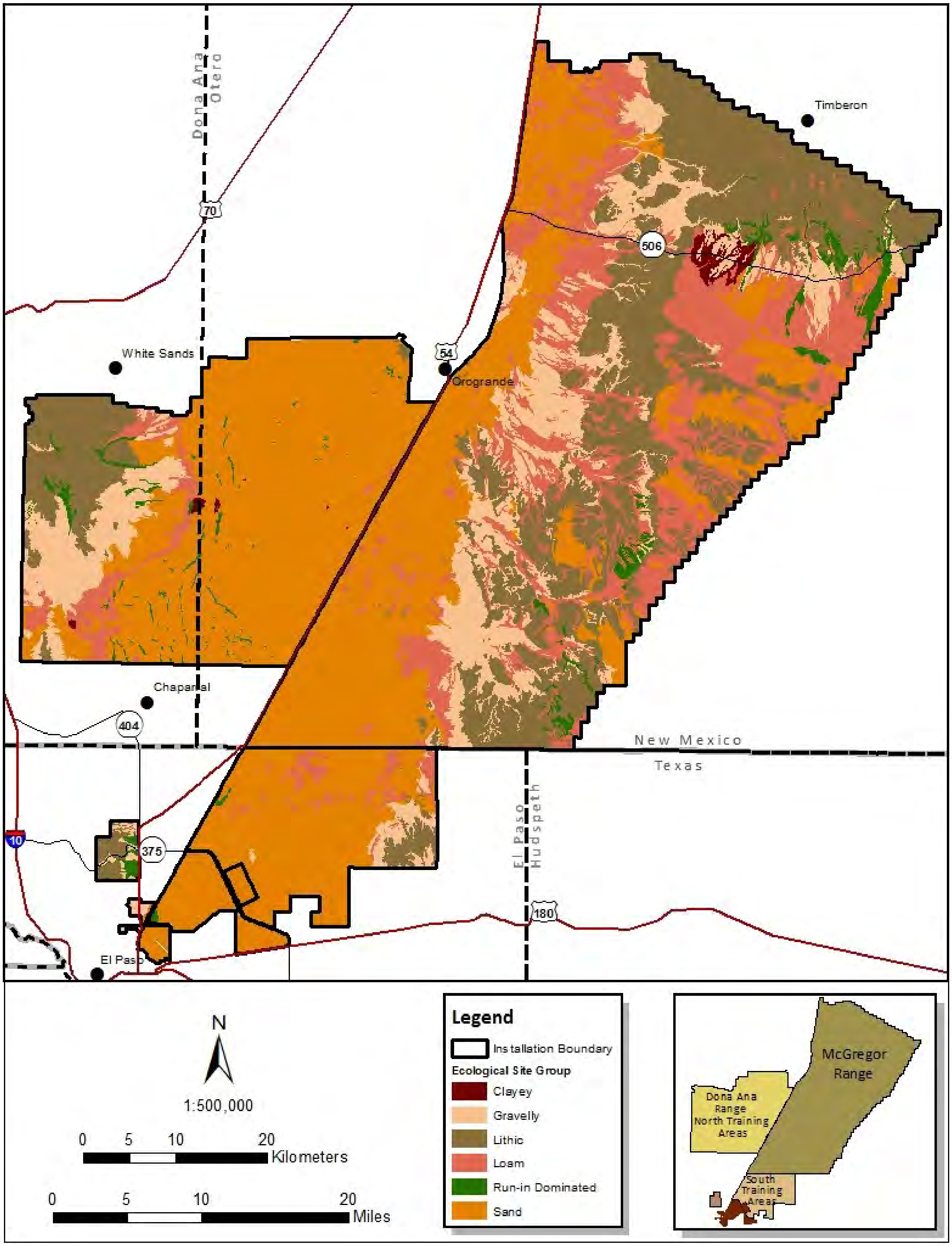


Figure 2.2-4 Location of Ecological Site Groups

2.2.5 Water Resources

This section addresses surface water and groundwater resources that supply Fort Bliss, the City of El Paso and other communities. Surface water includes lakes, rivers and streams and is important for a variety of reasons including economic, ecological, recreational and human health. Groundwater includes the subsurface hydrologic resources of the physical environment and is an essential resource often described in terms of depth to aquifer or water table and surrounding geologic composition.

Surface Water

Surface water is rare and mostly ephemeral on Fort Bliss. There are a few perennial springs located within the Organ Mountains. These springs include Fillmore Spring, Globe Springs, Rock House Spring, Pine Spring and Beasley Spring. Indian Spring is located on Castner Range in the Franklin Mountains. The only other semi-permanent surface water near Fort Bliss is the Rio Grande River, which is west and south of Fort Bliss. Surface water flows in the Rio Grande River vary greatly due to the upstream control of river water for irrigation and farming purposes. About 10% of the FBTC lands drain into the Rio Grande (Fig 2.2-5). The other 90% of FBTC lands drain into closed basin systems (US Army 2000). Precipitation events in the surrounding mountains can lead to runoff water that collects in these basins. The result is trapped surface water in small, shallow lakes called playas.

The Doña Ana Range-North Training Areas and McGregor Range are located within two closed basin systems, the Tularosa Basin and the Salt Basin. The Salt Basin includes the eastern part of Otero Mesa and the southern slopes of the Sacramento Mountains foothills. The Tularosa Basin lies between the Sacramento Mountains to the east and the Organ and San Andres Mountains to the west (Fig. 2.2-5). Both basins are characterized by small ephemeral streams that discharge toward the central areas of the basin.

Earthen impoundments called dirt tanks capture runoff rainwater during high precipitation events on FBTC. Livestock and wildlife use this water (Fig.2.2-6).

Two main pipeline systems occur on Fort Bliss, the McGregor system and the Oro Grande System. There are three diversions located in the Sacramento River and Carissa Springs, north of McGregor Range and Scott Able Creek. These diversions capture water for use on McGregor Range and the adjoining community of Orogrande. The diverted water is transported in three pipelines. One crosses the northwest corner of McGregor Range to Orogrande, and the other two supply water for wildlife and lifestock to numerous steel rim tanks and troughs across Otero Mesa on McGregor Range (Fig. 2.2-6) (U.S. Army 1999c). U.S Army Fort Bliss, Sacramento Ranger District of the Lincoln National Forest, and the BLM maintain the pipeline systems. These three entities have agreed to coordinate the maintaince of the McGregor Pipeline within their respective jurisdictions. The total flow is about 76 gallons per minute (U.S. Army 2000c). The U.S. Army holds water right Number 01657 for the diversions used on McGregor Range. The New Mexico State Engineers Office granted a change in the beneficial use from "livestock and domestic purposes" to the preservation of fish and wildlife in 1963. The right entitles the U.S. Army to divert 60,000 gallons per day (gpd) of surface water flow from the Sacramento River and 50,000 gallons per day from Carrisa Springs (U.S. Army 1998e) for the purposes of maintaining permanaent water for wildlife throughout the grasslands of Otero Mesa. Figure 2.2-6 shows the water pipelines, storage tanks and earthen impoundments on Fort Bliss.

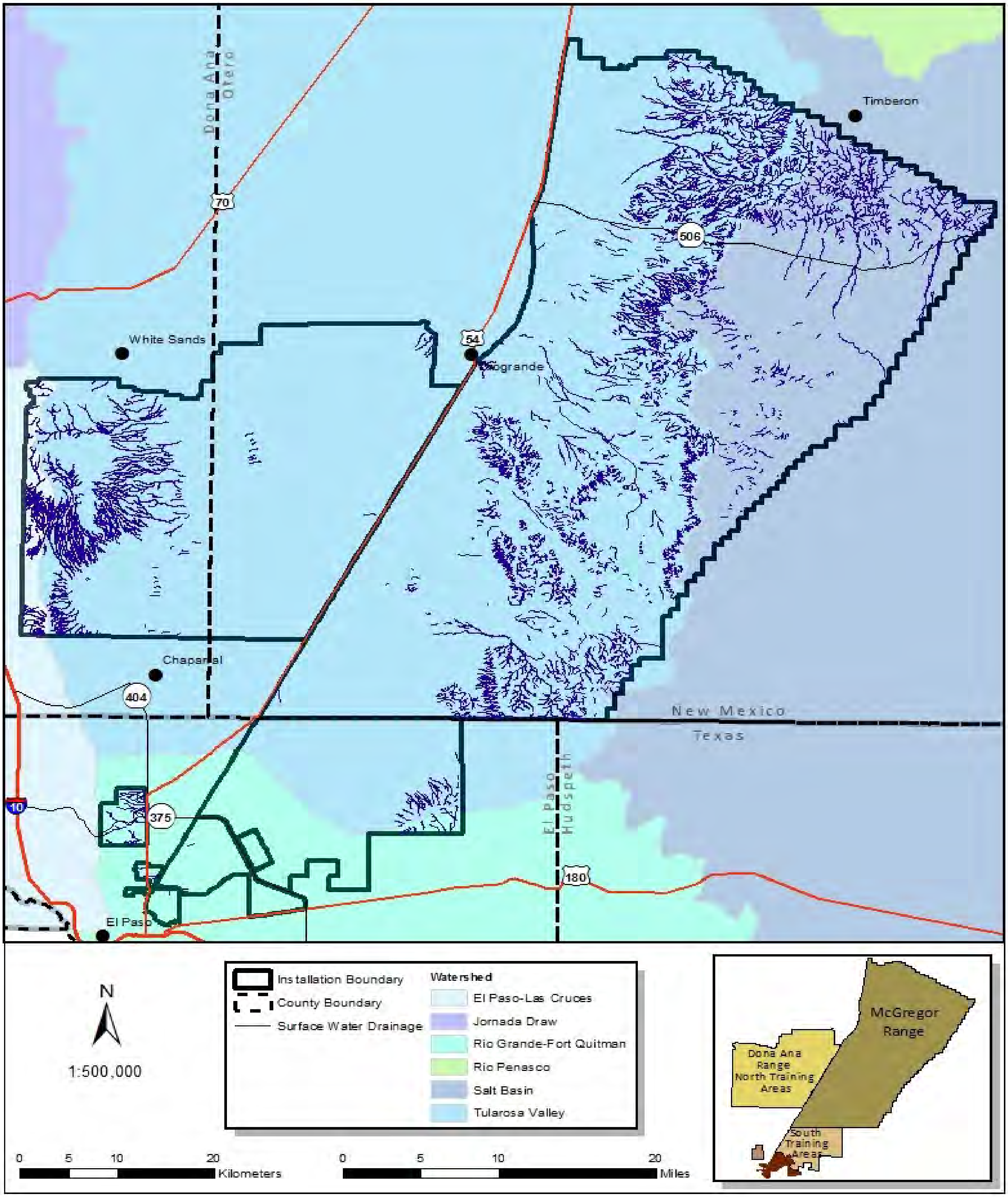
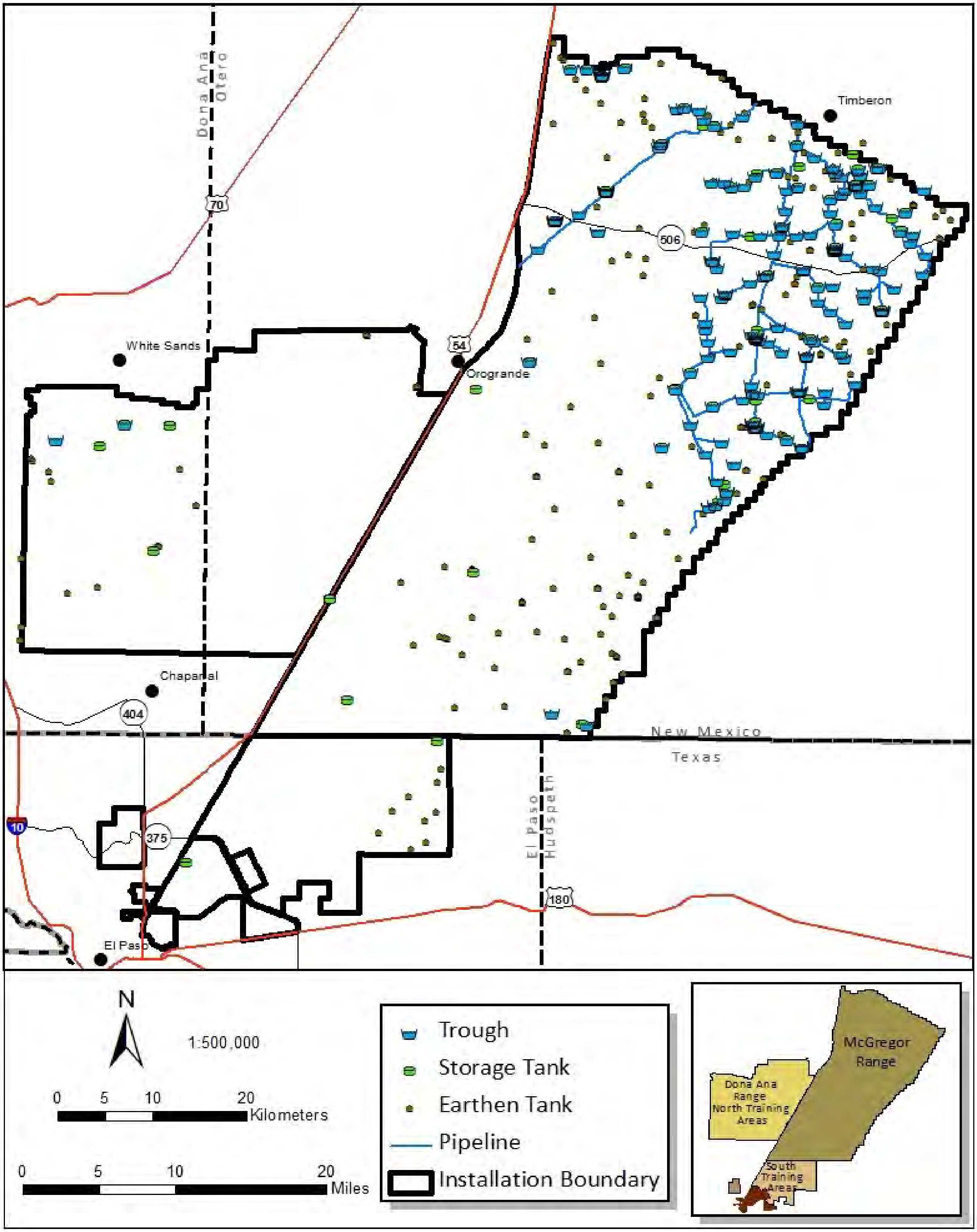


Figure 2.2-5 Surface Water Drainages of Fort Bliss



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1848 **Figure 2.2-6 Water Pipelines and Storage Areas on Fort Bliss**

2.2.5.1 Groundwater

Most of the water used by Fort Bliss comes from underground aquifers and is drawn to the surface by wells. The El Paso area obtained an average of 24 percent of its potable water supply from the Rio Grande between 1967 and 2002 and the remaining 76 percent of its potable water supply from wells located in the intermontane-basin aquifers in the Hueco and Mesilla Bolsons (Figure 2.2-7) (US Army 2000).

Fort Bliss is located primarily in the Tularosa-Hueco Basin of the Basin and Range Physiographic Province with small portions in the Mesilla Basin and the Salt Basin (Figure 2.2-7). The principal aquifers in the Tularosa-Hueco Basin are the Hueco Bolson, which provides groundwater to the City of El Paso, the Fort Bliss Main Cantonment Area, and Ciudad Juárez, Mexico; and the Tularosa Basin, which underlies parts of Doña Ana, Otero, Lincoln, and Sierra counties and portions of the Doña Ana Range–North Training Areas and McGregor Range.

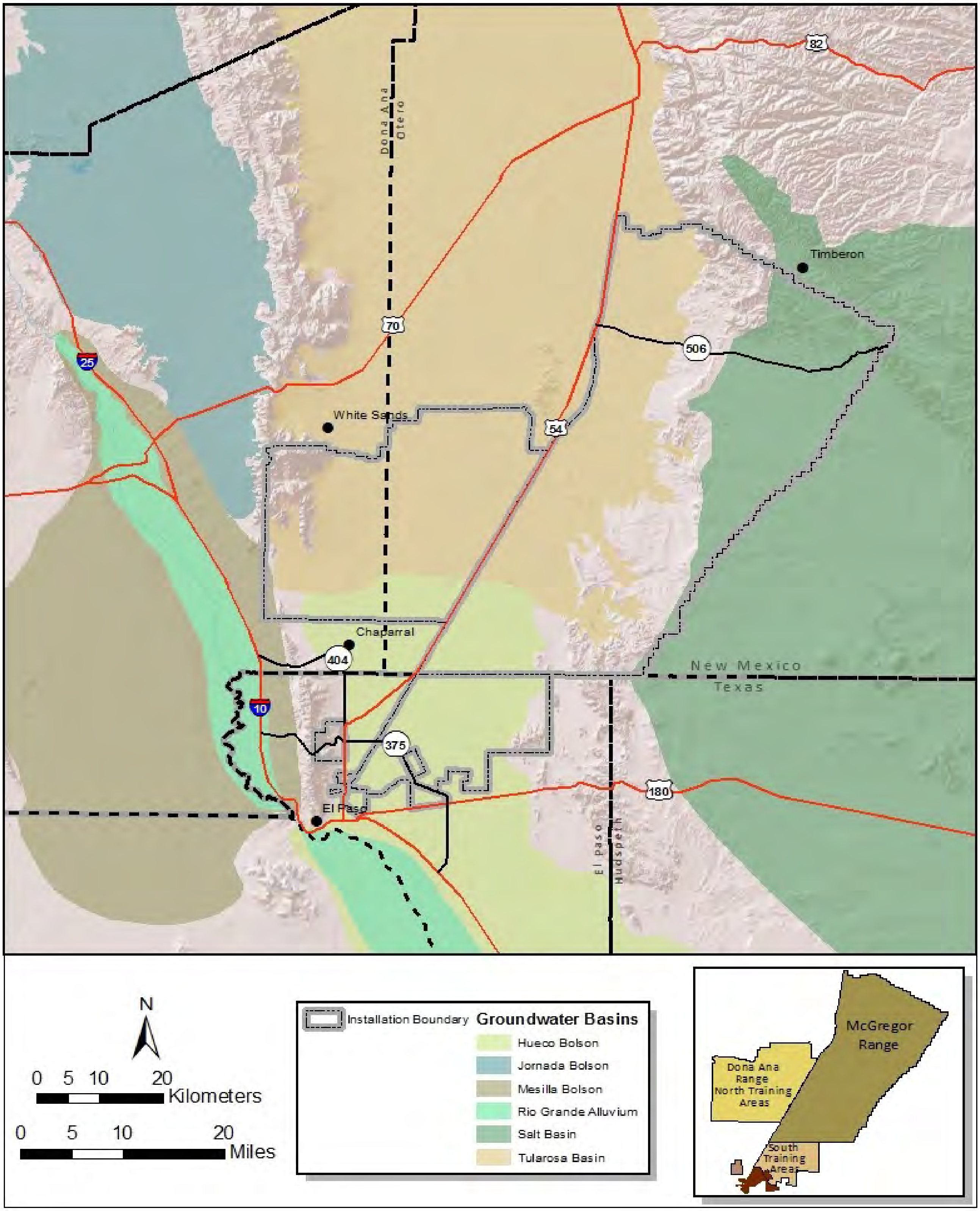
The population and water use of El Paso and surrounding areas continues to expand and limited water supplies in the Hueco Bolson are drawing down. Water use will become more expensive and may result in indefinite deliveries to customers. Contingency plans are in place for future water shortages. At present, water conservation policies are beneficial and necessary. Fort Bliss currently has a residential water conservation policy in effect that limits outdoor watering (Costello 1997).

Hueco Bolson

The Hueco Bolson is an intermontane basin incised by the Rio Grande Valley. The part of the basin north of the Rio Grande is the Upper Hueco Bolson. The principal area of recharge for the Hueco Bolson is the eastern edge of the Franklin and Organ Mountains where runoff from the mountains infiltrates into the coarse gravel of alluvial fans. U.S. Geological Survey (USGS) modeling efforts in the area indicate natural recharge from infiltration at 5,600-acre feet/year (afy). Most of the Rio Grande channel through the El Paso metropolitan area has been lined since 1968, virtually eliminating infiltration to the aquifer from the river in that area. Since 1985, the Fred Hervey water reclamation plant has recharged the basin artificially through injection of tertiary treated effluent into the aquifer at a rate estimated to be less than 2,000 afy (half of the plant's current average daily wastewater treatment) (US Army 2007a).

The majority of the fresh water (chloride less than 250 milligrams per liter) in the Hueco Bolson aquifer lies along the eastern front of the Franklin Mountains. The thickest part of the aquifer underlies Fort Bliss, northeastern El Paso and northern Mexico. The freshwater portion of the aquifer is more than 1,000 ft (305 m) deep in this area. The freshwater zone is widest at or near the water table and narrows with depth. Small areas of fresh water in the eastern portion of the Hueco Bolson aquifer are surrounded by slightly to moderately saline water. The area of fresh water thins toward the east until only brackish water is present. Small pockets of fresh water occur along the base of the Hueco Mountains and serve as a water supply for commercial and residential users. In addition to fresh groundwater in storage, large volumes of brackish water are stored within deeper Hueco Bolson sediments (US Army 2007a).

On-installation wells and El Paso Water Utilities (EPWU) furnish domestic water supplies for the Fort Bliss Main Cantonment Area and the City of El Paso. EPWU obtains groundwater primarily from the Hueco Bolson with some additional groundwater obtained from the Mesilla Bolson. The rate of groundwater pumping from the Hueco Bolson aquifer by the City and Fort Bliss



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1893 **Figure 2.2-7 Groundwater Basins on Fort Bliss**

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currently exceeds the recharge rate, creating water level declines, the largest of which have occurred adjacent to municipal well fields. A desalination plant, operated by EPWU is located within the boundaries of Fort Bliss. The plant draws brackish water from the Hueco Bolson and produces potable water. The impact of the desalination plant operation on groundwater movement and water quality in the El Paso area was evaluated by EPWU (U.S. Army 2004b). This evaluation assumed a projected population growth within the EPWU service area. Modeling predicted the effect of 50 years of pumping from the feed and blend wells that are the source water for the desalination plant. The model results show that the resulting drawdown would alter groundwater flow direction and hydraulic gradients over time (US Army 2007a).

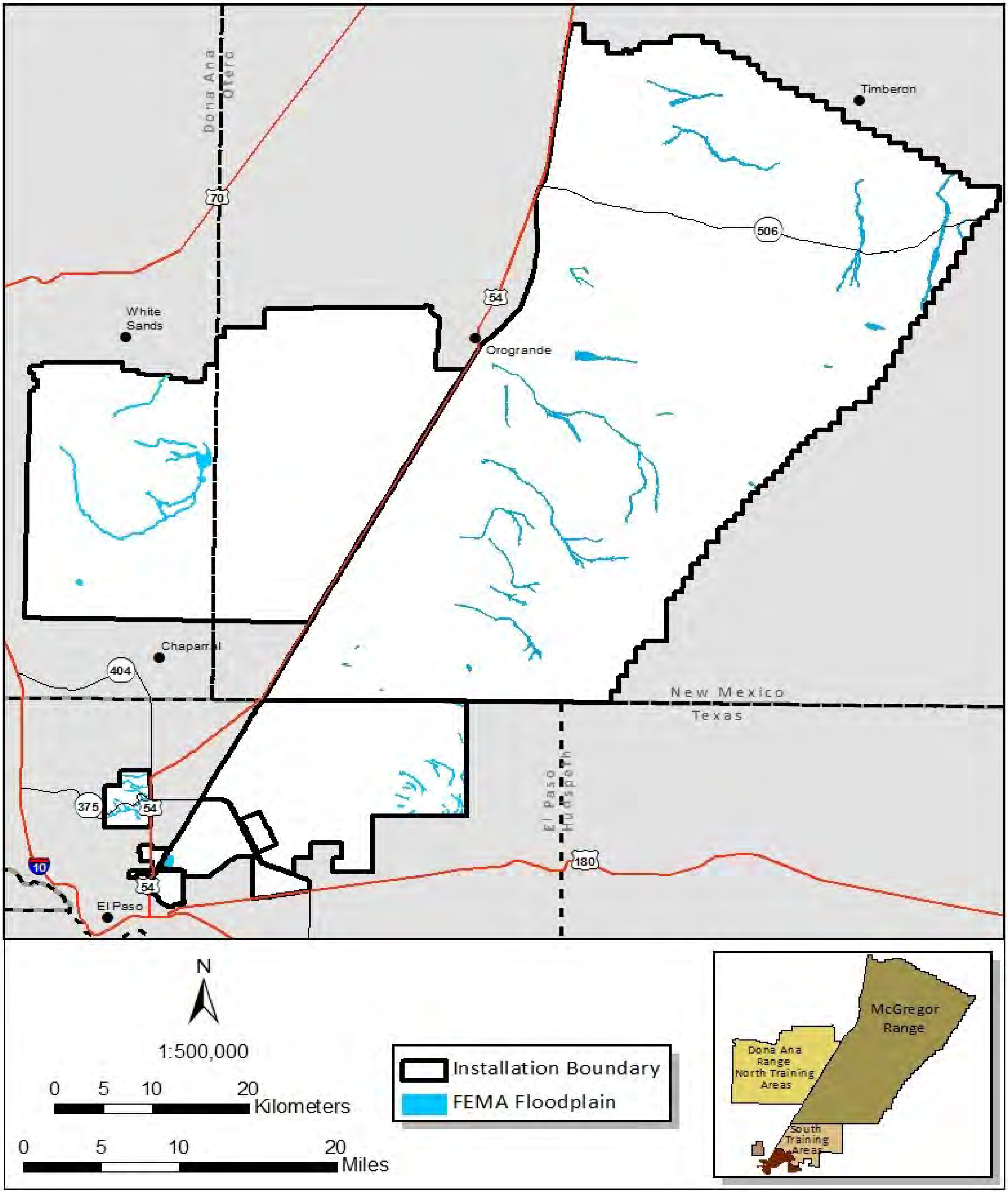
Tularosa Basin

The southern (lower) portion of the Tularosa Basin is contiguous with and geologically similar to the Upper Hueco Bolson. Large quantities of saline water occur within most of the basin sediments. Water enters the groundwater system principally as mountain-front recharge from storm runoff in alluvial fan areas adjacent to the Organ and Sacramento Mountains.

Well fields in the Tularosa Basin supply water for Doña Ana Base Camp, the Main Post at WSMR, and the City of Alamogordo. Groundwater development in the Tularosa Basin area of McGregor Range, except for a few livestock wells, has not been extensive due to water salinity (U.S. Army 2000c).

2.2.6 Floodplains

Floodplains, by EO 11988, *Floodplain Management*, are “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year.” Figure 2.2-8 depicts the 100-year floodplains on Fort Bliss as defined by the Federal Emergency Management Agency (FEMA). Floodplain management on Fort Bliss is in Section 4.19.



1920

1921 **Figure 2.2-8 100-Year Floodplains on Fort Bliss**

2.3 Ecosystems and Biotic Environment

Fort Bliss lies within the Chihuahuan Desert ecoregion (as defined by The Nature Conservancy) except for a small portion of the Arizona-New Mexico Mountains ecoregion found on the north end of Fort Bliss (Figure 2.3-1). The Chihuahuan Desert Ecoregion covers approximately 174 million acres from Mexico to southwestern Texas and southern New Mexico (NMDGF 2006b). This ecoregion is one of the most biologically diverse desert ecoregions of the world and has a high degree of endemism. The Chihuahuan Desert is composed of a series of basins and ranges with a central highland, and is a cooler desert than most other North American deserts due to its relatively high elevation (1,100 to 1,500 m) (World Wildlife Fund [WWF] 2001).

Within the Chihuahuan Desert, the varied and uplifted geology of the Southwestern US and Mexico combined with high variations in climate and soils has created a mosaic of abiotic and biotic environments. The great biodiversity of this region is the result of varied topographic relief and associated heterogeneity of climate, influence from several biogeographic realms, variations in vegetation structure, dynamic climate, and periodic disturbance (Van Devender 1986). Additionally, climatic and temperature gradients have long been recognized as central factors influencing distribution of habitats in the Southwest (Allen et al. 1999).

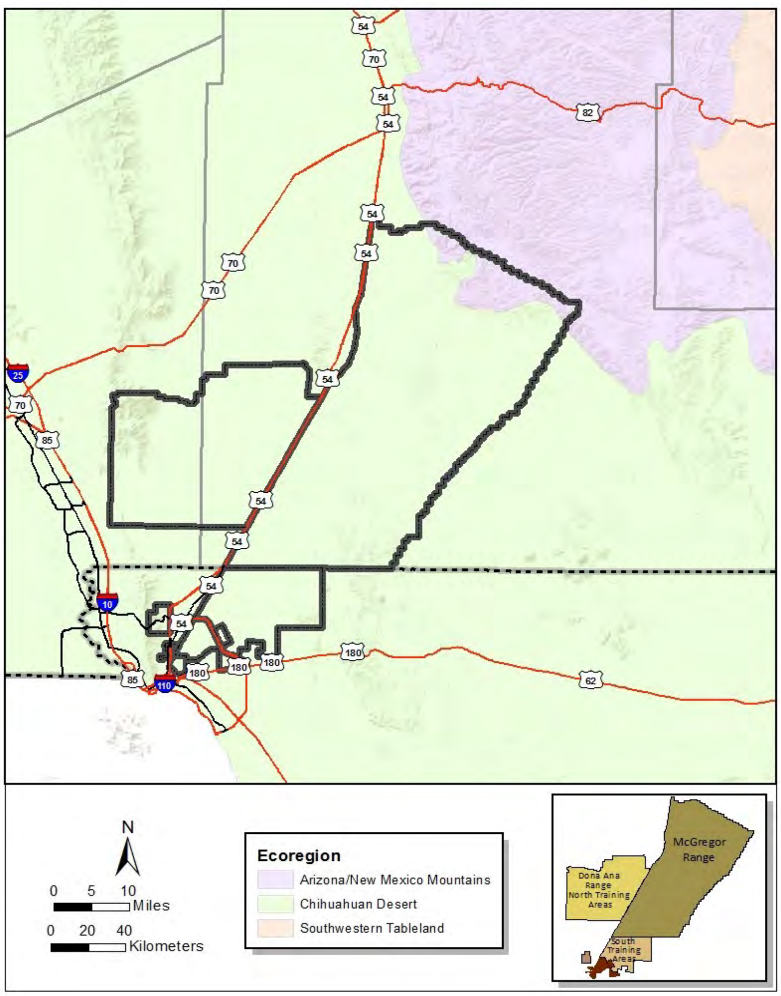


Figure 2.3-1 Chihuahuan Desert Ecoregion

2.3.1 Ecological Management Units (EMUs)

Regional Ecological Management Units (EMUs) (Figure 2.3-2)(Table 2.3-1) and eight Fort Bliss Ecological Management Units (Figure 2.3-3)(Table 2.3-2) were developed as management tools for maintaining ecological connectivity between Fort Bliss and the surrounding lands and to help with developing goals for ecosystem management. Table 2.3-2 depicts the types of military activities that occur within each EMU, as well as the acreage and percentage of each EMU that is available for that military activity or land use. Each EMU has similar vegetation, fauna, topography, soils, and climate, providing manageable systems upon which the following generalizations are based:

- EMUs have soil and topographic similarities.
- Some EMUs contain endemic species resulting in unique systems.
- EMUs encompass areas large enough to warrant specific management objectives.
- Plant assemblages characterizing EMUs are easily distinguished.
- Each EMU composed similarly of topography, soils, vegetation and other natural components, should respond similarly to management and mitigation actions.

Table 2.3-1 Acreage/ Percent of Fort Bliss within Ecological Management Units

Ecological Management Unit	Ft Bliss Acreage	Percentage of Fort Bliss	Percentage of Regional EMU in Fort Bliss
Basin Aeolian	446,274	39.95%	18.5%
Basin Alluvial	153,904	13.78%	84.8%
Foothill-Bajada Complex	282,808	25.32%	8.1%
Franklin Mountains	2,371	0.22%	15.4%
Hueco Mountains	22,527	2.02%	6.4%
Organ Mountains	25,077	2.25%	9.6%
Otero Mesa	127,639	11.43%	19.5%
Sacramento Mountains	55,994	5.02%	1.3%
Total	**1,116,595**	**100%**	

Table 2.3-2 Acreage/Percent of Ecological Management Units Available for Military Land Uses at Fort Bliss

Military Land Use	Basin Aeolian	Basin Alluvial	Foothill-Bajada Complex	Franklin Mountains	Hueco Mountains	Organ Mountains	Otero Mesa	Sacramento Mountains
Aircraft Operations	422,483	153,904	276,948	1,007	22,527	25,077	127,639	55,994
	95%	100%	98%	42%	100%	100%	100%	100%
Dismounted Maneuver	417,314	137,238	244,694	1,007	22,527	23,000	123,899	55,994
	94%	89%	87%	42%	100%	92%	97%	100%
Controlled FTX	0	0	160	0	0	0	3,761	0
	0%	0%	0.06%	0%	0%	0%	3%	0%
Live Fire	415,244	136,338	193,173	36	22,527	23,000	21,680	43,512
	93%	89%	68%	2%	100%	92%	17%	78%
Impact Areas	3,674	16,242	32,017	0	0	2,077	3,740	0
	1%	11%	11%	0%	0%	8%	3%	0%
On Road Vehicle Maneuver	417,109	137,238	233,598	1,007	22,527	23,000	118,865	53,279
	93%	89%	83%	42%	100%	92%	93%	95%
Off Road Vehicle Maneuver, Heavy	411,693	136,265	143,164	36	22,527	0	4,797	0
	92%	89%	50%	2%	100%	0%	4%	0%
Off Road Vehicle Maneuver, Light	411,956	136,265	154,008	36	22,527	0	10,592	9,001
	92%	89%	54%	2%	100%	0%	8%	16%
Environmental Management	442,600	137,661	250,791	2,372	22,527	23,000	123,899	55,994
	99%	89%	89%	100%	100%	92%	97%	100%
Surface Danger Zone	47,836	71,306	134,945	0	724	15,828	35,627	0
	11%	46%	48%	0%	3%	63%	28%	0%

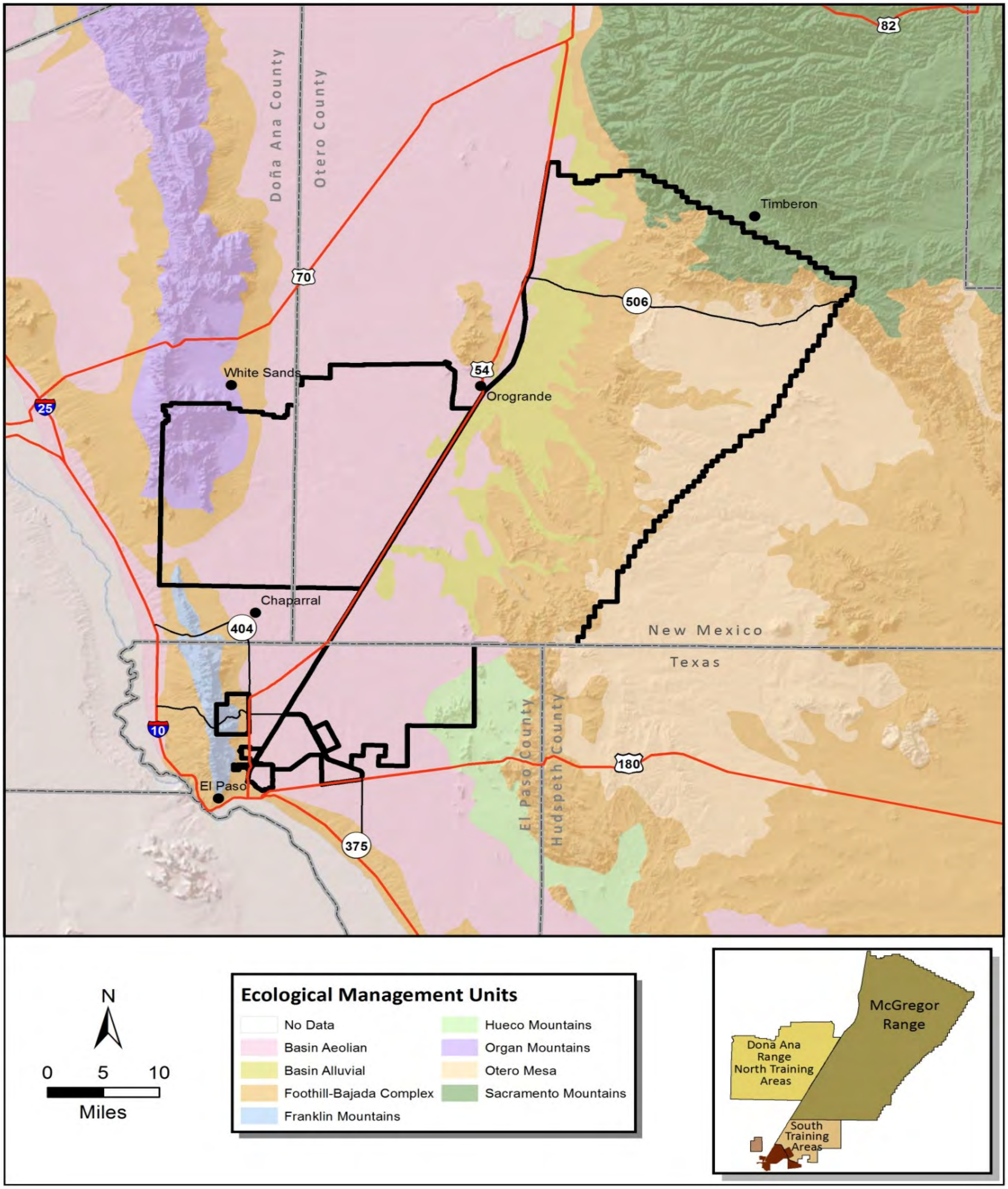
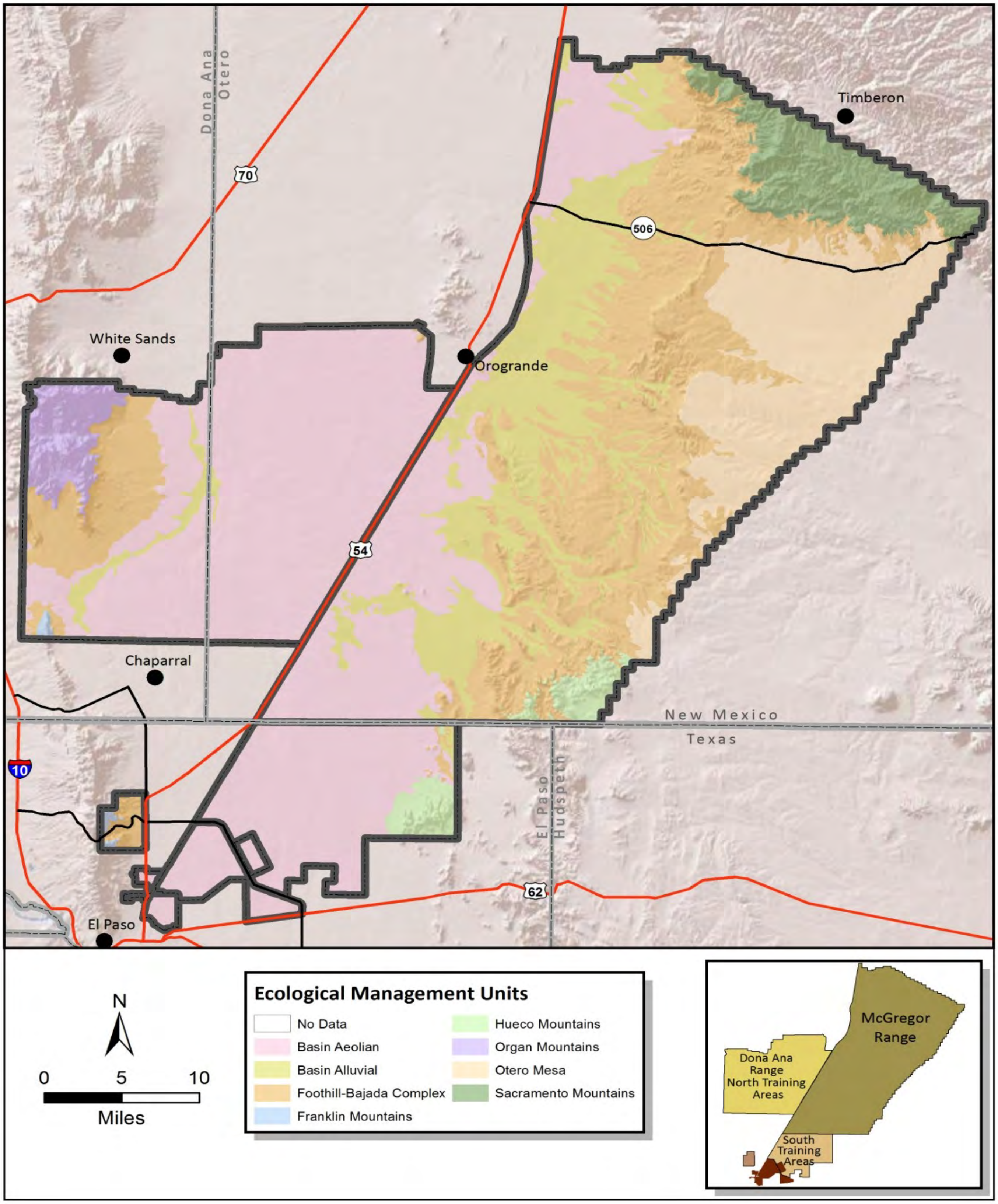


Figure 2.3-2 Regional Ecological Management Units



198
1983 **Figure 2.3-3 Fort Bliss Ecological Management Units**

2.3.1.1 Basin Aeolian

Major landforms of the Aeolian Basin EMU are wind-driven shifting sands, coppice dunes and sandsheets (Figure 2.3-3). Elevation ranges from 3,900 to 5,200 ft (1,189 to 1,585 m). The majority of the EMU is dominated by coppice dunes: small-scale dunes 3 to 9 ft (1 to 3 m) in height centered among mesquite (*Prosopis* spp.) or other shrubs. Areas between coppice dunes are typically devoid of vegetation except during wet periods when annuals and short-lived perennial grasses emerge. The dune soils are mainly Entisols, exhibiting little soil horizon development, and having formed only within the last few hundred years. They are sands and loamy sands that are highly susceptible to wind erosion due in part to the lack of soil structural development and sparse vegetative cover. Typically underlying the coppice sand dunes is a much older (Pliocene-Pleistocene) calcrete soil up to several meters thick. The calcrete ("caliche") is a massive white calcium carbonate unit which generally has a soil texture of sandy clay loam. Where calcrete horizons are exposed on the surface or are shallowly buried, the soils are classified as Aridisols, a soil order having diagnostic subsurface soil horizons (in this case, the calcrete) (USAEC 2013). During dry periods, inter-dune areas are scoured by wind and provide a source of sand for coppice dune enlargement. These dunes began to replace original vegetation in the late 19th century because of grazing and drought. Once established, coppice dunes become very stable due to accompanying shrub cover and are difficult to restore. Among the coppice dunes are older large-scale dunes, 30 to 160 ft (10 to 50 m) in height that occupy areas as large as 2,500 acres (1,000 hectares). Large-scale dunes are characterized by a unique assemblage of sand-obligate species including sensitive briar (*Mimosa quadrivalvis*), pink plains beardtongue *(Penstemon ambiguus*), sand reverchonia (*Reverchonia arenaria*), bindweed heliotrope *(Heliotropium convolvulaceum*), hoary rosemary mint (*Poliomintha incana*), shinnery oak (*Quercus havardii*) and others. The shinnery oak occurs in the northern portions of McGregor Range and represents one of the westernmost stands for the species geographic distribution (Peterson and Boyd 1998). This unique area of shinnery oak is protected by restrictions to off-road traffic. In general, coppice dune terrain limits off-road travel by restricting vehicle traffic to interdunal areas (U.S. Army 1995).

Outside the dune systems, sandy soils persist on the piedmont to the basin bottom transition, forming sparse desert grasslands and shrublands of sandscrub (*Ceanothus* spp.), mesquite, and a mix of mesa dropseed (*Sporobolus flexuosus*), four-wing saltbush (*Atriplex canescens*), and creosotebush (*Larrea tridentata*). Small depressions are scattered and infrequent, but ecologically important because runoff from adjacent areas supports playa and basin grassland communities of tobosa grass (*Pleuraphis mutica)* and dropseed grasses (*Sporobolus* spp.*)* as dominant species.

2.3.1.2 Basin Alluvial

The Basin Alluvial is the EMU landform intermediate between Basin Aeolian and the Foothill-Bajada Complex EMUs. Water-mediated erosion and deposition are the major terrain-forming processes as indicated by intermontane valleys, arroyos, alluvial fans (material deposited by flowing water), alluvial plains and playas. Elevation ranges from 3,900 to 5,200 ft (1,189 to 1,585 m) with upper elevations composed of mainly gravelly soils and at lower elevations, loamy and silty soils occupy depressions adjacent to Basin Aeolian sandsheets and dunes. Silt and clay soils are found in low-lying playas and other depressions that are subject to occasional flooding (USAEC 2013). Desert scrub with scattered inclusions of desert grassland occurs on the shallow rocky soils. Tarbush (*Fluorensia cernua*) and tobosa grass are found on the lower, gently grading to flat bottom areas with siltier soils. Sandy-loam soils support mesquite, sandsage, and a mix of mesa dropseed, four-wing saltbush, and creosotebush.

2.3.1.3 Foothill – Bajada Complex

The Foothill-Bajada Complex EMU is located within two separate areas of Fort Bliss: (1) on the eastern and southern slopes of the Organ Mountains, and (2) running north to south along the western edge of the Sacramento Mountains, Hueco Mountains, and Otero Mesa (Figure 2.3-3). Elevation ranges between 4,000 and 5,500 ft (1,219 to 1,676 m). This area comprises a gently sloping piedmont dissected by drainages originating in the Organ, Franklin, Sacramento, and Hueco Mountains and upon Otero Mesa. Foothills support a diversity of shrubs such as creosotebush, beargrass (*Nolina* spp.), sotol (*Dasylirion* spp.), feather pea bush (*Dalea Formosa)* Mormon tea (*Ephedra* spp.), mariola (*Parthenium incanum*), javelina bush (*Condalia ericoides*), acacia (*Acacia* spp.), mesquite (*Prosopis* sp.), dropseed grasses, grama grasses *(Bouteloua* spp.), muhly grasses (*Muhlenbergia* spp.), tobosa grass and numerous cacti. Soils derive from granite, rhyolite, limestone, and sandstone alluvium and support a mix of desert scrub and grassland. Sandier soils near the basin support increasing numbers of mesquite in transitional communities mixed with creosotebush and grama grasses (U.S. Army 1996b).

Large-scale climbing sand dunes are a significant inclusion within this EMU on the northern end of McGregor Range, just at the edge of the Culp Canyon Wilderness Study Area. The dunes contain typical sand-obligate plant species including shinnery oak (*Quercus havardii)*. There are high quality grama grasslands in portions of the Foothill-Bajada Complex EMU.

2.3.1.4 Franklin Mountains

The Franklin Mountains are a relatively small EMU located within Castner Range and the southwestern corner of Doña Ana Range (Figure 2.3-3). Elevation ranges from 4,300 to 5,500 ft (1,311 to 1,676 m). Vegetation is a mix of desert scrub with some arroyo/riparian vegetation, and a high diversity of cacti and agave (U.S. Army 1996b).

2.3.1.5 Hueco Mountains

The Hueco Mountains EMU is located along the southeastern border of Fort Bliss (Figure 2.3-3). Elevation ranges from 4,500 to 6,000 ft (1,372 to 1,829 m). Steep, limestone mountains with shallow soils alternate with narrow to broad mountain valleys that drain northwest through alluvial piedmonts to the basin floor. Succulent communities with agave, sotol, yucca, beargrass, and cacti populate the lower elevations; juniper (*Juniperus* spp.) grows sparsely on the higher slopes and in canyons. Although there are mesic canyons, there is no montane riparian vegetation or perennial water. Lechugilla (*Agave lechuguilla*), creosotebush, and mariola dominate the shallow soils on the steep, rocky limestone slopes. Sideoats grama (*B. curtipendula*) and black grama occupy gentler slopes as well as gravelly, somewhat deeper soils on the upper piedmont. The lower piedmont supports creosotebush communities (U.S. Army 1996b).

2.3.1.6 Organ Mountains

The Organ Mountains EMU encompasses the slopes and peaks of the Organ Mountains, which are along the northwest border of Fort Bliss (Figure 2.3-3). Elevation ranges from 4,500 to 8,800 ft (1,372 to 2,721 m). Topographic relief is high with steep, precipitous slopes alternating with deep canyons. Steep elevation gradients combine with diverse geologic substrates to support the highest vegetation diversity of any EMU on Fort Bliss. Piñon pine *(Pinus edulis)* and juniper *(Juniperus* spp*.)* are prevalent woodland species. Ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) stands occur at the higher elevations. Oak woodlands occupy the middle slopes along with montane grasslands. Chihuahuan Desert grassland and scrub are found at lower elevations and on south-facing slopes. The Organ Mountains contain several endemic species (Section 2.3.4) and rare cryptogamic plants including lichen (*Omphalora arizonica*) and a fern (*Phanerophlebia auriculata*) (U.S. Army 1996b).

2.3.1.7 Otero Mesa

The Otero Mesa EMU is located adjacent to the Sacramento Mountains and the Foothill-Bajada Complex EMUs (Figure 2.3-3). This area is tableland with a broad drainage system that originates in the Sacramento Mountains to the north and the Otero Mesa escarpment to the west (U.S. Army 1996b). Elevations range from 4,756 to 5,248 ft (1,450 to 1,600 m). This EMU has average cooler temperatures and rainfall several inches higher than adjacent lowlands. The Otero Mesa EMU is a large expanse of relatively intact black grama grasslands that The Nature Conservancy rates as globally important (Benton et al. 2008). Otero Mesa is an uplifted fault block primarily covered by grasslands including gramas, muhlys, and three-awns (*Aristida spp.*) with swale areas having coarser grasses such as tobosa grass. The black grama grasslands of the Southwest, like many types of grasslands in the United States, are diminished ecosystems due to major impacts from agricultural activities (including grazing), fire suppression and invasion of exotic species (Noss and Cooperrider 1994). Many of the grasslands in New Mexico and Texas have been historically overgrazed and are dominated by non-palatable desert shrubs such as mesquite and creosotebush (Dick-Peddie 1993). These desert shrublands do not support the same faunal habitats as intact grasslands. The remaining Otero Mesa grasslands are important faunal and floral habitats, particularly for several migratory bird species now listed as endangered or as species of concern. Four separate plots of land on Otero Mesa are now Areas of Critical Environmental Concern (ACECs) established to enable portions of black grama grasslands to remain intact.

The area north of the mid-mesa uplift consists of gently rolling hills with deep, medium- to fine-textured soils. Piedmont is a landform limited to the northern boundary of the EMU near the Sacramento Mountains. Vegetation is predominantly grama grasses with a creosotebush component that occurs in a transitional zone between Chihuahuan Desert and basin grasslands. Swale grasslands with tobosa and burro grass (*Scleropogon brevifolius*) occur in depressions and broad drainage systems near the piedmont often with a tarbush component (U.S. Army 1996b). The area south of the mid-mesa uplift consists of rocky, rolling limestone hills with shallow soils and shallow upland valleys. Grama grasses dominate here also. The shallower soils favor a slightly different mix of species and these soils contribute to inhibiting shrub development. New Mexico feathergrass (*Hesperostipa neomexicana*) frequently occurs on rocky slopes and ridges, while blue grama (*B. gracilis*) and tobosa grass are often restricted to mesic areas in depressions and north-facing slopes (U.S. Army 1996b).

2.3.1.8 Sacramento Mountains

This EMU comprises the southern end of the Sacramento Mountains, which occur at the northeastern border of Fort Bliss (Figure 2.3-3). Elevations range from 4,450 to 7,700 ft (1,356 to 2,347 m). This area is made up of limestone foothills of diverse aspects alternating with steep-sided canyons and narrow to moderately wide valleys. The entire mountain range includes coniferous forest, riparian zones and springs. However, Fort Bliss occupies only a small portion of this mountain range and is primarily piñon-juniper, scrub oak and mountain mahogany *(Cercocarpus montanus)* associated with a variety of perennial grass species, cacti and succulents.

2.3.2 Plant Communities

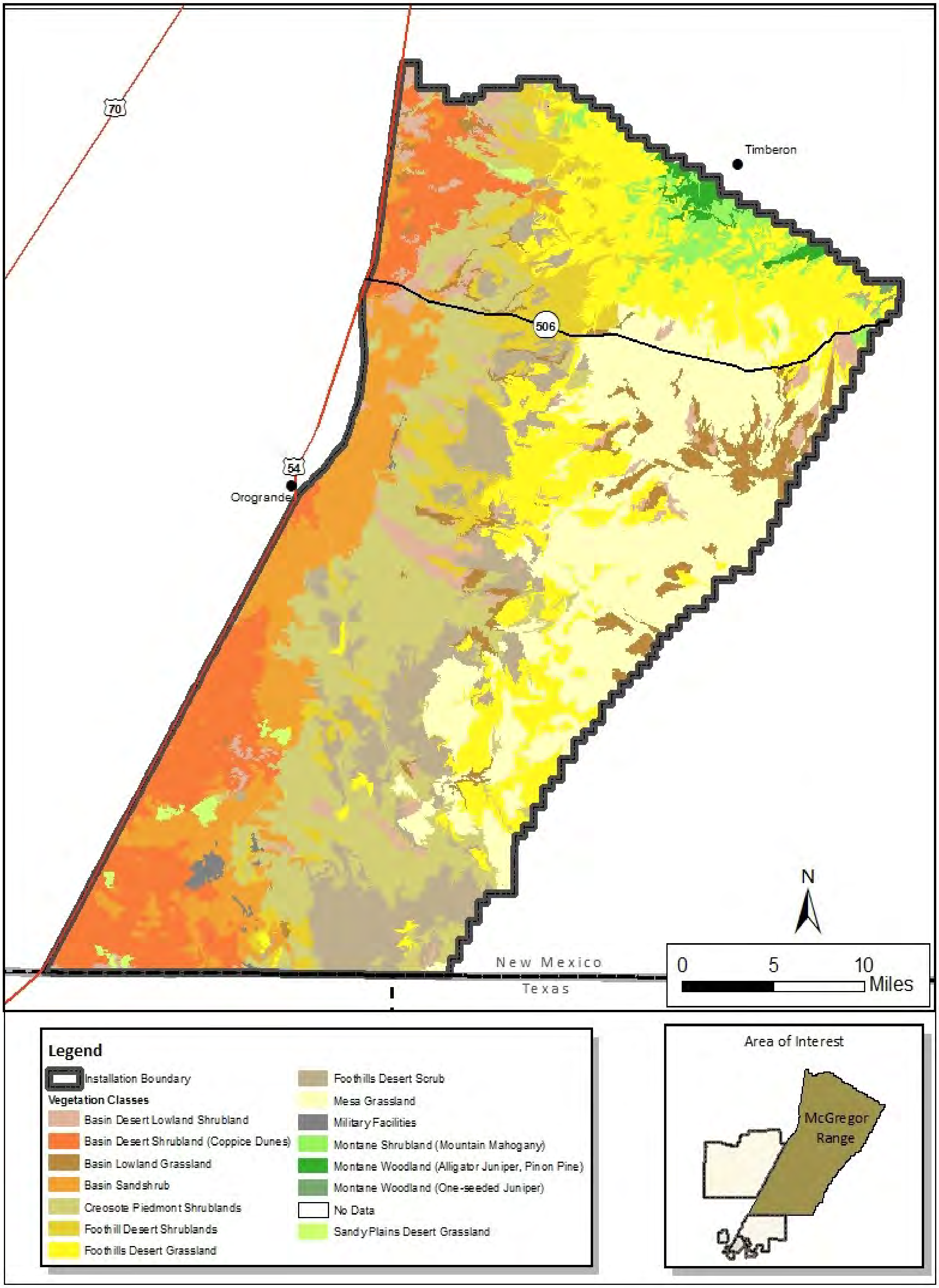
Fort Bliss exhibits a high degree of biodiversity due to its varied topography and large size (approximately 1.12 million acres). Plant communities on the installation range from the Chihuahuan Desert plant communities in the Tularosa Basin to Rocky Mountain conifer forests in the Organ and Sacramento Mountains (U.S. Army 2000c). The major plant community types in the lower areas of Fort Bliss are desert grasslands, Chihuahuan Desert scrub, and plains mesa sandscrub. Types that occur in the mountains are juniper savanna, coniferous and mixed woodlands and montane conifer forests (Dick-Peddie 1993). The cantonment area on Fort Bliss contains trees and other landscaped shrubbery that should be managed and conserved because these areas provide habitat to migratory and non-migratory birds and other small mammal species on Fort Bliss. Of the approximately 4,000 plant species found in New Mexico, an estimated 300 nonvascular (lichen, mosses, liverworts) and 1,200 vascular (ferns, fern allies, ephedras, conifers, flowering plants) species occur on Fort Bliss, with over 800 taxa in the Organ Mountains alone (U.S. Army 2001). See **Appendix D Results of Planning Level Surveys, a. Flora** for a complete list of plants found on Fort Bliss. Fort Bliss vegetation types and their distribution are within Table 2.3-3, and within Figures 2.3-3, 2.3-4, 2.3-5, and 2.3-6. Overall, Fort Bliss is characteristic of a shrub-grassland vegetation community within the Chihuahuan Desert ecoregion.

Grassland plant communities account for over 26 percent of the land on Fort Bliss. Approximately 3 percent of Fort Bliss is sandy plains and basin desert grasslands, 11 percent is mesa and piedmont grasslands, and 12 percent is foothills desert grasslands. This distinction is important as certain animal species, such as the Northern aplomado falcon (*Falco femoralis septentrionalis*), may find much of the grasslands unsuitable for foraging and nesting due to foothills desert grasslands tending to have steep slopes and poor ground cover, or piedmont grasslands that have a high density of shrubs Intermixed. Mesa grasslands and some basin lowland grasslands currently provide the best potential habitat for the Northern aplomado falcon on the installation (Young, et al. 2005). Woodland plant communities cover approximately 1 percent of Fort Bliss.

Table 2.3-3 Land Cover Vegetation Types and Distribution within Fort Bliss

Vegetation Types	Acres	Percent
Basin Desert Lowland Shrubland *Larrea tridentata/Flourensia cernua*	45,178	4.05%
Basin Desert Shrubland (Coppice Dunes) *Prosopis glandulosa/Coppice Dune Formation*	348,847	31.24%
Basin Lowland Grassland *Pleuraphis mutica/Scleropogon brevifolius*	27,344	2.45%
Basin Sandshrub *Artemesia filifolia/Psorothamnus scoparius*	76,160	6.82%
Creosote Piedmont Shrublands *Larrea tridentata* *Larrea tridentata/Bouteloua eriopoda*	141,638 114,819 26,819	12.69% 10.28% 2.40%
Foothill Desert Shrublands *Larrea tridentata/Acacia constricta*	64,416	5.77%

Foothills Desert Grassland *Bouteloua curtipendula*	133,740	11.98%
Foothills Desert Scrub *Larrea tridentata/Partheneium incanum*	95,361	8.54%
Mesa Grassland *Bouteloua gracilis/Bouteloua eriopoda*	127,188	11.39%
Military Facilities Military Facilities	14,721	11.39%
Montane Forest *Pinus ponderosa/Pseudotsuga menziesii*	538	0.05%
Montane Riparian *Fraxinus velutina/Salix exigua*	250	0.02%
Montane Shrubland *Cercocarpus montanum*	18,844	1.69%
Montane Shrubland *Quercus gambellii/Quercus undulata*	1,108	0.10%
Montane Woodland *Juniperous deppeana/Pinus edulis*	8,416	0.75%
Montane Woodland *Juniperous monosperma*	2,019	0.18%
Non-Native Vegetation *Cynodon dactylon/herbaceous*	1,605	0.14%
Sandy Plains Desert Grassland *Sporobolus cryptandrus/Sporobolus flexuosus*	8,908	0.80%



2148
2149 **Figure 2.3-4 McGregor Range Vegetation**

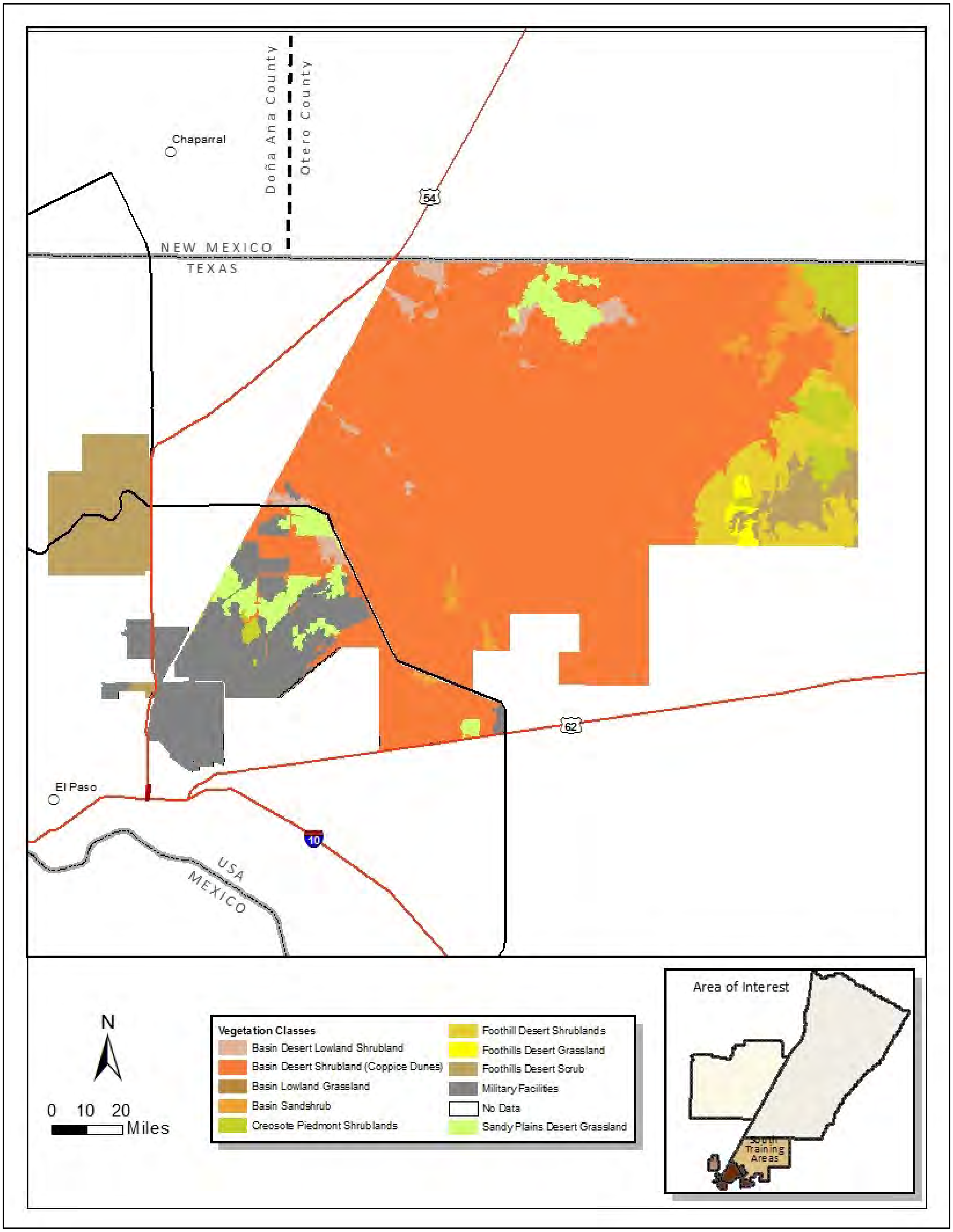


Figure 2.3-5 South Training Areas Vegetation

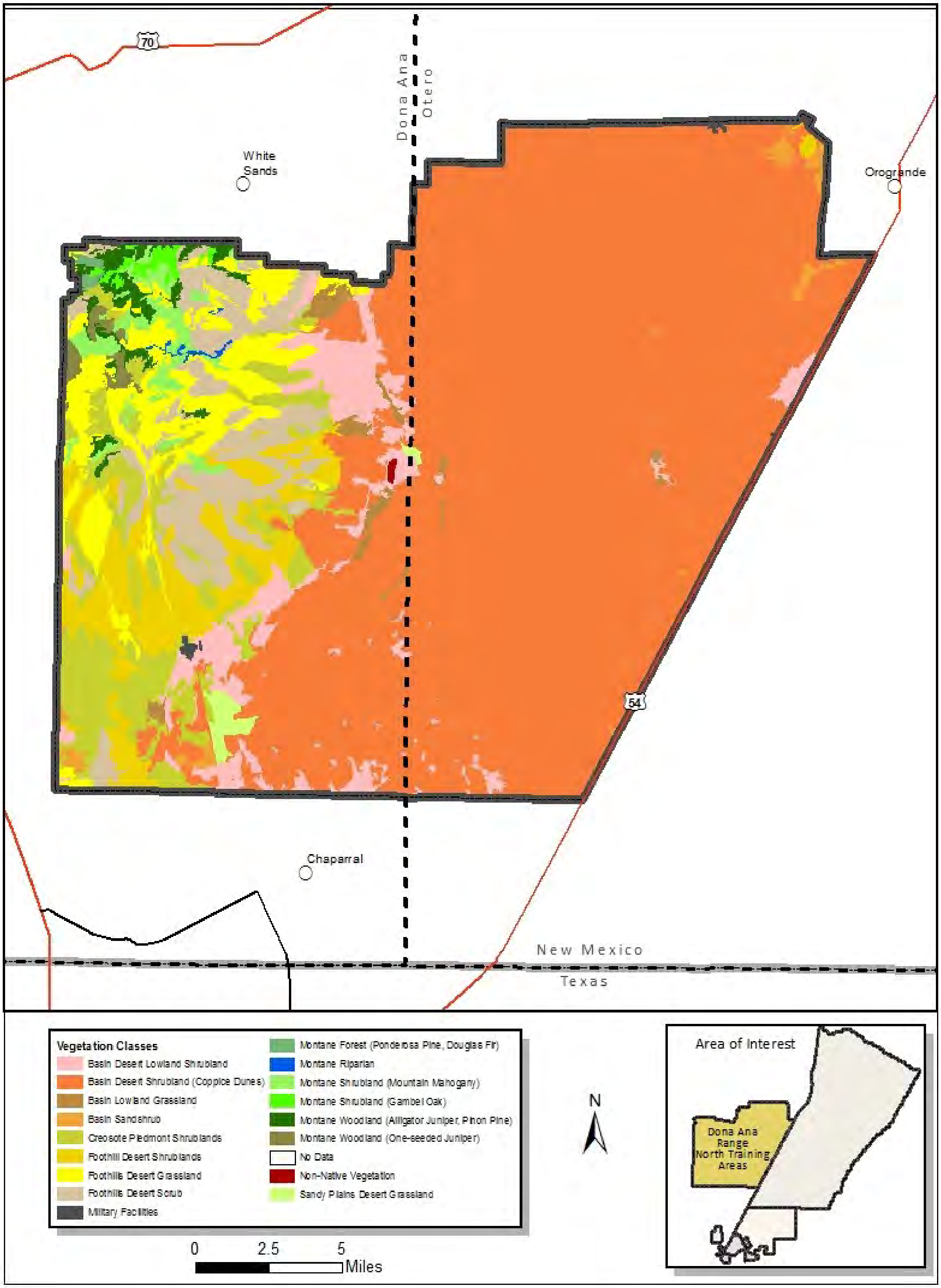


Figure 2.3-6 Doña Ana Range- North Training Areas Vegetation

Piñon-juniper woodlands and montane shrublands dominated by mountain mahogany, montane coniferous forests, and montane shrublands dominated by Gambel oak (*Quercus gambelii*) occur only in the Organ Mountains and Sacramento Mountains foothills on Fort Bliss (U.S. Army 2000c). The desert shrublands on Fort Bliss are mostly located within the Tularosa Basin. About 31 percent of Fort Bliss is mesquite-dominated plant communities, most of which are coppice dunes. Creosote-dominated plant communities cover about 30 percent of Fort Bliss. Isolated islands of deep sand dominated by shinnery oak occur on McGregor Range. These unique areas occur at the entrance to Culp Canyon and Grapevine Canyon. Basin sandscrub communities cover about 8 percent of Fort Bliss and are areas where a large diversity of annual and perennial plant species can occur during years of average to above average precipitation (US Army 2007a).

Historic land use in southern New Mexico has contributed to the current landscape conditions. Shrub-dominated plant communities have replaced grassland plant communities (including black grama grasslands) over large areas of southern New Mexico. This conversion was due to past grazing practices (Buffington and Herbel 1965; Whitford 1997; Pidgeon et al. 2001). Some areas have transformed further to mesquite coppice dunes and have little chance of reverting to historic grassland conditions (Whitford 2002).

The conversion from grassland to shrublands is a step in the desertification process (Schlesinger et al. 1990; U.S. Army 2000c; Whitford 2002; Kerley and Whitford 2000). Wind erosion, which occurs mostly between January and June, is a major problem in the region (USACE 1983). It is associated with both degrading grasslands and shrub-dominated areas, particularly on sandy soils (Okin et al 2006). Long-term studies carried out at the Jornada Experimental Range have shown that the conversion to shrublands has resulted in a reduction in plant species diversity (Huenneke 1996; U.S. Army 2000c; Whitford 2002). Grassland communities had 2.5 times more plant species than mesquite communities did and 1.7 times more plant species than creosote communities. Net primary productivity did not differ substantially between the grassland and shrubland types (Huenneke 1996, Fay et al. 2003). Once established, coppice dunes persist with little conversion back to less-desertified communities. The return to grasslands, even in areas where livestock were excluded for many years, is highly unlikely (Gardner 1951, Buffington and Herbel 1965, Hennessy et al. 1983).

Despite this history, the exclusion of grazing from Fort Bliss for many years has resulted in some areas of land that have made significant recovery from grazing earlier in the century. Some plant communities are approaching pre-settlement conditions within black grama/blue grama grassland, sand sagebrush (*Artemesia filifolia*), and mesa dropseed (*Sporobolus flexuosus*) communities. One such area is a 127,233-acre black grama-blue grama grassland on Otero Mesa and on an area just to the south of Otero Mesa, called the sub-mesa. High grass cover characterizes these areas with a low incidence of shrubs and weedy species and a general absence of exposed and eroded soil. The black grama grasslands are particularly important here because, overall, they have been widely reduced throughout the Chihuahuan Desert ecoregion starting in the 19th century (Whitford 2002).

Two sand sagebrush communities exist on Fort Bliss. Both communities are on northern McGregor Range. The next nearest known sand sagebrush plant community of the type found here is 150 mi. (241 km) north on WSMR (U.S. Army 1996b).

2.3.2.1 Locally Important Natural Resources – Flora Communities

Black Grama Grasslands

The black grama grasslands occurring on the Otero Mesa represent some relatively rare communities still existing in the Chihuahuan Desert. Documented field observations have indicated that if a predominant area of black grama grassland was driven-over by a vehicle, it appeared that portions of the black grama grassland converted into a predominant blue-grama grassland area (U.S. Army 2010i).

Chihuahuan Desert grasslands are the most endangered ecosystem or plant community type in North America (U.S. Army 2010i). Once widespread in southwest Texas, southern New Mexico, Arizona, and the state of Chihuahua in Mexico, almost all of the Chihuahuan Desert grasslands have been converted to desert scrub, or grassland with a high cover of shrubs, such as mesquite and creosote bush (U.S. Army 2010i). The importance of black grama grassland to the Chihuahuan Desert ecoregion has been documented in previous EISs (U.S. Army 2010i) and related documents and is discussed in the Land Use section.

Sand Sagebrush Communities

Three unique, relatively undisturbed, and high quality areas of sand sagebrush vegetation occur on Fort Bliss: one on the east side of the Jarilla Mountains in the central Tularosa Basin, one in the Culp Canyon WSA, and another on portions of the northern Otero Mesa. The nearest known sand sagebrush plant community of similarly high quality to that found on northern Otero Mesa is 150 miles (241 km) north of Fort Bliss (U.S. Army 2010i). Of these three unique areas, the community east of the Jarilla Mountains would be impacted by off-road vehicle maneuver training activities proposed in this EIS.

Shinnery Oak Islands

At the entrance of Culp Canyon, in the Tularosa Basin north of Highway 506, and in the Aeolian Basin there are unique isolated islands of shinnery oak growing in deep sand dunes. Shinnery oak is adapted to sand dune habitats and the species is not found in other situations. Those shinnery oak habitat islands are approximately one-square-mile in size (U.S. Army 2010i).

2.3.2.2 Invasive Plant Species

Seven exotic plant species considered noxious occur on Fort Bliss (Table 2.3-4). Management of these species is in Section 4.8. African rue (*Peganum harmala*) exists on the Cantonment and on Otero Mesa and is the only actively controlled invasive species on Fort Bliss. It invades disturbed sites and once successfully established can spread and outcompete native grasses. Russian thistle (*Salsola tragus*) is another species that has established on disturbed ground and exists throughout Fort Bliss. Salt cedar (*Tamarix ramosissima*) exists at some stocktanks and at other widely scattered locations on Fort Bliss. Malta starthistle (*Centaurea melitensis*) is another potential problem plant that grows along U.S. Highway 54, and may occur along other roadways on Fort Bliss. Other exotic species of concern include Johnsongrass (*Sorghum halepense*) which occurs in some drainages on Fort Bliss, Bermudagrass (*Cynodon dactylon)* which is found on some abandoned farmland that is no longer irrigated, and Kochia (*Bassia scoparia*), which occurs on Otero Mesa (U. S. Army 2009c).

Table 2.3-4 Noxious Weed Species Present on Fort Bliss

Common Name	Scientific Name	NM Status	TX Status
African rue	*Peganum harmala*	B	Other
Russian thistle	*Salsola tragus*	Other	Other
Salt Cedar	*Tamarix ramosissima*	C	NP
Malta starthistle	*Centaurea melitensis*	B	Other
Johnson grass	*Sorghum halepense*	Other	Other
Kochia	*Bassia scoparia*	Other	Other
Bermuda grass	*Cynodon dactylon*	Other	Other

Notes:

Other = listed as noxious in other states but not in New Mexico or Texas.

Class "A" noxious plants are limited in distribution or not found in the state at the present time, but have the potential to cause serious problems.

Class "B" noxious plants are limited to one portion of the state and high priority is given to preventing the movement into new areas.

Class "C" noxious plants are widespread in the state.

NP = Considered a noxious plant by the Texas Department of Agriculture.

2.3.3 Fauna

The borderlands region of New Mexico/Texas has an abundance of invertebrates, birds, mammals, amphibians and reptiles (Table 2.3-5) (Parmenter et al. 1995, Parmenter and Van Devender 1995). There are numerous mammals occurring in the region that are unique to the area. In addition, the highest known arthropod diversity in North America is found in the Southwest (Danks 1994) and several groups of arthropods have their centers of diversity for North America in the borderlands region (Parmenter et al. 1995).

Many of the birds and mammals (and a good proportion of the herpetofauna) found on Fort Bliss are those generally found in the intermountain west, with a substantial Great Plains influence (Parmenter et al. 1995, Parmenter and Van Devender 1995). Approximately 335 species of birds, 58 species of mammals, 39 species of reptiles and 8 species of amphibians occur on Fort Bliss lands. See **Appendix D, Results of Planning Level Surveys** for a complete listing of all faunal species found on Fort Bliss.

In addition, many more species have the potential to occur on Fort Bliss due to the presence of suitable habitat. As is true across the western United States, riparian areas and all areas that carry water (e.g., arroyos) are disproportionately more important for a large variety of wildlife species for cover, breeding, raising young, shade, and as food and water sources. Studies on Fort Bliss have demonstrated that arroyo-riparian drainage areas are used more by wildlife than adjacent upland areas (U.S. Army 1997d, Kozma and Matthews 1997). Over 1,700 miles (2,376 km) of arroyos occur on Fort Bliss (USGS 1997) and many of these arroyos offer suitable habitat for wildlife, particularly avian species (Kozma and Matthews 1997).

Table 2.3-5 Representative Wildlife Species that Occur on Fort Bliss

Representative Wildlife Species	Habitat
Game Mammals	
Mule deer (*Odocoileus hemionus*)	Shrublands, riparian
Mountain lions (*Puma concolor)*	Mountains, foothills, canyons
Black bears (*Ursus americanus)*	Mountains
Pronghorn (*Antilocapra americana)*	Grasslands
Small game (e.g., rabbits)	Various habitats
Nongame Mammals	
Medium-sized predators (coyote [*Canis latrans*], badger [*Taxidea taxus*], bobcat [*Felis rufus*])	Desert shrublands and grasslands
Small rodents (e.g., pocket mouse species [*Chaetodipus penicillatus*], Merriam's kangaroo rat [*Dipodomys merriami*])	Swales and arroyo-riparian
Deer mouse (*Peromyscus maniculatus)*, cactus mouse (*Peromyscus eremicus)*	Acacia scrub
Various bat species	Foothills, escarpments, stock tanks
Migratory Birds	
Black-throated sparrow (*Amphispiza bilineata*), western kingbird (*Tyrannus verticalis*), Scott's oriole (*Icterus parisorum*), ash-throated flycatcher (*Myiarchus cinerascens*), Swainson's hawk (*Buteo swainsoni*), turkey vulture *(Cathartes aura)*	Desert shrublands
Mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), various warblers	Arroyos
Horned lark (*Eremophila alpestris*), eastern meadowlark (*Sturnella magna*), black-throated sparrow (*Amphispiza bilineata*)	Grasslands
Black-throated sparrow (*Amphispiza bilineata*), northern mockingbird (*Mimus polyglottos*), cactus wren *(Campylorhynchus brunneicapillus)*, canyon towhee (*Pipilo fuscus*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*)	Mountains/foothills
Northern mockingbird (*Mimus polyglottos*), bushtit (*Psaltriparus minimus*), spotted towhee (*Pipilo maculates*), black-chinned sparrow (*Spizella atrogularis)*	Piñon-juniper woodlands
Canyon wren (*Catherpes mexicanus*), house finch (*Carpodacus mexicanus*), rock wren (*Salpinctes obsoletus*), rufous-crowned sparrow (*Aimophila ruficeps*)	Montane shrublands

Plumbeous vireo (Vireo plumbeus), black-headed grosbeak (Pheucticus melanocephalus), western woodpewee (Contopus sordidulus), black-chinned hummingbird (Archilochus alexandri)	Mountain riparian
Spotted towhee *(Pipilo maculates),* quail, Cassin's vireo *(Vireo cassinii)*	Mixed conifer forest
House finch *(Carpodacus mexicanus),* bushtit *(Psaltriparus minimus),* canyon wren *(Catherpes mexicanus),* spotted towhee *(Pipilo maculates),* Bewick's wren (*Thryomanes bewickii)*	Ponderosa pine forest
Amphibians and Reptiles	
Leopard lizard (*Gambelia wizlizenii*), striped whiptail (*Aspidocelis inornata*), side-blotched lizard (*Uta stansburiana*), marbled whiptail (*Aspidocelis marmoratus*)	Desert shrublands
Tree lizard (*Urosaurus ornatus*)	Wooded habitat/foothills
Northern earless lizard (*Holbrookia maculata maculate*), southern prairie lizard (*Sceloporus undulatus consobrinus*), striped whiptail	Otero Mesa
Prairie rattlesnake (*Crotalus viridis*), box turtle (*Terrapene ornata*)	Grasslands of Otero Mesa
Texas long-nosed snake (*Rhinocheilus lecontei)*	Sacramento Mountain Foothills, desert shrublands of Tularosa Basin
Invertebrates	
Various ant and termite species	Desert shrublands and grasslands

2.3.3.1 Game Species

Both large game and small game species exist on Fort Bliss. Information on game management and regulations are in Section 4.13, Outdoor Recreation. Small game animals existing in huntable numbers on Fort Bliss include the desert cottontail (*Sylvilagus audubonii*), dove spp., scaled quail *(Callipepla squamata),* Gambel's quail *(Callipepla gambelli)* and numerous waterfowl spp. Big game species include Rocky Mountain elk *(Cervis elaphus),* mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*), javelina (*Pecari tajacu*), oryx (*Oryx gazella*), and Barbary sheep (*Ammotragus lervia*). Information regarding oryx and Barbary sheep are in Section 2.3.3.3, Exotic Species.

Mule deer are common ungulates in western foothills and shrubland habitats. Mule deer occur throughout Fort Bliss but are most common in the mountainous portions of the installation, including the foothills of the Sacramento and Organ Mountains. Past population studies indicate that the number of mule deer in the Sacramento Mountains foothills on McGregor Range ranged from 587 in 1984 to 206 in 1995 (NMDGF 1997). The number of deer observed north of NM Highway 506 was substantially greater than the number observed south of the highway indicating mule deer preference for the Sacramento Mountains foothills over the grasslands and shrublands to the south (NMDGF 1997). Data from aerial surveys of the Hueco Mountains in Texas from 1985 through 1990 indicate that the number of mule deer ranged from 1.2 to 6.1 per 1,000 acres except for 1986 when there were an estimated 23.1 per 1,000 acres (Cantu 1990).

In 2002, Chronic Wasting Disease (CWD) was confirmed in a mule deer on WSMR. CWD is a transmissible spongiform encephalopathy disorder of deer and elk. A drooping head, lethargy and chronic weight loss leading to death (NMDGF 2005) characterize CWD. In 2004, 6 deer tested positive for CWD on WSMR in the Organ Mountains. In 2005, a mule deer from the Sacramento Mountains in Game Management Unit 34 tested positive for CWD. In all, since 2002, 26 deer and 4 elk in Otero and Doña Ana counties have tested positive for CWD. Fort Bliss DPW-E Conservation Branch biologists and NMDGF are cooperating to monitor for this deadly disease. All mule deer and elk harvested on Fort Bliss big game hunts are screened for the disease by Fort Bliss biologists who remove tissues from each brain stem or from the lymphatic system. The tissue samples are collected and sent to NMDGF for laboratory testing for the disease. As a precaution against spreading this disease further, big game hunters on Fort Bliss face restrictions about removing deer and elk parts from the field. Only boned meat, hides and decontaminated skull caps are allowed to leave Unit 29 (McGregor Range game management unit). To date, seven mule deer from Fort Bliss have tested positive for CWD. See Section 4.6.2.4 for further information on CWD management on Fort Bliss.

Pronghorn are grazing ungulates common on prairies throughout the central United States. Pronghorn on Fort Bliss occur mostly in the grassland communities of Otero Mesa and adjacent grasslands, with occasional use of the desert shrubland habitat in the Tularosa Basin. An estimated 500 to 700 pronghorn inhabit Otero Mesa on Fort Bliss.

Javelinas are widely dispersed but uncommon in the Tularosa Basin. Javelinas exist in many locations throughout Fort Bliss but prefer canyons and foothills habitats where there are large numbers of shrubs and prickly pear cactus for food and hiding cover (U.S. Army 2000c, U.S. Army 2001). See Section 4.6.2 for management of big game.

2.3.3.2 Nongame Species

Mammals

Fifty-eight species of native mammals occur on Fort Bliss with an additional 20 species that have the potential to occur because suitable habitat is present. Small mammal surveys conducted in a variety of habitats in 1997 and 1998 revealed that the largest numbers of species used sandy arroyo scrub (14 species) and Desert willow arroyo habitats and the smallest number occurred in mesquite dunes (U.S. Army 2007c). Similarly, studies of rodents in arroyos and associated adjacent upland habitats found the relative abundance and species diversity of small mammals were greater in the swale and arroyo-riparian habitats as compared with any of the other vegetation communities. The most abundant species were the silky pocket mouse (*Perognathus flavus*) and Merriam's kangaroo rat (*Dipodomys merriami*). Other common species were the deer mouse (*Peromyscus maniculatus*), hispid cotton rat (*Sigmodon hispidus*), white-footed mouse (*Peromyscus leucopus*), Chihuahuan pocket mouse (*Chaetodipus penicillatus*), rock pocket mouse (*C. intermedius*), cactus mouse (*Peromyscus eremicus*), western harvest mouse (*Reithrodontomys megalotis*), and Ord's kangaroo rat (*Dipodomys ordii).* Black-tailed jackrabbits (*Lepus californicus*) are also common on the installation in desert shrubland habitat (U.S. Army 1997f).

Medium-sized mammals observed on Fort Bliss include the porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis),* gray fox *(Urocyon cinereoargenteus),* ringtail *(Bassariscus astutus),* badger (*Taxidea taxus*), and bobcat (*Lynx rufus*) (U.S. Army 2000c, U.S. Army 2001).

Past studies conducted for bats at Fort Bliss reveal that a maternity colony of pallid bats (*Antrozous pallidus*) resided at the Orogrande Base Camp in 1997 (Howell 1997). Sensitive bat species are identified on Table 2.3-6. Surveys for bats along the Otero Mesa escarpment and at nearby stock tanks indicate that bats roost in small scattered groups; no large roost sites were observed. Western pipistrelles (*Pipistrellus hesperus*), Myotis (*Myotis* spp.), and free-tailed bats (*Tadarida* spp.) were observed emerging from the escarpment and at some stock tanks (USAF 1997a; 1997b).

Mountain lions (*Puma concolor*) occur in much of Fort Bliss including the Sacramento Mountains, the Organ Mountains and the foothills and canyons of the Otero Mesa escarpment. Black bears (*Ursus americanus*) occur in the Sacramento Mountains portion of Fort Bliss and within the Organ Mountains.

Reptiles and Amphibians

Fifty-four species of reptiles and amphibians have been recorded on Fort Bliss (45 reptiles and 8 amphibians) (U.S. Army 2007a). The Hueco Mountains had the highest herpetofuana diversity on Fort Bliss with 32 species. This is probably due to the limestone fractures and fissures that provide extensive microhabitats (WSMR 2006). The next most diverse habitat is grasslands followed by coppice dune shrublands (Clary et al. 2002, WSMR 2005), Sacramento Mountains foothills and Organ Mountains (U.S. Army 2000c, U.S. Army 2001).

The most diverse group of reptiles is the lizards; 21 species exist on Fort Bliss including six species of whiptails, two geckos, and one skink (U.S. Army 2000c, U.S. Army 2007a). Common species encountered on Otero Mesa were the little striped whiptail (*Aspidoscelis inornatus*) and the lesser earless lizard (*Holbrookia maculata*), while common species in the desert shrublands in the Tularosa Basin were the tiger whiptail (*Aspidoscelis tigris*), and the side-blotched lizard (*Uta stansburiana*).

Twenty-two species of snakes exist on Fort Bliss. The largest number of species recorded was in grasslands on Otero Mesa, followed by desert shrubland, mountain foothills, and mountains. Species such as the western diamondback rattlesnake (*Crotalus atrox*) and bull snake (*Pituophis catenifer)* are common and widespread throughout Fort Bliss. Smith's black-headed snake (*Tantilla hobartsmithi*), Western threadsnake (*Leptotypholops humilis*), and the night snake (*Hypsilglena torquata*) are common in the Hueco Mountains. Coachwhips and whipsnakes (*Coluber spp.*) are common on Otero Mesa, and Plains black-headed snakes (*Tantilla nigriceps*) are common in the Tularosa Basin (U.S. Army 2007a).

During past surveys, it was determined that the box turtle (*Terrapene ornata*) is the only species of turtle observed on Fort Bliss and is most common in the grassland plant communities on Otero Mesa, although it has been regularly observed in the desert shrubland communities of the Tularosa Basin (U.S. Army 2000c, U.S. Army 2001; U.S. Army 2007a). Seven of the eight amphibian species are toads. The most common species of toad captured was the Great Plains toad (*Anaxyrus cognatus*), followed by the Mexican spadefoot (*Spea multiplicata*). The barred tiger salamander (*Ambystoma mavortium*) is found in stock tanks on the Otero Mesa and in the Tularosa Basin (US Army 2007b).

Invertebrates

Invertebrates are abundant and diverse across Fort Bliss. Invertebrates play a crucial role in the trophic structure of desert ecosystems and are a food source for many reptiles, amphibians and birds. There are a number of invertebrates that are of special interest for various reasons (such as endemic species or species prized by collectors), including but not limited to a number of grasshoppers (Lightfoot 1997), beetles, flies, and butterflies (Forbes 1997).

Ants and termites are the most numerous invertebrates found in arid ecosystems (Whitford et al. 1995). Termites play important roles in desert ecosystems by affecting soil properties and consuming vegetation, and are prey for many species (Narayanan 2004; Whitford et al. 1982; Tracy et al. 1998). Termites can be very important in the decomposition of cattle dung; termite biomass exceeds that of cattle (Narayanan 2004). In some areas, termites consume 50 percent or more of all photosynthetically fixed carbon. Ant species are diverse and dominant in the Chihuahuan Desert (Parmenter et al. 1995). By moving subsurface soil to the surface, ants are important for increasing water infiltration into soil (Whitford et al. 1995).

Endemic snail species (*Ashmunella* spp.) exist in the Organ Mountains and on Bishop's Cap (Metcalf 1984, Metcalf and Smartt 1997) (Section 2.3.4 Fort Bliss Special Protection Species).

During the monsoon season in the Chihuahuan Desert an assortment of ephemeral invertebrates (primarily larvae and small shrimp-like crustaceans) hatch in the playas, and reproduce before the water dries up. In turn, this invertebrate fauna provides important food for adult and larval toads, salamanders, and some birds (MacKay et al. 1990).

Birds

Three hundred thirty four species of birds exist on Fort Bliss. Most of these species are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (Section 4.9 and **Appendix F, Migratory Bird Management**). Eighty species occur throughout the year, 129 species are temporary during migration, 42 species are spring and summer residents, and the remaining species occur principally during the winter (U.S. Army 2000c, U.S. Army 2001). Of these bird species, 121 are common, 72 uncommon, and 141 rare to very rare (U.S. Army 2000c, U.S. Army 2001).

Bird species occupying the Main Cantonment Area are typical of more urbanized areas. Species such as the house sparrow (*Passer domesticus*), great-tailed grackle (*Quiscalus mexicanus*), house finch (*Carpodacus mexicanus*), and rock dove (*Columba livia*) are common. Many of the 101 species of waterbirds observed on Fort Bliss exist at the EPWU Oxidation Ponds near the Main Cantonment Area. These bird species also reside at playa lakes and stock tanks in the South Training Areas, Doña Ana Range-North Training Areas, and McGregor Range.

In western states, more than 60 percent of the Neotropical migrants use arroyo/riparian areas for stopover habitat during migration or for breeding (Bystrak 1981, Krueper 1993, Robbins et al. 1993). Riparian habitat, especially, is important for breeding, in-transit, and wintering birds, and is often the most affected by human activities. Studies primarily have focused on mesic riparian areas dominated by species such as willow *(Salix* spp.*)* and cottonwoods *(Populus* spp.*)*, which are found on Fort Bliss only in the Organ Mountains. However, the lower elevation arroyo-riparian drainages throughout Fort Bliss are also important for Neotropical migrants (Kozma 1995; Kozma and Mathews 1997; U.S. Army 1996c; U.S. Army 2000c; U.S. Army 2001). Fort

Bliss has an extensive network of arroyos with well-developed channels that occur throughout the training areas. Much of the focus on arroyo-riparian drainage research has occurred in the foothill and desert scrub communities within the Tularosa Basin and the southeast training areas of McGregor Range. During a 5-year mist netting study, 290 Neotropical migrants (comprising 24 species) were captured in arroyos, while 52 Neotropical migrants (comprising 14 species) were captured in adjacent upland habitat. Neotropical migrants captured all 5 years included the Virginia's (*Vermivora virginiae),* orange-crowned (*Vermivora celata)*, and Wilson's (*Wilsonia pusilla)* warblers; these species were much more common in arroyos than in adjacent uplands.

More information is available on the avian communities in the Tularosa Basin than in other areas of Fort Bliss, primarily due to its size and the number of studies conducted in that area. Bird breeding surveys occurred in the Tularosa Basin in desert shrub habitats dominated by sandsage, mesquite, creosotebush, and whitethorn, (U.S. Army 1996a). Surveys demonstrated that black-throated sparrow (*Amphispiza bilineata)* was the most common species recorded in all four vegetation types (U.S. Army 1996a, U.S. Army 1997b, USACE 1998, Pidgeon et al. 2006). The western kingbird (*Tyrannus verticalis),* Scott's oriole (*Icterus parisorum),* and ash-throated flycatcher (*Myiarchus cinerascens)* were common (U.S. Army 1996a). As many as 40 species exist in this habitat on Fort Bliss including the black-throated sparrow, the northern mockingbird, cactus wren, canyon towhee, house finch, red-tailed hawk, the American kestrel, and mourning dove. Scaled quail (*Callipepla squamata*) and Gambel's quail (*C. gambelii)* were common but were most frequently associated with the larger arroyo-riparian drainages (U.S. Army 1997c).

The black grama grasslands and the mesa grasslands (dominated by blue grama) on Otero Mesa, and the black grama grasslands of the Tularosa Basin also provide important habitat for songbird species (U.S. Army 1996a, U.S. Army 1997b, USACE 1998). Of the 54 bird species recorded, 27 (excluding raptors) were likely to nest in the grasslands, and the other species were likely migrants. Examples of species found in the mesa grasslands include the horned lark (*Ereophila alpestres*), while species such as the eastern meadowlark (*Sturnella magna*), Baird's sparrow, and black-throated sparrow were found in the black grama grasslands (U.S. Army 1996a, U.S. Army 1997b, USACE 1998, Meyer 2003, Pidgeon et al. 2006).

Common breeding bird species present in piñon-juniper woodlands of the Sacramento Mountains foothills within Fort Bliss include the northern mockingbird, bushtit (*Psaltriparus minimus)*, spotted towhee (*Pipilo maculatus)*, and black-chinned sparrow (*Spizella atrogularis)* Common species in the oak/juniper habitat include the mourning dove, house finch, bushtit, Bewick's wren, (*Thryomanes bewickii)* and canyon wren (*Catherpes mexicanus).* The canyon wren was the most common species encountered in the montane shrubland habitat, which is dominated by mountain mahogany (U.S. Army 1994). Other common species in this habitat were the house finch, rock wren (*Salpinctes obsoletus)*, and rufous-crowned sparrow (*Aimophila ruficeps)*. The mountain riparian forest habitat is dominated by velvet ash, gray oak, box elder, and narrow-leaf cottonwood. Plumbeous vireo *(Vireo plumbeus)*, black-headed grosbeak (*Pheucticus melanocephalus)*, western wood pewee (*Contopus sordidulus)*, black-chinned sparrow, and black-chinned hummingbird (*Archilochus alexandri)* were the most common species recorded in this habitat. Within the mesic shrubland habitat, Virginia's warbler was the most common species noted, followed by the bushtit, house finch, canyon wren, and spotted towhee (U.S. Army 1996a, U.S. Army 1997b, USACE 1998).

The mixed conifer forest of the Organ Mountains is represented by Douglas fir and ponderosa pine and supports populations of spotted towhee and Cassin's vireo (*Vireo cassinii*) as the most common species. Within the ponderosa pine forest, the house finch and bushtit were common.

Other common species were the canyon wren, spotted towhee, Bewick's wren, western wood pewee, rock wren, and plumbeous vireo (U.S. Army 1996a, U.S. Army 1997b, USACE 1998).

Common raptors on the installation include Swainson's hawk (*Buteo swainsonii*) and turkey vulture (*Cathartes aura*) as the most frequently observed during past breeding bird surveys in the desert shrublands (U.S. Army 1996a, U.S. Army 1997b). Other raptor species observed on Otero Mesa were the golden eagle (*Aquila chrysaetos*), merlin (*Falco columbarius*), burrowing owl (*Athene cunicularia*), and great horned owl (*Bubo virginianus*). The red-tailed hawk (*Buteo jamaicensis*) was another common buteo that nested on portions of Otero Mesa. Surveys along the Otero Mesa escarpment revealed a nesting pair of falcons consisting of a prairie falcon (*Falco mexicanus*) and a possible prairie/peregrine falcon (*Falco peregrinus*) hybrid near Rough Canyon (U.S. Army 1998j, U.S. Army 1998e). Other surveys on the Otero Mesa escarpment and in the Hueco Mountains recorded an active golden eagle nest (U.S. Army 1998j). Relatively common raptors were observed nesting in that area as well, including the American kestrel (*Falco sparverius*), great horned owl, and barn owl (*Tyto alba*) (U.S. Army 1998j). Winter raptor surveys in the desert shrubland habitat showed that the golden eagle, red-tailed hawk, and American kestrel were the most common species (U.S. Army 2000c, U.S. Army 2001). The great horned owl and western screech owl (*Megascops kennicottii*) occurred during winter surveys (Meyer 1996). The ferruginous hawk (*Buteo regalis*) occurred on the mesa in the winter and spring (USACE 1998).

2.3.3.3 Migratory Birds

Executive Order (EO) #13186, Responsibilities of Federal Agencies to Protect Migratory Birds (2001), recognizes the ecological and economic importance of migratory birds to this and other countries. It requires federal agencies to evaluate the effects of their actions and management plans on migratory birds (with an emphasis on species of concern) in their NEPA documents. Species of concern are those identified in the report "Migratory Nongame Birds of Management Concern in the United States" (USFWS 1995), priority species identified by established plans such as those prepared by Partners in Flight [PIF], or listed species in 50 CFR 17.11 Endangered and Threatened Wildlife (USFWS 2005b).

The New Mexico Bird Conservation Plan, developed by the New Mexico Chapter PIF, lists 12 habitat types that occur on FBTC. These habitat types, based on both bird assemblages and vegetation associations, were ranked (high to low) based on the habitat's importance to birds, the degree of threat, and opportunities for habitat protection. Finally, each habitat type received a ranking for the opportunity for conservation (NMPIF 2007). Of the 94 priority bird species that the plan lists as being associated with those habitat types, 49 occurred on Fort Bliss. A list of these habitat types and bird species, as well as policies, programs and other management guidelines is in **Appendix F, Migratory Bird Management.**

2.3.3.4 Exotic Species

Oryx are a native antelope of Africa introduced to WSMR in 1969 by the NMDGF. The oryx population has been growing in southern New Mexico over the past several decades and they now occur across the FBTC. Oryx have become common in Doña Ana Range-North Training Areas and on McGregor Range. These ungulates exist in the area of Mack Tanks in the Tularosa Basin and evidence of oryx is common at New Tank in the Hueco Mountains (U.S. Army 1997g, USAF 1997c). Population reduction hunts occur on Doña Ana Range for Fort Bliss active duty military personnel and on McGregor Range for active duty military personnel and for the public.

Another exotic species that has expanded their range onto Fort Bliss is the Barbary sheep. Barbary sheep are native to northern Africa and released into New Mexico in 1950 and in Texas in 1957 (Harding County 2007). Limited hunting for Barbary sheep occurs on Fort Bliss for both active duty military personnel and for the public.

Feral populations of domestic animals also exist on the base whose activities can interfere with healthy ecosystem function. These include domestic cats (*Felis domesticus*), and dogs (*Canis familiaris*). Other non-native species such as house (or English) sparrows (*Passer domesticus*), European starlings (*Sturnus vulgaris*), house mice (*Mus musculus*) and rats (*Rattus norwegicus*) are common inhabitants of the Main Cantonment Area and other areas. Bullfrogs (*Lithobates catesbeianus*) occur in some water catchments and likely affect populations of native frogs that are their prey species (e.g., spadefoots [*Scaphiopus couchii* and *Spea* spp.] and *Anaxyrus* spp). While it is not feasible to manage established populations of sparrows or starlings, other organisms might need control. Any mitigation programs and adaptive management procedures will likely involve Fort Bliss DPW-E, TPWD and NMDGF, and implemented to minimize/prevent impacts on native plants and animals.

2.3.4 Threatened and Endangered Species

Three categories of wildlife and plants with special status are included in this section and in Table 2.3-6 **(Appendices G, K and I contain management plans and actions for special status species):**

1. **Federally Listed Threatened and Endangered Species** The Endangered Species Act (ESA) provides protection to species listed as endangered or threatened. Endangered species are those species that are at risk of extinction in all or a significant portion of their range. Threatened species may be listed as endangered in the near future if declines in populations or available habitats continue.

2. **State Listed Threatened and Endangered Species** New Mexico and Texas maintain their own lists of state endangered and threatened plant and animal species that have shown declines within respective states. These species may or may not be included on federal ESA lists.

3. **Other Sensitive Species** These include federal candidates for listing, species proposed for federal listing, and state-listed sensitive species and species of concern – including those recognized as Species of Greatest Conservation Need. Federal candidate species are those for which the USFWS has sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened, but issuance of proposed rules for listing these species is preceded by higher priority listing actions. Federal proposed species are those proposed for listing as endangered and threatened under the ESA, and for which formal ruling is in progress. Species of concern are those identified to receive attention for planning purposes by state agencies. At present, only those species listed as threatened or endangered receives protection under the ESA.

2.3.4.1 Designated Critical Habitat

Fort Bliss does not contain any federally designated critical habitat.

"Critical habitat" is a term used under ESA to define a specific geographic area(s) that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection (USFWS 2005c). Critical habitat may include areas not occupied by the species but may be needed for its recovery.

2.3.4.2 Federally Listed Species

Table 2.3-6 lists 53 sensitive, threatened or endangered species of flora and fauna known to occur, or having the potential to occur, on Fort Bliss. The list includes current species' federal and/or state status and provides brief comments on known occurrences within the installation. Because of the diversity of habitats on Fort Bliss, there is potential that some status species may occur but have never been observed. Continued monitoring and documentation of Fort Bliss' natural environment helps ensure that newly discovered sensitive species receive adequate protection. Fort Bliss has an active monitoring and survey program for sensitive, threatened and endangered (T&E) plant and animal species. Several contracts each year require to survey and monitor for sensitive and T&E species. A natural resources database captures the results of all surveys for these species and includes species locations, dates of survey, other species observations, GPS data and areas surveyed where species were not located. The database is managed by DPW-E Conservation Branch for Fort Bliss and is continually updated as new survey data comes in. Information gathered in the database allows Fort Bliss natural resource managers to monitor species trends and make management decisions based on those trends. **Appendix I** contains species management plans written for some of the sensitive and T&E species on Fort Bliss.

Of the 53 sensitive plant and animal species that are known to occur, or have the potential to occur on Fort Bliss, 9 are federal special status species (Table 2.3-6). Eight of these species are federally listed as threatened or endangered and one is a candidate for listing. Of these eight listed species, only the Sneed's pincushion cactus (*Escobaria sneedii* var. *sneedii*) occurs on Fort Bliss. Six of the seven endangered species are Kuenzler's hedgehog cactus [*Echinocereus fendleri* var*. kuenzleri*], interior least tern [*Sterna antillarum athalassos*], yellow-billed cuckoo [*Coccyzus americanus*], southwestern willow flycatcher [*Empidonax trailii extimus*], piping plover [*Charadrius melodus]*, and Mexican spotted owl [*Strix occidentalis lucida*]. These species are not known to occur; have no suitable habitat or insufficient habitat to maintain a population; or exist as rare, transitory, or seasonal migrants, and breeding is not known to occur on Fort Bliss. The Northern aplomado falcon is federally listed as endangered, but is considered a Nonessential Experimental Population within the states of NM and AZ. The Northern aplomado falcon occurs occasionally on Fort Bliss on Otero Mesa, but only as a transitory visitor. Sprague's Pipit (*Anthus spragueii*) is a federal candidate species for listing as endangered and occurs on the grasslands of Otero Mesa during the winter.

For specific Fort Bliss conservation goals and management prescriptions for Federaly listed species, refer to Chapter 4.

Table 2.3-6 Threatened, Endangered, Candidate and Sensitive Species Known to Occur or Having the Potential to Occur on Fort Bliss

Plants		
Species	**Status**	**Comments**
Alamo Beardtongue (*Penstemon alamosensis*)	NM-SC; TX-SGCN	Last monitored on Fort Bliss in 2010 (U.S. Army 2010e) in Hueco Mountains, on steep limestone cliffs.
Crested Coral-Root (*Hexalectris spicata*)	NM-E	Last documented on Fort Bliss in 1992 (U.S. Army 1994) in North Canyon of the Organ Mountains.
Desert Night Blooming Cereus (*Peniocereus greggii var. greggii*)	NM-E; TX-SGCN	Last documented during a survey on Fort Bliss in 2011, (U.S. Army 2011g) on the eastern bajadas of the Organ Mountains.
Hueco Mountains Rock Daisy (*Perityle huecoensis*)	TX-SGCN	Occurs on vertical limestone cliffs in the Hueco Mountains within relatively narrow, deep, shaded canyons (U.S.Army 2010f)
Kuenzler hedgehog cactus (*Echinocereus fendleri var. kuenzleri*)	Fed-E; NM-E	Surveys have been conducted on gravelly gentle slopes or benches in the Sacramento Mountains on Fort Bliss. This is similar in habitat to existing populations occurring north of the Fort Bliss boundary in the Sacramento Mountains (U.S. Army 2011b). It has not been documented on Fort Bliss.
Nodding Cliff Daisy (*Perityle cernua)*	NM-SC	Monitored on Fort Bliss Organ Mountains (U.S. Army 2010a) growing in cracks on igneous cliffs with pinon-juniper and mixed conifer vegetation zones.
Organ Mountain Paintbrush *(Castilleja organorum)*	NM-SC	Plants were documented during surveys in 2012 (U.S. Army 2012b) in the Organ Mountains, along partly shaded mountain slopes ranging in elevation of 2,000 – 2, 400 meters, that contained pinon-juniper woodland or montane coniferous forests.
Organ Mountains Evening Primrose (*Oenothera organensis*)	NM-SC	Surveys for new plants, as well as monitoring of established plants were conducted in 2010 (U.S. Army 2010c). Plants occur in canyon bottoms and drainages, in mesic environments at elevations of 4860 to 7800 ft.
Organ Mountains Figwort (*Scrophularia laevis*)	NM-SC	Survey and monitoring of established plots were conducted in 2010 (U.S. Army 2010d) in the Organ Mountains. Plants occur in Pinon-Juniper woodland and Rocky Mountain montane coniferous forest at elevations of 6,200-7,800 ft.
Organ Mountains Pincushion cactus (*Escobaria organensis*)	NM-E	Survey and monitoring of established plots were conducted in 2010 (U.S. Army 2010b) in the Organ Mountains. Specimens were observed in canyons, and upper ridgelines especially near Organ Peak.

Sand Prickly Pear *(Opuntia arenaria)*	NM-E; TX-SGCN	Surveys have been conducted on the southwestern portion of Fort Bliss Training Center in sandy substrates. No plants were detected (Corral Communication 2013). The species occurs in Doña Ana County, NM and El Paso and Hudspeth Counties, TX in sandy dunes or on sandy flood plains in arroyos (USACE 1997; U.S. Army 2014a).
Sandhill goosefoot (*Chenopodium cycloides*)	TX-SC	Species exists near Fort Bliss (Corral Communication 2013). Further information has identified specimens in El Paso County at Hueco Tanks State Park (U.S. Army 2014a; Ladyman 2006).
Sneed's Pincushion Cactus (*Coryphantha sneedii var. sneedii)*	Fed-E; NM-E; TX-E,SGCN	Survey and monitoring of existing populations have occurred continuously since 1980. Recent surveys were done on potential habitat on Doña Ana Range in 2011 (U.S.Army 2011d) and in the Franklin Mountains in 2014 (Corral 2014). Sneed's populations occur on South Hill, North Hill and Webb Gap on Fort Bliss.
Standley whitlowgrass (*Draba standleyi*)	NM-SC; TX-SGCN	Observed in the Organ Mountains; last documented in 1992 (U.S. Army 2014a). Last surveyed for in 2011, no plants found (GSRC 2012c).

Invertebrates		
Species	**Status**	**Comments**
Franklin Mountain Talus Snail (*Sonorella metcalfi*)	NM-SGCN	This species was not found in the most recent survey of the Organ Mountains (U.S. Army 2008d). Currently two records exist, which show this species was collected on Fort Bliss (U.S. Army 2014a). One specimen was collected in the Franklin Mountains in 1996 near the Wilderness park and the other was collected in 1972 in Finley Canyon in the Organ Mountains.
Boulder Canyon Woodland Snail (*Ashmunella auriculata)*	NM-SGCN	Surveys were conducted in the Organ Mountains in 2006 (U.S. Army 2008d). This species of woodlandsnail was found in Beasley Canyon, Boulder Canyon, and Fillmore Canyon.
Beasley Woodlandsnail (*Ashmunella beasleyorum*)	NM-SGCN	Surveys were conducted in the Organ Mountains in 2006 (U.S. Army 2008d). This species of woodlandsnail was observed in Ash Canyon.
Organ Mountain Woodlandsnail (*Ashmunella organensis)*	NM-SGCN	Surveys were conducted in the Organ Mountains in 2006 (U.S. Army 2008d). This species of woodlandsnail was observed in Bar Canyon, Chimney Basin, Fillmore Canyon, Finley Canyon, North Canyon, Rock Springs Canyon, and Soledad Canyon.

Maple Canyon Woodlandsnail (*Ashmunella todseni*)	NM-SGCN	Surveys were conducted in the Organ Mountains in 2006 (U.S. Army 2008d). This species of woodlandsnail was observed in Ash Canyon and Maple Canyon.

Reptiles		
Species	**Status**	**Comments**
Gray-banded kingsnake (*Lampropeltis alterna*)	NM-E, SGCN	Surveys were conducted from 2003-2005, (U.S. Army 2007b) however none were encountered. This species is expected to occur therefore Fort Bliss will continue surveying suitable habitat.
Mottled Rock Rattlesnake (*Crotalus lepidus lepidus*)	NM-T, SGCN	Surveys were conducted from 2003-2005 (U.S. Army 2007b) *C. Lepidus* was not encountered on this survey. This species is expected to occur therefore Fort Bliss will continue surveying suitable habitat.
Mountain short-horned lizard (*Phrynosoma hernandezii hernandezii*)	TX-T, SGCN	Surveys were conducted from 2003-2005, (U.S. Army 2007b) however none were observed. This species is known to occur therefore Fort Bliss will continue surveying suitable habitat.
Texas Horned Lizard (*Phrynosoma cornutum*)	TX-T, SGCN	Surveys were conducted from 2003-2005 (U.S. Army 2007b) this species was observed in the Tularosa Basin on North McGregor Range.
Texas lyre snake (*Trimorphodon biscutatus vilkinsoni*)	TX-T, SGCN	Surveys were conducted from 2003-2005 (U.S. Army 2007b) this species is known to occur on Fort Bliss, however it was not encountered in this survey. Fort Bliss will continue surveying suitable habitat.

Birds		
Species	**Status**	**Comments**
Baird's Sparrow *(Ammodramus bairdii)*	NM-T, SGCN; TX-SGCN	Species was observed in 2011 (U.S. Army 2011e) on Fort Bliss. Recommendations are to continue surveying and develop habitat maps.
Bald Eagle *(Haliaeetus leucocephalus)*	NM-T, SGCN; TX-T, SGCN	Surveys on wintering Bald Eagles were last conducted on Fort Bliss in 1994-96 (U.S. Army 1996f) on the northern portion of McGregor Range. Eagles were observed November through March. Continue monitoring and surveying in suitable habitats.
Bell's Vireo *(Vireo bellii)*	NM-T,SGCN; TX-T,SGCN	Species was observed in 2011 (U.S. Army 2011e) on Fort Bliss. Recommendations are to continue surveying and develop habitat maps.
Ferruginous hawk *(Buteo regalis)*	NM-SGCN; TX-SC, SGCN	Species was observed in 2011 (U.S. Army 2011e) on Aplomado survey routes on Otero Mesa and in El Paso Draw, nine times between the months of February – March. Monitoring of suitable habitat ongoing.

Gray Vireo *(Vireo vicinior)*	NM-T,SGCN	Species observed in surveys in 2012 (U.S. Army 2013f) in the Sacramento and Organ Mountains at elevations ranging from 5,200-6,100 ft.
Interior least tern *(Sterna antillarum athalassos)*	Fed-E; NM-E; TX-E	One observation from the Fort Bliss sewage ponds (Locke 2014).
Loggerhead Shrike *(Lanius ludovicianus)*	NM-S, SGCN; TX-SC, SGCN	Species was observed frequently from February – August 2011 (U.S. Army 2011e) on all survey routes for Aplomado Falcon survey on McGregor Range.
Piping plover *(Charadrius melodus)*	Fed-E; NM-E; TX-T	Species was observed once in 1997 at the Fort Bliss sewage ponds (U.S. Army 1997).
Mexican Spotted Owl *(Strix occidentalis lucida)*	Fed-T; NM-S, SGCN; TX-T, SGCN	Surveys were conducted in the Organ Mountains and the Sacramento Mountains of Fort Bliss (U.S.Army 1996d) in suitable habitat. As of 2013, a single sighting is documented in the Natural Resource Database (U.S. Army 2014a) The species has been seen on WSMR in the Organ Mountains near the boundary with Ft. Bliss.
Northern Aplomado Falcon *(Falco femoralis septentrionalis)*	Fed-E; NM-E, SGCN; TX-E, SGCN	Nine sightings of Aplomado Falcon on Otero Mesa, ranging from 1917-2010 are within Fort Bliss boundaries (U.S. Army 2011e). Surveys were conducted each year from 2010-13 in El Paso Draw and Otero Mesa; this species was not detected.
Peregrine falcon *(Falco peregrinus)*	NM-T, SGCN; TX-T, SGCN	Avian surveys were conducted from May-August 2011 in the Organ Mountains on Fort Bliss (U.S. Army 2012e). A pair was observed within Fillmore Canyon, but not confirmed as nesting.
Mountain Plover *(Charadius montanus)*	Fed-T; NM-T; TX-T, SGCN	Surveys of potential habitat were conducted in March through May of 2011 during the breeding season on Otero Mesa desert grasslands (U.S. Army 2011f) Historic records of sightings of Mountain Plover exist for Otero Mesa and areas adjacent to Fort Bliss. No birds were observed during this survey.
Southwestern Willow Flycatcher *(Empidonax trailii extimus)*	Fed-E;NM-E, SGCN; TX-E	No confirmed observations. A total of 24 willow flycatchers have been documented during 13 separate occasions (U.S. Army 2014a); these were not identified to subspecies and none were observed nesting. Surveys were conducted in the Organ Mountains for potential habitat as well as for this subspecies. The most suitable riparian habitat was identified in Soledad Canyon, no birds were detected (U.S.Army 1997e).
Sprague's Pipit *(Anthus spragueii)*	Fed-C; NM-SGCN; TX-SC, SGCN	Survey and monitoring was conducted in the winter of 2012 (U.S.Army 2013e). Species was observed in El Paso Draw on Otero Mesa, likely due to favorable habitat of flat topography, loamy soils, and herbaceous cover.

Varied Bunting *(Passerina versicolor)*	NM-T,SGCN	One observation from the Sacramento Mountains during gray vireo surveys (U.S. Army 2013f). It is suggested this spp. is a rare transient, that suitable habitat does not exist on Fort Bliss (USACE 1999).
Western Burrowing Owl *(Athene cunicularia)*	NM-SGCN; TX-SC, SGCN	Survey and monitoring (USACE, 1998; U.S.Army 1998g) observed this species in Otero Mesa prairie dog colonies, as well as numerous incidental observations (U.S. Army 2014a) including on the main cantonment.
Yellow-billed cuckoo *(Coccyzus americanus)*	Fed-T; NM-S, SGCN; TX-SC, SGCN	This species was observed in a survey in Soledad Canyon in the Organ Mountains and on the Otero Mesa These two records make up four sightings in the Natural Resource Database (U.S. Army 2014a)
Zone-tailed hawk *(Buteo albonotatus)*	TX-T, SGCN	This species. was observed in the Organ Mountains, however not confirmed in the Organ Mountains on Fort Bliss (U.S.Army 2012e). Two incidental observations documented; one on Otero Mesa and one below the Otero Mesa escarpment (U.S. Army 2014a).

Mammals		
Species	**Status**	**Comments**
Arizona black-tailed prairie dog *(Cynomys ludovicianus arizonensis)*	NM-SGCN; TX-SGCN	This survey examined colonies in the northeast section of McGregor Range. Habitat consists of Chihuahuan Desert Grasslands. (U.S.Army 2003b) Periodic surveys recommended to identify new colonies and determine dispersal characteristics.
Big free-tailed bat *(Nyctinomops macrotis)*	NM-S; TX-SGCN	This species is confirmed to occur on Fort Bliss from capture and release surveys in the Hueco Mountains and Tularosa Basin, as well as being acoustically detected in the Organ and Sacramento Mountains. Suggested long-term monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan. (U.S.Army 2010g)
Desert Bighorn Sheep *(Ovis canadensis mexicana)*	NM-SGCN	Though no animals were observed this survey and report evaluated and found suitable habitat for this species to possibly exist in the Organ Mountains (Dunn and Haussamen, 1991).
Fringed myotis *(Myotis thysanodes)*	NM-S; TX-SGCN	This species is confirmed to occur on Fort Bliss through capture and release surveys on Otero Mesa, Sacramento Mountains and Tularosa Basin survey sites, as well as being acoustically detected in the Organ Mountains. (See Big free-tailed bat comments for suggested monitoring recommendations) (U.S.Army 2010g)

Gray-footed Chipmunk *(Neotamias canipes sacramentoensis)*	NM-S; TX-SGCN	Species was trapped and subspecies was verified through museum specimen records comparisons at the Denver Museum of Nature and Science. This specimen was trapped along an arroyo bottom on the Fort Bliss boundary north of McAfee Canyon in pinon juniper habitat (U.S.Army 2010j).
Long-legged myotis *(Myotis volans)*	NM-S; TX-SGCN	This species is confirmed to occur on Fort Bliss through capture and release surveys in the Organ Mountains and Sacramento Mountains survey sites. (See Big free-tailed bat comments for suggested monitoring recommendations) (U.S.Army 2010g)
Occult little brown bat *(Myotis occultus)*	NM-S,SGCN	This species is confirmed to occur on Fort Bliss through capture and release surveys on Otero Mesa and the Sacramento Mountains. (See Big free-tailed bat comments for suggested monitoring recommendations) (U.S.Army 2010g)
Organ Mountain Colorado Chipmunk *(Neotamias quadrivittatus australis)*	NM-T	Chipmunk monitoring surveys were conducted in the Organ mountains simultaneously with woodlandsnail surveys (WTS, 2008). Previous survey and monitoring projects have confirmed that this species occurs in the Organ Mountains on Fort Bliss (U.S.Army 1994; U.S.Army 2014a).
Spotted Bat *(Euderma maculatum)*	NM-T,SGCN; TX-T, SGCN	This species is confirmed to occur on Fort Bliss through capture and release surveys in the Hueco Mountains. (See Big free-tailed bat comments for suggested monitoring recommendations) (U.S.Army 2010g)
Townsend's pale big-eared bat *(Corynorhinus townsendii pallescens)*	NM-S	This species is confirmed to occur on Fort Bliss through capture and release surveys in the Hueco & Organ Mountains, as well as being acoustically detected in the Sacramento Mountains and Tularosa Basin survey sites. (See Big free-tailed bat comments for suggested monitoring recommendations) (U.S.Army 2010g)
Yuma myotis *(Myotis yumanensis)*	NM-S; TX-SGCN	This species was not detected in recent survey (U.S.Army 2010g). However, it is possible that it does occur on Fort Bliss, Texas and New Mexico. (Frey, 2004; Davis & Schmidley, 1997).

Note: *This species has been designated as a Nonessential Experimental Population within the states of NM and AZ, thus carrying 10(j) status under ESA. Thus, the species is treated as if they were proposed for listing within these designated geographic confines and is separate from other populations' Federal listing status.

NRDB Natural Resource Database — E Endangered Species
C Candidate Species — SC Species of Concern
S Sensitive Species — T Threatened species
SGCN Species of Greatest Conservation Need

Sneed pincushion cactus (*Coryphantha Sneedii var. Sneedii)*

The Sneed pincushion cactus is a federally endangered species found in New Mexico and Texas. Collectors, destruction of habitat through urban expansion and road construction caused Sneed pincushion cactus to be listed by the USFWS as endangered in 1979 (U.S. Army 2007a). Throughout its range, Sneed pincushion cactus may still be under collection pressure, but it is unknown to what extent (Corral et al. 1998a). Sneed pincushion cactus is a small, multiple-stemmed cactus that grows at elevations from 4,265 to 7,800 ft (1,300 to 2,380 m). The species grows in cracks and on vertical cliffs and ledges as well as on horizontal benches of loose rock. The vegetative cover in Sneed pincushion cactus habitat is typically very sparse due to the rocky nature of the occupied habitat. Typical Chihuahuan desert shrubland plant species such as ocotillo (*Fouquieria splendens*), sotol (*Dasylirion wheeleri*), mariola (*Parthenium incanum*), and prickly pear (*Opuntia* spp.) are common associates in Sneed pincushion cactus habitat. Sneed pincushion cactus occupies steep, limestone rocky slopes within the Franklin Mountains in Texas and New Mexico and in the Bishop Cap Hills of New Mexico. Known populations of Sneed pincushion cactus occur within and outside of Fort Bliss boundaries (Corral et al. 1998a, U.S. Army 2007a). The primary limiting factor for Sneed pincushion cactus on Fort Bliss is that it seems to grow only on outcrops of Paleozoic Silurian Fusselman dolomite. However, the habitat requirements of the cactus are not fully understood (Corral et al. 1998a). In addition to the Silurian Fusselman dolomite, all adjacent formations have been surveyed without any additional cacti detected beyond the reported typical rock type (Corral 2014). However, due to the manner in which the occupied outcrops of Silurian Fusselman dolomite extend above the surrounding landscape, the Off Limits Areas that surround known populations of Sneed pincushion cactus also surround other dolomite layers (Montoya group) that are adjacent to the Silurian Fusselman dolomite (Corral 2014).

At Fort Bliss, the three known populations of Sneed pincushion cactus exist on separate rocky limestone hills on the Doña Ana Range-North Training Areas (Worthington and Freeman 1980). These three populations have been monitored almost continuously since 1980 (Corral 2014). The entire range of hills where the cactus occurs are identified on training maps as Off Limits Areas (OLAs) and the perimeters of these hills have been marked in the field with siber stakes which are the official sign for protecting sensitive resources on military lands. All three known populations on Fort Bliss are off-limits to all military activities. Two populations are in areas near where vehicle traffic occurs but vehicle traffic is limited to on roads only. All of the Sneed pincushion cacti on Fort Bliss are located in rocky areas that are inaccessible to vehicles. On Fort Bliss, there is low potential for impacts from natural or ordnance-caused wildfires because the cacti grow on rocky substrates where fuel loads are too low to sustain a ground fire (Corral et al. 1998a). In 1997 and 1998, 36 long-term monitoring plots were established for Sneed pincushion cactus on Fort Bliss. Fixed, long-term monitoring plots have been visited annually from 1997, with the exception of 2009 due to lack of funding. The most recent monitoring (August 2013) found marked plants in good health (Corral 2014).

Other areas of potential habitat have been surveyed for *C. sneedii* though none have been found. Surveys of potential habitat in the Rattlesnake Ridge area within the Organ Mountains occurred in 1980. No specimens were identified (Worthington et al. 1980). Surveys occurred on portions of Castner Range within potential habitat but no specimens were identified (Worthington et al. 1980). One small patch of Precambrian limestone supports some *Escobaria strobiliformis* but no *C. sneedii* (Worthington et al. 1980)**.** Field site visits to that area by Fort Bliss Botanist, Dr. Rafael Corral, occurred in 2014 but the group did not detect any *C. sneedii* (Corral 2014). It is important to note that Castner Range is a Closed Range and is no longer used for military training. Entry to Castner Range is prohibited and is off-limits to human activities due to the known presence of UXO throughout much of the area.

Kuenzler hedgehog cactus (*Echinocereus fendleri var. kuenzleri)*

Kuenzler hedgehog cactus was federally listed as endangered on 29 October 1979 (USFWS 1985). It is endangered in New Mexico. No critical habitat has been designated for this species. Kuenzler hedgehog cactus is not known to occur on Fort Bliss, but is found just outside the installation on the Lincoln National Forest (LNF). Some juniper woodlands and rocky limestone habitats on Fort Bliss are very similar to the Kuenzler cactus occupied habitats on the LNF. Surveys conducted from 2004 to 2012 in potential habitat on northern McGregor Range did not detect this species on Fort Bliss (U.S. Army 2007a).In 1985, only two populations were documented; one in the Rio Hondo and another in the Rio Peñasco drainage in New Mexico (USFWS 1985). Since then, approximately 3,200 individuals have been discovered in Chaves, Eddy, Lincoln and Otero counties, New Mexico (U.S. Army 2007a, USFWS 2005e).

Kuenzler hedgehog cactus prefers gravelly gentle slopes or benches of Permian limestone at elevations between 5,195 to 6,990 ft (1,584 and 2,130 m) within the lower slopes of piñon/juniper woodlands (NMRPTC 2005).

Interior least tern (*Sterna antillarum athalassos*)

The interior least tern was listed as an endangered species in 1985 (USFWS 2005b) and is listed as endangered in New Mexico and Texas. No interior least terns are known to occur on Fort Bliss but could be a rare visitor to sewage treatment ponds. The California (*Sterna antillarum brownii*) and eastern subspecies (*S. a. antillarum*) occur along the coasts of the United States. The interior least tern occurs principally along the Missouri and Mississippi river systems, although some nest along the Rio Grande drainage in the western United States. Historically, this species was abundant and nested on sandbars along low gradient portions of these river systems.

In New Mexico, the interior least tern nests at the Bitter Lakes National Wildlife Refuge on the Pecos River in Chaves County and at Brantley Lake on the Pecos River in Eddy County (NMDGF 2006a). Over the past 50 years, the breeding population at Bitter Lake has been smaller, rarely exceeding eight breeding pairs. However, in 2005 the population increased to 14 breeding pairs (NMDGF 2006a). At Brantley Lake, up to nine breeding pairs were present in early 2005. However, the population declined to three to four pairs later in the year with no known successful nesting (NMDGF 2006a).

Northern aplomado falcon *(Falco femoralis septentrionalis)*

The northern aplomado falcon is listed as endangered by USFWS, New Mexico, and Texas. The northern aplomado falcon is a transient species on Fort Bliss; no breeding of Northern aplomado falcons has been documented on Fort Bliss and Northern aplomado falcons do not consistently inhabit the installation (GSRC 2013). The suspension of reintroductions may reduce the potential for this species to colonize Fort Bliss (GSRC 2013). The species has been designated as a Nonessential Experimental Population within the states of New Mexico and Arizona, thus carrying 10(j) status under ESA. Within these geographic confines, the species is treated as if it were proposed for listing under ESA (USFWS 2006). Formal surveys have been conducted on FBTC in most years since 1994 (Table 2.3-7), including surveys, habitat and nest suitability predictive modeling, and visual assessments of habitat (GSRC 2013). The last sightings of aplomado falcons occurred during late summer of 2010 when two immature birds were present on McGregor Range (GSRC 2013). Surveys were conducted each year in 2011-2013 but no birds were detected (Ray Meyers, pers.comm.).

The northern aplomado falcon once inhabited the grasslands of southern Texas, New Mexico and Arizona. Historic records show that it was common until about 1940 (U.S. Army 1996a). In southern New Mexico, the species occupied open yucca grasslands that included the grasslands of Otero Mesa on Fort Bliss. The reasons for this species' decline are unclear. Habitat loss (e.g., grassland habitat converted to shrubland due to livestock grazing), disruption of the natural fire regime and pesticide contamination are likely factors that contributed to this decline (U.S. Army 1996a).

The earliest known record of an aplomado falcon sighting on what is now Fort Bliss occurred in 1917 (Hector 1981), when Ligon collected a subadult female 45 miles south of Alamogordo, New Mexico, at 5,500 feet elevation. Although a precise location is unknown, an estimate of the likely area in which this falcon was collected can be made from the observation details, using the historic location of the post office in Alamogordo as a likely benchmark for measuring the distance described (Figure 2.3-8). For this estimate, elevation ranges were created, giving the observer an error of plus or minus 250 feet because the elevation at the collection site was likely visually estimated. To then further refine the area in which the observation could have occurred, slope was considered. Aplomado falcon do not typically frequent areas of greater than 10% slope (Ray Meyer, pers. comm.) so slope is also depicted in Figure 2.3-8. Northern aplomado falcons occurred on Otero Mesa in recent years with detections made on Fort Bliss in 2010 and further east of the military reservation. The increase in sightings could be associated with falcon releases in west Texas (GSRC 2013).

In 2006, the first New Mexico releases of captive-reared aplomados falcons occurred on the privately owned Pedro Armendaris Ranch. Since then, releases have been made at additional sites in southern New Mexico on nearby BLM managed lands, state land, and WSMR. In 2010, 107 falcons were released at five New Mexico sites and three West Texas sites. Pair formation and breeding by released birds has occurred in west Texas with as many as 10 pairs monitored in 2009. However, only two pairs were located in the subsequent year. In New Mexico, five breeding attempts by released birds have been observed. Due to the lack of success of released birds in New Mexico and West Texas, a monitoring program is underway to track banded birds using radio telemetry and additional reintroductions of northern aplomado falcons have been suspended in New Mexico and Texas (GSRC 2010). Meyer and Williams conducted surveys and a literature search for all aplomado falcon sightings in New Mexico between the years of 1960 and 2004. They documented 53 sightings. Their research included photographically documented reports, published reports, and other reports considered certain or probable (Meyer and Williams, 2005).

Assessments of the potential for habitat to support aplomado falcon on Fort Bliss have been made (Figure 2.3-7) (GSRC 2013e). Predictive habitat suitability modeling was used in these assessments and qualitative and quantitative "ground-truthing" was used to verify the model (GSRC 2013c). Areas of Fort Bliss with the highest habitat potential for this species are located on Otero Mesa, which are the large, ecologically intact grasslands on McGregor Range (Figure 2.3-8). Areas of Otero Mesa most suitable for aplomado falcons include the El Paso Draw, the southern part of Otero Mesa in Training Area 23, and the upper end of Prairie Valley, west of Antelope Well. Each of these areas are relatively shrub free and include broad, relatively flat drainages with fine-textured soils that promote high grass plant productivity and therefore high prey numbers (Figure 2.3-8).

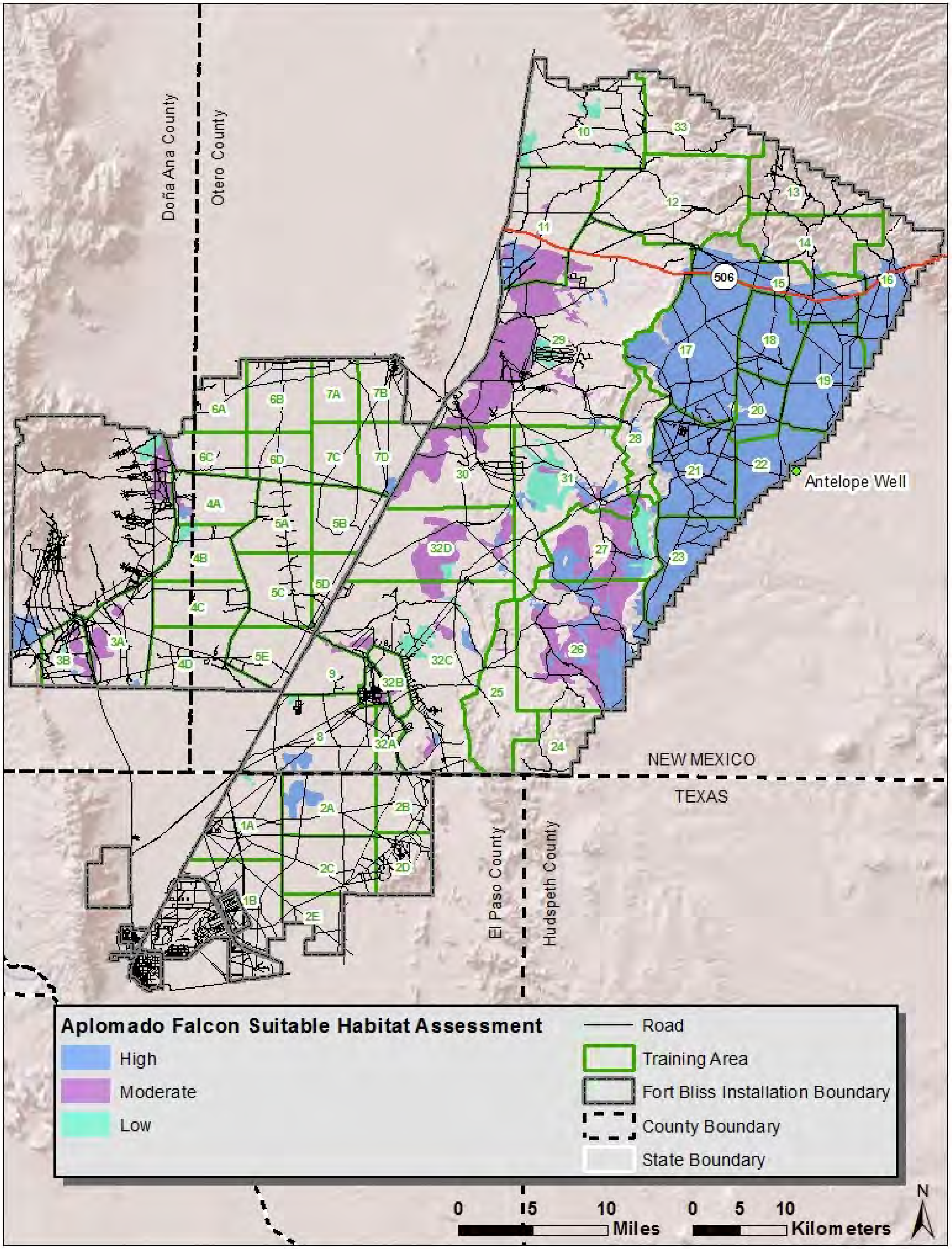
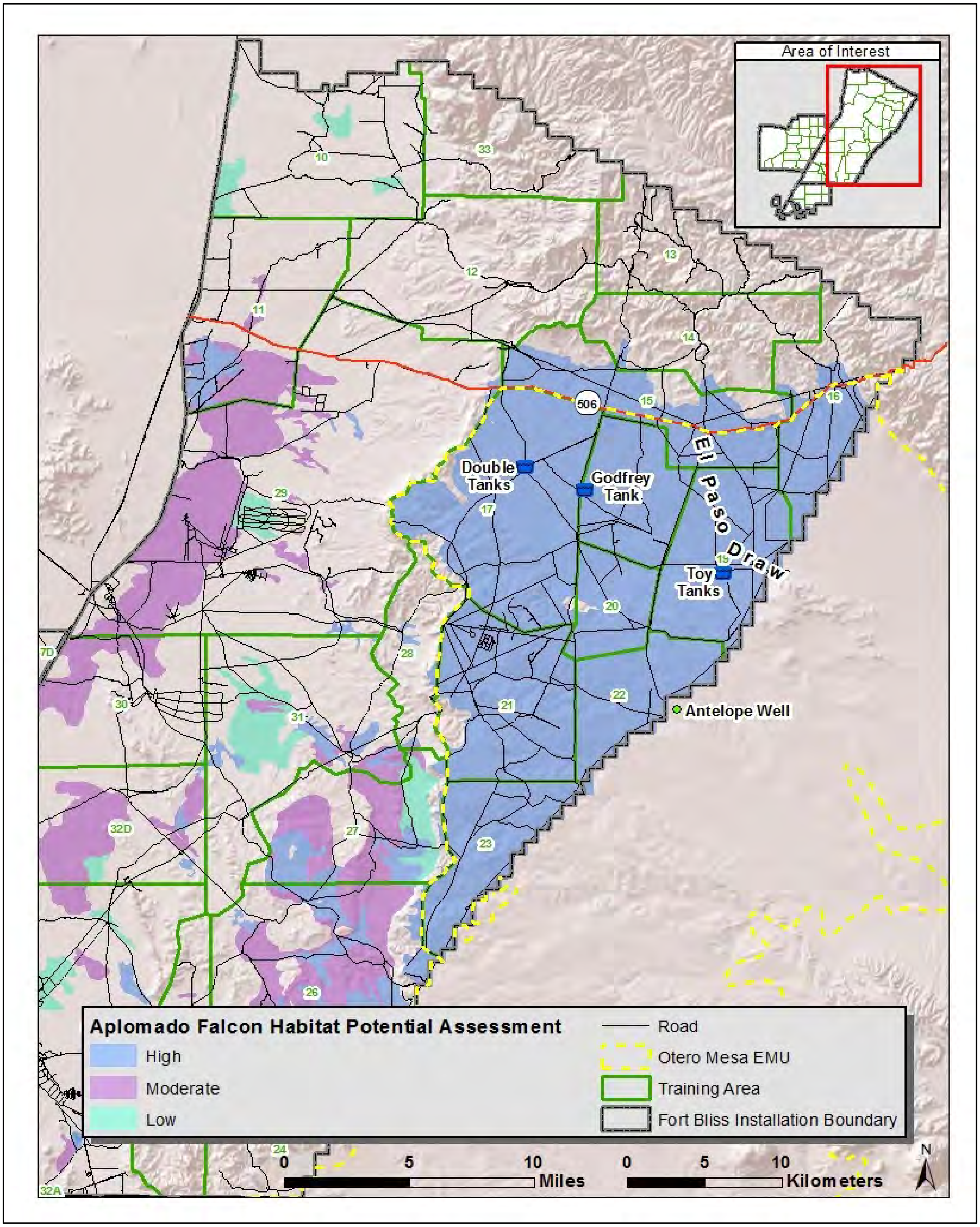


Figure 2.3-7 Aplomado Falcon Suitable Habitats on Fort Bliss



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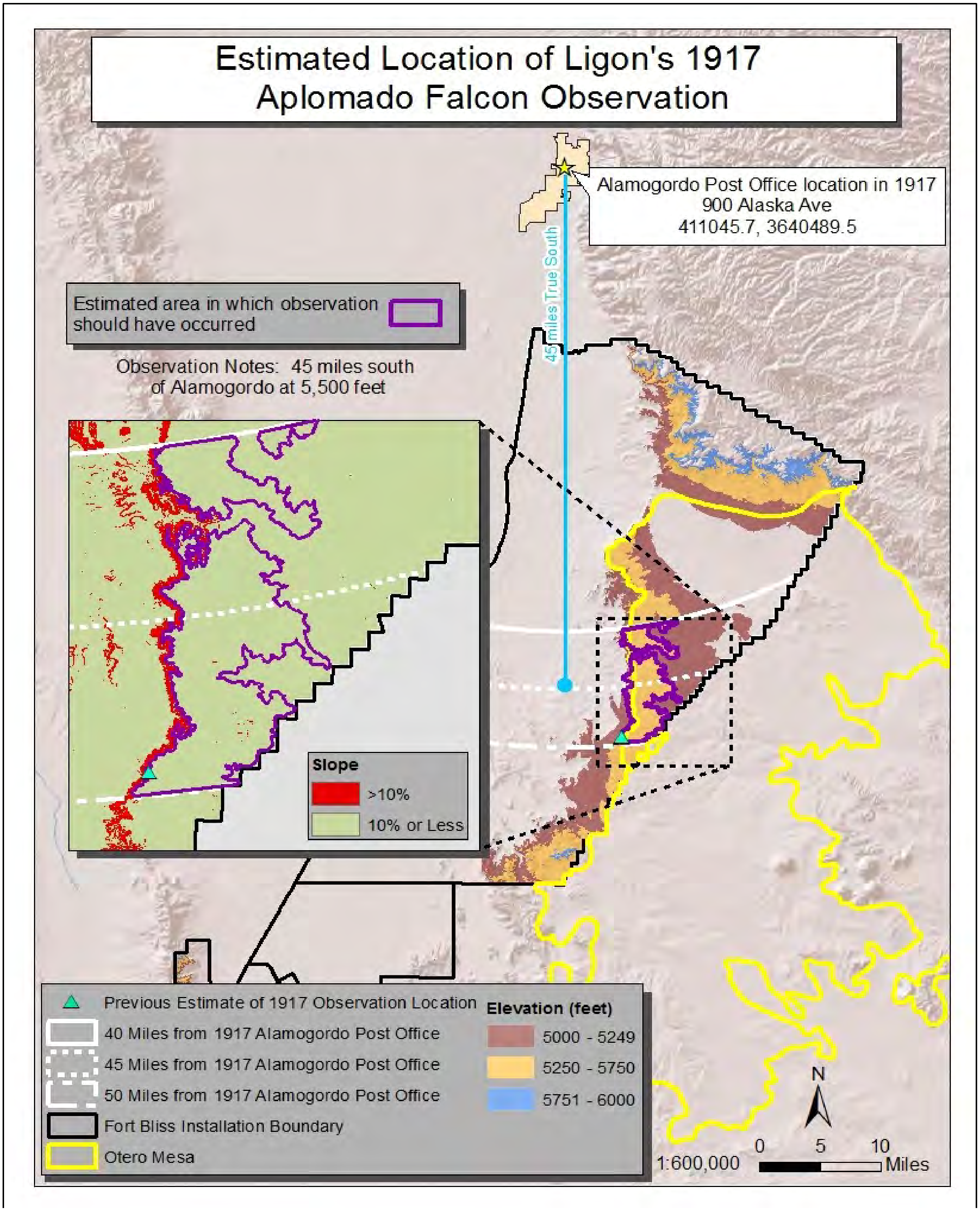
2752 **Figure 2.3-8 Aplomado Falcon Suitable Habitats on Northern McGregor Range**



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2754 **Figure 2.3-9 Estimated Location of Northern Aplomado Falcon Observed in 1917**

Table 2.3-7 Northern Aplomado Falcon Sightings and Survey Summary on Fort Bliss

Summary		
Date	Action	Comments
1994 – 2013	Surveys completed on Fort Bliss in 1994, 1996-2013	Two birds observed in 2010 and 2008, one bird in 2005, one in 1999, one in 1997 (all mentioned below).
July 2010	Two immature birds observed on Otero Mesa; birds observed repeatedly into September.	Surveys conducted during breeding season of 2011 in same area did not detect birds.
July 2008	Two birds observed on Otero Mesa; birds observed repeatedly into September; no nesting attempted.	Surveys conducted during breeding season in same area did not detect birds.
3 October 2005	Northern aplomado falcon observed on Fort Bliss.	Sighting area was checked twice prior to observation and five times post-sighting with no additional observations.
11 & 18 September 1999	Northern aplomado falcon observed on Otero Mesa portion of McGregor Range. Bird was a juvenile, banded before fledging earlier in the year.	Bird hatched in Mexico and moved 186 mi. north as part of post-hatch wandering. Follow-up surveys failed to observe bird again.
23 May 1997	Northern aplomado falcon sighting as part of Air Force study on Fort Bliss.	Follow-up survey failed to observe bird again.
June 1917	Female northern aplomado falcon shot 45 mi. south of Alamogordo.	Apparently on Otero Mesa portion of McGregor Range because elevation listed as 5,500 ft.

Source: Taken directly from U.S. Army 2009b

<u>Southwestern willow flycatcher *(Empidonax trailii extimus)*</u>

This subspecies of willow flycatcher is classified as federally endangered. The southwestern willow flycatcher is a Neotropical migrant that breeds in southwestern United States and winters in southern Mexico, Central America and northern South America. The willow flycatcher has been recorded on McGregor Range but the subspecies was not determined. Willow flycatchers were recorded in arroyos during breeding bird surveys conducted in 1996 and 1997 and were likely migrants, as appropriate nesting habitat for the southwestern willow flycatcher does not exist on McGregor Range (U.S. Army 1996c, U.S. Army 1997b). Surveys have been conducted in the Organ Mountains on Fort Bliss and the species was not been recorded there (U.S. Army 1997e; Griffin et al. 2012). Fort Bliss has no suitable breeding habitat.

The southwestern willow flycatcher breeds in dense riparian vegetation interspersed with small openings near surface water or saturated soil (USFWS 2002, Sogge et al. 1997). Southwestern willow flycatcher populations have experienced significant declines, and breeding populations occur from about 986 territories where there are an estimated 1,200 to 1,300 pairs in existence (USFWS 2002). The principal factors resulting in decline of this species are extensive loss, modification, and fragmentation of riparian breeding habitat and brood parasitism by brown-headed cowbirds (USFWS 2002; Sogge et al. 1997). There are approximately 344 territories of southwestern willow flycatchers in New Mexico (Sogge et al. 2003).

Piping plover (*Charadrius melodus)*

The piping plover is a federally endangered species in the Great Lakes region and threatened elsewhere in the United States. This species is endangered in New Mexico and threatened in Texas. This species is a very rare migrant in New Mexico, having been documented six times (NMDGF 2006a). It was observed once on Fort Bliss at the sewage lagoons in 1987 (U.S. Army 1997d). Surveys in 1998 did not observe this species (TRC Mariah 1998). The piping plover has experienced range-wide declines and the principal factors are habitat deterioration (Haig and Oring 1985), human disturbance (Flemming et al. 1988), and predation (Gaines and Ryan 1988). The piping plover nests on beaches along the Atlantic coast and Great Lakes and along lakes and rivers in the Great Plains from Canada into the United States (Haig and Oring 1985).

Mexican spotted owl *(Strix occidentalis lucida)*

The Mexican spotted owl is a federally threatened species, a sensitive species in New Mexico, and a threatened species in Texas. Its range includes southern New Mexico where it occurs in suitable habitat in isolated mountain ranges (Meyer 1996). During the breeding season, the Mexican spotted owl inhabits mixed coniferous mountain forests and canyons (Skaggs and Raitt 1988, Ganey and Balda 1989, and Zwank et al. 1995). The Sacramento Mountains contain a breeding population of Mexican spotted owls with the closest recorded breeding pair located 10 miles (16 km) north of the Fort Bliss boundary (Meyer 1996).

The Mexican spotted owl has been documented on or near Fort Bliss on five occasions (Meyer 1996). Two individuals were seen - each twice - on or very near McGregor Range in the Sacramento Mountains during the winter of 1989-1990. An adult female with a juvenile was seen in the Organ Mountains one-half mile (0.8 km) north of the Fort Bliss boundary during the summer of 1979. Surveys conducted on Fort Bliss for spotted owls have not resulted in any further owl observations (Griffin 2012, Meyer 1996, U.S. Army 1991). Given the habitat available in the Sacramento Mountain foothills, and dispersal and winter migration behavior of some spotted owls, McGregor Range may be occupied on an occasional basis (Meyer 1996).

Skaggs (U.S. Army 1991) estimated about 10 mi^2 of the Organ Mountains contain potential Mexican spotted owl habitat. The suitable habitat available is highly fragmented, with most of the potential habitat falling inside the Fort Bliss boundary. The Organ Mountains could potentially support a maximum of two or three spotted owl territories (U.S. Army 1991). However, spotted owl occupation would be sporadic given the small amount of potential habitat and the high potential for local extinction (U.S. Army 1991).

Yellow-billed Cuckoo *(Coccyzus americanus)*

Two subspecies of yellow-billed cuckoo are described as geographically separated by the continental divide; the western subspecies, *Coccyzus americanus occidentali,* and the eastern subspecies *Coccyzus americanus americanus* (USFWS 2007). The western distinct population segment of the yellow-billed cuckoo is a candidate species under the ESA as of October 30, 2001. The western yellow-billed cuckoo inhabits deciduous woodlands with large trees along rivers and creeks. It is an uncommon species in the West and pursues insects for prey, especially destructive hairy caterpillars. Nesting occurs almost exclusively near water, and biologists hypothesize that the species may be restricted to nesting in moist river bottoms in the West. This is because of humidity requirements for nesting and rearing of young. Tangled willow habitat is preferred for nesting, while areas of tall cottonwood stands are preferred for foraging. Yellow-billed cuckoos prefer canopy cover of at least 50 percent in both the understory and overstory (MTNHP 2008).

Because of extensive habitat loss, the overall range of the western yellow-billed cuckoo has decreased significantly. Millions of acres of riparian habitat were available along western waterways historically, but as human populations spread across North America, much of the riparian habitat was lost to agriculture, livestock grazing pressure, and use of vegetation for fuel. A pair of yellow-billed cuckoos most recently nested in the Organ Mountains on 22 July 1992 at Dripping Springs Natural Area in an arroyo that was vegetated with net-leaf hackberry (*Celtis reticulata*), oaks, and various sumacs (*Rhus* spp.; Griffin et al. 2012). The most suitable breeding habitat for this species on Fort Bliss occurs in the Soledad Canyon riparian area within the Organ Mountains (Griffin et al. 2012). However, much of that riparian habitat was destroyed during the 2011 Abrams Fire (Griffin et al. 2012).

2.3.4.3 State Listed Species

New Mexico lists 11 species as threatened and 5 as endangered that occur or may occur on Fort Bliss. Texas lists 10 species as threatened that occur or may occur on Fort Bliss, and 4 species as endangered. Table 2.3-6 and **Appendix K, New Mexico and Texas Comprehensive Wildlife Conservation Strategies and Fort Bliss Compliance c**ontain lists of species for Texas and New Mexico**.**

2.3.4.4 Fort Bliss Special Protection Species

Fort Bliss has developed threatened, endangered and species of special concern management plans for 16 species of plants and animals (Corral and Ball 2000; Corral et al. 2000c, 2000d, 2000e, and 2000f) (Lane et al. 2013) (See **Appendix I Species of Concern Management Plans**). In addition to federal and state listed species and species of concern, Fort Bliss has identified four invertebrates that should receive special attention as species of concern. They include the Boulder woodland snail (*Ashmunella auriculata*), Maple Canyon woodland snail (*Ashmunella todseni*), the Organ Mountains woodland snail (*Ashmunella organensis*) and Beasley's woodland snail (*Ashmunella beasleyi*). All four of these snails occur in the Organ Mountains on Fort Bliss (NM Coop 2001).

2.3.5 Wetlands, Playas and Arroyo-Riparian Drainages

Wetlands provide a variety of functions, including groundwater recharge and discharge, flood attenuation, sediment stabilization, sediment and toxicant retention, nutrient removal and transformation, aquatic and terrestrial diversity and abundance and aesthetic values. Three criteria are necessary to define wetlands: a site must contain a dominance of hydrophytic vegetation, hydric soils and wetland hydrology (high frequency of flooding or soil saturation). Jurisdictional wetlands are wetlands subject to regulatory authority by the US Army Corps of Engineers (USACE) under Section 404 of the *Clean Water Act* (CWA) and EO 11990, Protection of Wetlands. A 2009 survey identified 32 sites as wetlands using USACE criteria and a GIS wetland database (Lougheed, 2009). The Wetland Delineation Report for Fort Bliss surveyed 218 potential wetland areas across Fort Bliss. The study determined that none of the wetland areas met the criteria for jurisdictional wetlands as defined by USACE. The study did determine that Fort Bliss contains approximately 8.3 acres of isolated, non-jurisdictional wetlands. The study also found that Fort Bliss has another, approximately 6.7 acres of what is termed Palustrine Emergent Wetlands (PEW) (GSRC, 2010).

A USACE study identified 2,410 mi. (3,878 km) of drainages on Fort Bliss (U.S. Army 2000c). A subsequent study by the U.S. Geologic Survey in 1997 (USGS 1997) refined that number to 1,722 mi. (2,771 km; Figure 4.7-2). The majority of these drainages are in the northeast, central, and southeast portions of McGregor Range.

Wetlands are a subset of the "waters of the United States". The term "waters of the United States" are all waters, which are currently used, were once used in the past, or may be susceptible to use in future interstate or foreign commerce (GSRC 2010). The only known Waters of the U.S. on Fort Bliss are on the west side of the Organ Mountains (part of the Rio Grande drainage), and some arroyos on McGregor Range that originate in New Mexico and cross into Texas and empty into the Rio Grande. One storm water retention pond in the Cantonment has been identified as a jurisdictional wetland by USACE (U.S. Army 2010i). Numerous dirt tanks and playa lakes scattered throughout Fort Bliss have been identified as non-jurisdictional wetlands by USACE because they lack a significant nexus to a navigable waterway (USEPA 2007).

Arroyo-riparian areas typically associated with ephemeral streams are arroyos or gullies that support high densities and diversities of fauna and flora. In areas of the southwest, 90 percent of the avian diversity is found within riparian corridors (Chaney et al. 1990). Based on studies of ephemeral streams on McGregor Range and the Doña Ana Range-North Training Areas, arroyo/riparian areas have:

- shrub, tree, and forb cover that is more dense than the surrounding area;
- greater species richness (for shrubs, trees, grasses, and forbs) than the surrounding area;
- heights of shrubs along the drainage channels that are nearly twice the height of shrubs in the uplands;
- riparian species such as desert willow that are taller than non-drainage species;
- animal and plant species normally found in drainages at lower elevations are found outside drainages at higher elevations (U.S. Army 2000c).

Playas located on Fort Bliss are numerous but isolated. Playas provide valuable wetland functions including surface water drainage, recharging of aquifers and wildlife habitat (Bolen et al. 1989; Sabin and Holliday 1995). Playa habitats are shallow depressions in desert landscapes, which experience significant seasonal changes in semi-arid to arid climates. Playas may have higher levels of salinity relative to adjacent landscape features and may be completely dry. Playas are ephemeral and will generally only stage water for a short time following the summer monsoon season (GSRC, 2010). Fine-grained sediments, mostly sand, silt, and clay occur in thin horizontal layers after seasonal heavy rains and develop into an impermeable layer. Since permeability is slow and shallow, standing water may remain for a few weeks, or several months. This factor enables them to contain a higher vegetative diversity, which increases habitat diversity and increases water-holding capacity in the arid environment. However, playas are subject to greater vegetation losses through soil compaction than adjacent areas (Bolen et al. 1989).

Many invertebrate species rapidly colonize and occupy habitats in and around a playa upon initial inundation. In 2006 and 2007, 17 playas on Fort Bliss were surveyed for presence of freshwater shrimp during periods of inundation. Fairy shrimp were collected at three of the 17 playas visited during the survey. Other wildlife recorded near playas during the survey included 41 vertebrate species, including 32 bird species, 4 reptiles and amphibians and 8 mammals. In addition, 5 taxa of invertebrates were recorded (Hobert, et al 2007).

2.3.5.1 Locally Important Natural Resources (LINR) – Riparian Wetland Areas

All of the wetland habitats on Fort Bliss are important habitats for wildlife and are protected accordingly.

Federally Regulated Wetlands

Very few of the arroyo-riparian drainages and none of the playa lakes on Fort Bliss are regulated as jurisdictional wetlands as defined by the Army Corps of Engineers (USACE). The only known Waters of the U.S. are on the west side of the Organ Mountains (part of the Rio Grande drainage), and some arroyos on McGregor Range that originate in New Mexico and cross into Texas and the Rio Grande drainage. One stormwater retention pond in the Cantonment is identified as a jurisdictional wetland by USACE (U.S. Army 2010i). Whether federally regulated or not, Fort Bliss recognizes all arroyo-riparian drainages and playa lakes as LINR.

Arroyo-Riparian Drainages

Fort Bliss studies have identified 291 square kilometers of arroyo-riparian drainage areas on the facility (U.S. Army 2010i). They are designated as Limited Use Areas (LUAs) in the ROD for the 2007 SEIS. Shrub, tree, and forb cover that is more diverse and dense than in the surrounding area characterizes these drainages. The highest species density and variety of shrubs, trees, grasses, and forbs is in the main channel rather than in adjacent areas. Montane riparian plant communities have a distinct mix of species, while the ephemeral drainages or dry arroyos that cross each of the other communities are less distinct. Canyons support diverse woodland and grassland riparian plant communities. These areas were mapped and are inhabited more extensively by wildlife, particularly avian species, than adjacent upland areas (U.S. Army 2010i).

Playa Lakes

Playa lakes are natural depressions that are ephemeral (seasonally flooded) and are typically wet in the summer and fall. These wetlands are usually surrounded with vegetation and may be completely vegetated in the bottoms, or not vegetated at all. As with other wetland types, playa wetlands provide unique flora and fauna assemblages, important to the overall diversity and uniqueness of wildlife on the installation. The majority of the wetlands within Fort Bliss is playas, and occurs mostly in the Basin Aeolian and Basin Alluvial EMU areas of the Tularosa Basin of McGregor Range. A few widely distributed playas exist in the Foothill-Bajada and Otero Mesa EMUs. Playas are LUAs, where concentrations of vehicles or personnel, fixed sites, and digging are not permitted.

Springs

There are a few perennial springs located within the Organ Mountains. These springs include Fillmore Spring, Globe Springs, Rock House Spring, Pine Spring and Beasley Spring. Indian Spring is located on Castner Range within the Franklin Mountains.

3 MISSION SUSTAINABILITY AND COLLABORATIVE PLANNING

3.1 Integrating Military Mission and Sustainable Land Use

The Fort Bliss Army Growth and Force Structure Realignment, Final Environmental Impact Statement, March 2010 explains in detail how the Army does now, and will in the future, balance natural resource sustainability with the military training mission on the lands of the FBTC (US Army 2010b).

Positive effects of proper management of natural resources on FBTC lands include:

- Maintaining or improving ecological conditions of natural landscapes
- An increased ability to support military training and readiness
- An improvement in the quality of life of military personnel and their families
- A reduction in littering, pollution, and poaching of wildlife and vegetation by limiting public access (Keystone Center 1996).

Fort Bliss provides several different environments for units to conduct military training and maintain operational readiness. Natural vegetation supported by stable soil in training areas provides opportunities for realistic ground training in a desert setting, and the large land base is ideal for conducting tactical vehicle exercises. Vertical topography of the mountains affords a backstop for lasers and projectiles, as well as a rugged locale for different types of troop training. The land base includes adequate acreage for impact areas and safety zones. The large acreage encompassed by FBTC provides restricted airspace for military aircraft operations as well as assuring safety during weapons firings. With the adjacent WSMR, the land base at Fort Bliss is capable of supporting missile firing and artillery that may accompany future mission changes (Table 3.1-2). The ability to sustain training lands in a natural and balanced ecological state is critical to maintaining the long-term integrity of the military training mission (US Army 2010b).

3.1.1 Cultural and Natural Resource Constraints to Military Mission

Maintaining compliance with the numerous laws, policies, and regulations that provide protection of environmental elements and guidance for management of natural and cultural resources is critical to the military mission. Without management for natural resources, unrestricted military use could degrade the land, plant and animal species of concern could become endangered, requiring USFWS consultation and possible listing. This could lead to restrictions/prohibitions for military training and constrain the ability of the military to support the training mission.

Installation operations that involve ground-disturbing activities have the potential to adversely affect prehistoric and historic archaeological sites on Fort Bliss. These include land-based training activities, mission changes, changes to supporting infrastructure, and natural resources management practices. Limitations of activities for the protection of cultural resources is dependent upon the level of archaeological investigation already conducted in the area of concern, and the decision on what areas, districts, or sites require protection. The ICRMP for Fort Bliss outlines the required SOPs to ensure the protection of historic properties in conjunction with ground-disturbing activities including restrictions on military training and activities (U.S. Army, 2001).

Areas with military training restrictions within the FBTC are in existence to comply with environmental and cultural resources laws and regulations (AR 200-1). These restrictions to military activities are due to the documented presence of sensitive natural and cultural resources and provide compliance with existing environmental laws. Restricted area designations are two-fold and include Off-Limits Areas (OLAs) (Section 3.1.1.1) and Limited Use Areas (LUAs) (Section 3.1.1.2). OLAs and LUAs are determined according to the degree of protection necessary to protect the value of the underlying resource. The designations are to protect multiple resource types, including natural and cultural resources (U.S. Army 2010i).

The training activities categorized on Table 3.1-1 and 3.1-2 (U.S. Army 2010i) may have detrimental impacts on natural and cultural resources. The most significant of these impacts may result from off-road vehicle maneuver and the use of ordnance in training. The movement of large vehicles, tracked or wheeled, over the landscape may cause vegetation or cultural resources to be crushed, broken, or uprooted, and soils to be mixed or compacted. These impacts become more severe in areas where large numbers of vehicles are used, and in areas that are subjected to these activities on a regular basis, such as tactical operations centers, staging areas, firing points, and bivouac sites. In areas where these activities are most intense, soil erosion due to wind may become a significant problem. On-road vehicle maneuver also occurs throughout the installation. However, these activities have little effect on resources unless the roads are not maintained, or are improperly sited, relative to the soils, resulting in wind erosion and deposition of soils down-wind (U.S. Army 2008a).

The use of ordnance, including missiles, artillery rounds, small arms rounds, or bombs, may affect natural and cultural resources in or near-surface impact areas by directly impacting vegetation, soils, and wildlife, or indirectly, by starting wildfires. Wildfires are an integral part of many ecosystems, such as grasslands, shrublands, and forests. Wildfires support biodiversity on Fort Bliss, as in most other ecological systems. Wildfires may also prevent shrub encroachment into desert grasslands. However, wildfires may produce short-term losses of food and cover for wildlife, and expose soil to increased erosion by wind and water. At high frequencies, fire may alter community structure and change native species composition (U.S. Army 2010i).

Other activities may result in soil, cultural or vegetation disturbances. FTXs range in size from 35 to 1,000 personnel typically.The training on Fort Bliss may include off-road maneuvering and associated mobile/temporary facilities, including temporary camps (bivouacs), kitchen facilities, vehicle parking areas, communications and control. Berms and anti-vehicle ditches may be constructed in some areas for training in defensive operations. Dismounted training (foot traffic, rock climbing, repelling, etc.) has little potential to have substantial effects on natural resources except when large groups are used. Damage in maneuver and training areas is most prominent where concentrated activities such as command posts, staging areas, and firing points have been located. Soil and vegetation disturbance also occurs in mission support facilities, built-up areas, and weapons firing areas when people and equipment operate in a generally, fixed, routinely used site (U.S. Army 2010i).

In addition to soil and vegetation disturbance, mission activities may result in noise and aircraft operations. The impacts of noise and overflights on natural resources, and wildlife in particular, has been evaluated extensively with results indicating impacts vary among the types of activities and the species potentially affected (U.S. Army 2010i).

Table 3.1-2 presents the total acres of OLAs and LUAs and the percentage of areas constrained by military uses on Fort Bliss. OLAs restrict all military uses but are relatively small in total area. LUAs are more common and maneuvers are not restricted in these areas; however, establishment of fixed sites is restricted within an LUA. Nearly all military uses within the installation have some military use restrictions. Figure 3.1-1, Tables 3.1-2 and 3.1-3, presents the constraints on Fort Bliss, including OLAs and LUAs (U.S. Army 2010l). Fort Bliss DPW-E maintains current maps of all restricted areas.

3.1.1.1 Off-Limits Areas (OLA)

Entry (military or recreational) is prohibited inside OLAs (U.S. Army 2010j). OLAs include 466 acres that are restricted due to natural resources concerns, primarily endangered species habitat, and 14,125 acres of archaeological sites and specific mission activities where training does not occur (impact areas or hazard waste sites) (Figure 3.1-1). OLAs are marked in the field by signs and siber stakes (distinctly colored fiberglass cylinders atop t-posts).

3.1.1.2 Limited Use Areas (LUA)

LUAs on Fort Bliss exist to protect biological and cultural resources, and to limit certain operations to maintain sustainability of those lands for training. 328,754 LUA acres are restricted due to natural resource concerns on FBTC (Table 3.1-4). 14,765 LUA acres are restricted due to cultural resource concerns. LUAs are open to military training activities, but are restricted from the following:

- static vehicle positions
- concentrations of vehicles
- All logistical, training unit assembly areas
- Fuel depots
- Any digging or excavations
- Field fortifications
- Bivouac areas
- Tactical Operations Centers (TOC)
- Any other proposed concentrations of vehicles, personnel or ground disturbing activities

LUAs include grasslands including much of the Otero Mesa, playas, earthen water collecting tanks (cattle tanks), water troughs and other wildlife watering locations, arroyo-riparian habitat, cultural sites, the four units of the 3,817-acre Black Grama Grassland ACECs, the 11,268-acre Culp Canyon WSA and other sensitive plant population locations(U.S. Army 2010n) (Table 3.1-4). LUAs include areas within 300 m of earthen tanks or playas in order to limit disturbance to wildlife and because these ephemeral wetlands are important to migratory birds and are areas where sensitive wildlife and plant species may be more numerous than outlying areas.

LUAs may be established to control specific activities in designated areas; for example, one LUA in TA 2D, identified by signs displaying “No Climbing on Cliffs Beyond this Point” was established to restrict climbing and/or rappelling activities in a specific portion of TA 2D (U.S. Army 2010n). Drop zones, have similar restrictions as LUAs, and exist to maintain land conditions conducive to parachute landings.

Table 3.1-1 Approximate Acreage in Different Military Training Categories on Fort Bliss

Training Category*	Acres	Percentage of Fort Bliss
1. Mission Support Facility	388,971	34.8 %
2. Weapons Firing	553,507	49.6%
3 Surface Impact	57,806	4.9%
4. SDZ/Safety Footprint	913,167	81.8%
5. Off-Road Vehicle Maneuver	745,199	67%
6. On-Road Vehicle Maneuver	4,182	0.4%
7. Controlled Access FTX Areas	15,949	3%
8. Dismounted Training	1,022,023	92%
9. Aircraft Operations	1,116,595	100.0%
10. Built-up Areas	10,368	0.9%

*Many training activities can take place in more than one location; therefore, sum of acreages is greater than size of installation.

Table 3.1-2 Land Use Constraints To Military Use on Fort Bliss

	Area of Military Use (Acres)	Area of Off Limit Areas (Acres)	Percentage of Military Use in OLA	Limited Use Area (Acres)[1]	Percentage of Military Use in LUA	Unrestricted Military Use	Percentage Unrestricted Military Use
Off Road Vehicle Maneuver	743,258	12,816	2%	167,415	23%	563,027	76%
Dismounted Maneuver	1,020,424	14,221	1%	341,150	33%	665,052	65%
On-Road Vehicle Maneuver	1,005,369	0	0%	0	0%	1,005,369	100%
Controlled FTX[2]	15,949	0	0%	0	0%	15,949	100%
Surface Impact	57,720	0	0%	0	0%	57,720	100%
Base Camps	2,156	0	0%	0	0%	2,156	100%

[1] Limited Use Areas are not restrictions to maneuver directly but iare off-limits to static positions, Field headquarters, Tactical Operation Centers (TOCs), bivouac sites, parking lots or other vehicle concentrations, and digging but allow other military actions, such as manuever through the area, thus they are sometimes referred to as "roll-through" areas.

[2] FTX areas are places for concentrations of vehicles, TOCs, bivouac, limited digging (fightng positions), and other fixed sites necessary for military training exercises.

Table 3.1-3 Natural Resources Constraints by Fort Bliss Subdivisions*

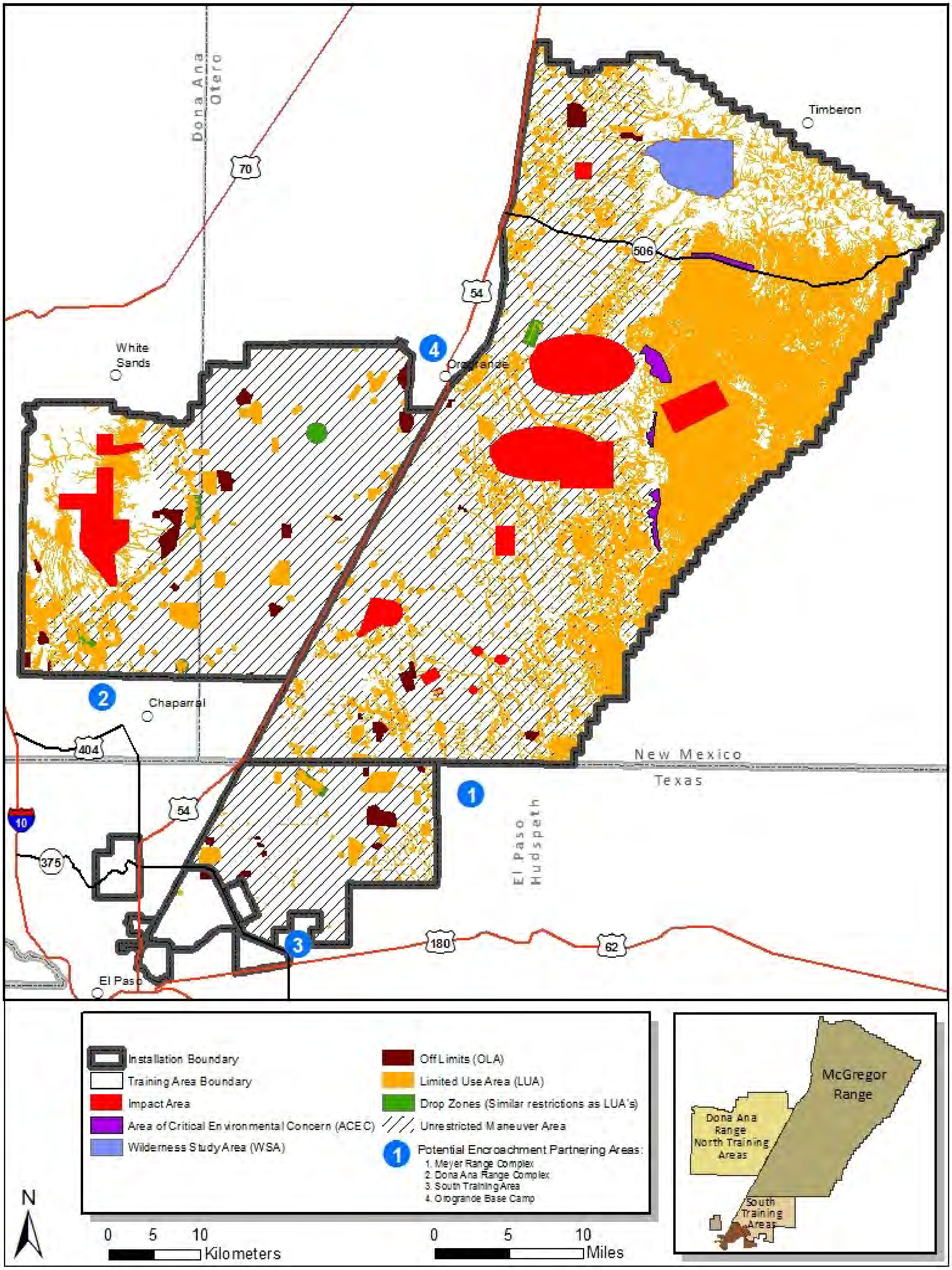
Area	Acres Fort Bliss	Acres LUA	Acres OLA	Percentage in Area LUA	Percentage in Area OLA
Cantonment	23,632	70		0%	
South Training	92,286	6,041		7%	
Doña Ana Range	295,782	34,219	466	12%	0%
McGregor Range	695,699	288,424		41%	
Total	**1,107,399**	**328,754**		30%	

*Cultural OLAs and LUAs not included

Table 3.1-4 Types of Fort Bliss Natural Resources Protected within LUAs and OLAs

Protected Natural Resources by Type	Acres for Each LUA/OLA (Natural Resources only))
Off Limits	466
Arroyo/Riparian	64,781
Culp Wilderness Study Area	11,268
Rock Daisy	66
Shinnery Oak	473
Grasslands	255,413
Tanks	22,371
Wetlands	9,133
ACEC	3,817
Total*	**367,787**

*this number is more than the above 328,754 because some areas counted more than once where there is overlap.



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3117 **Figure 3.1-1 Natural Resources Constraints/Opportunities on Fort Bliss**

3.2 Encroachment Management

Areas of Fort Bliss that are not OLAs or LUAs have minimal to no restrictions with respect to mission activities. According to the Range Complex Master Plan, there are no internal encroachment issues adversely affecting training (U.S. Army 2010m).

3.2.1 US Army Compatible Use Buffer (ACUB)

Title 10, Section 2684a of the U.S.C. authorizes the DoD to partner with non-Federal governments or private organizations to establish buffers around installations. The Army implements this authority through the ACUB program. This program is an integral part of the Army's sustainability program and supports collaborative partnerships with public and private organizations to establish buffer areas around training and testing areas. The Army assists these organizations in acquiring land or receiving approval from willing landowners in order to prevent these adjacent properties from being developed. The partner will own and manage the land according to mutual objectives agreed upon by all parties. These buffer areas not only relieve constraints placed on the training and testing at the installation but also help to conserve valuable habitat (Wolters 2008).

Fort Bliss received approval for their ACUB program in August 2007 and identified priorities for the installation where urban growth extending up to the installation boundary would have a negative impact on the training capability of the installation (US Army 2010a).

Compatible Use Buffer with the New Mexico State Land Office (NMSLO): The Department of the Army purchased specified development rights as an easement on approximately 5,200 acres of NMSLO land immediately adjacent to the southern Doña Ana Range boundary. The easement is in an area where noise from tank gunnery and artillery goes off the installation. The purpose of the easement is to preclude residential development and other incompatible development such as schools in the area immediately adjacent to the Fort Bliss boundary. The easement also provides a buffer for the town of Chaparral, NM.

Land Transfer and Withdrawal with the Bureau of Land Management (BLM): Fort Bliss and the BLM Las Cruces District have agreed to an exchange and withdrawal to protect Fort Bliss' southern and western Doña Ana Range boundary from further incompatible development. Noise levels projected off the installation by the US Army Public Health Command are incompatible with residential development and other land uses such as schools and medical facilities. The Army has agreed to return approximately 2,500 acres of previously withdrawn land in the extreme northwest corner of the installation (Fillmore Canyon) to the public domain and BLM management. The area is essentially inaccessible from any Fort Bliss TA or range due to extremely rugged terrain. In exchange, BLM has agreed to withdraw approximately 35,000 acres south and west of Fort Bliss from future disposal considerations. The Army has submitted the transfer and withdrawal as a proposed action in the FY 14 National Defense Authorization Act. Fort Bliss continues to work with the NM Congressional delegation for possible Congressional action to implement the Fort Bliss/BLM agreement.

Land Exchange with Texas General Land Office (TGLO): The Texas General Land Office owns a tract of land that extends into the Fort Bliss southern training area east of Highway 375. Historically, the land has remained undeveloped and used during training events as a route for military vehicule traffic to eastern portions of the training area. It is located in the general proximity of Brigade Combat Team facilities adjacent to Highway (Loop) 375. Concurrently with the Department of the Army's decision to station the 1st Armored Division at Fort Bliss, TGLO indicated an intent to sell the land. Residential and/or retail development on the land would be a significant encroachment threat to training. Consequently, Fort Bliss and the TGLO agreed to a land exchange whereby most of the TGLO land would be transferred to Fort Bliss in return for Fort Bliss transferring land to TGLO west of the 375 Loop and along Montana Avenue. Congress has approved the exchange as a buffer for Fort Bliss.

Army Compatible Use Buffer (ACUB) Adjacent to Meyer Range Complex: The Meyer Range Complex consists of over 30 small-arms ranges including a Light Demolition Range. The ranges support both Active Component units stationed at Fort Bliss as well as Reserve Component units. Civilian law enforcement and other Military Services also use the Complex. Noise levels that are incompatible with residences, schools, and medical facilities project off the installation in this area. One owner owns seven sections of land immediately adjacent to the Fort Bliss boundary. Fort Bliss is actively exploring possible options for either acquiring the land or purchasing development rights through the ACUB Program. The intent is to use the land as a buffer and not for training.

3.3 Enabling the Military Mission through Range Sustainment

The U.S. Army Strategy for the Environment (ASE) (U.S. Army 2004c) identifies the interdependence between the military mission, the human community and the natural environment. Accordingly, the ASE's primary goal is to "sustain the environment to enable the army mission and secure the future." AR 350-19, *The U.S. Army Sustainable Range Program* (SRP) provides policy and guidance for meeting the goal of ASE and for managing the long-term viability of the Army ranges and training lands. The goal of the SRP is "to maximize the capability, availability and accessibility of ranges and training lands to support doctrinal requirements, mobilization, and deployments under normal and surge conditions" (DA 2005). The SRP is dedicated to ensuring that the best data and science are available and used to support the mission and that all aspects of range management are fully integrated for sustaining training lands.

Range sustainability is maintained with the Range Facility Management Support System (RFMSS). All requests for off-road maneuver and field training exercises must be approved by DPW-E prior to mission or training scheduling in RFMSS. Requests are reviewed for compliance with the Fort Bliss Range SOP, for safety procedures, and for environmental requirements. Potential impacts to natural resources are assessed and measures to mitigate those impacts are proposed. The process for scheduling and using training lands is provided to all incoming units and is included in the Commanders Training Course and the Environmental Officers training course (U.S. Army 2010i). Training activity requests that are substantially different from previously reviewed projects must undergo NEPA review (Section 3.3).

SRP is composed of two programs, the Range and Training Land Program (RTLP) and Integrated Training Area Management (ITAM). The RTLP provides for the central management, programming and policy for modernization of the Army's ranges and their day-to-day operations. ITAM provides Army Range Officers with the ability to manage and maintain training lands by integrating mission requirements with environmental requirements and sound land management practices.

3.3.1 Integrated Training Area Management (ITAM)

The function of ITAM is to establish policies and procedures to achieve optimal, sustainable use of military training and testing lands. The ITAM program on Fort Bliss has been evolving along with the military training mission and focuses on developing management strategies to minimize environmental impacts caused by new types of training activities at the FBTC. ITAM activities include (a) locating and categorizing future issues that may arise due to the new training footprint, (b) addressing both on- and off-road erosion issues, and (c) establishing benchmark surveys in new maneuver/training areas (U.S. Army 2007a). Fort Bliss ITAM has partnerships with external organizations, such as the Natural Resource Conservation Service (NRCS), Jornada Experimental Range (JER), and WSMR ITAM program (USAEC 2010). ITAM relies on coordinated, integrated management guidance from Headquarters Department of the U.S. Army (HQDA), and feedback from the various training components on FBTC to accomplish its mission. ITAM has two components:

3.3.1.1 Range and Training Land Assessment (RTLA)

RTLA assesses land quality, monitors land conditions and recommends land rehabilitation options. RTLA is a land management process to maximize the capability and sustainability of land to meet the U.S. Army training and testing mission. It incorporates a relational database and uses GIS to support land use planning decisions. RTLA collects physical and biological resources data from training lands in order to relate land conditions to training and testing activities (USAEC 2010). The overall goals of RTLA are to:

- Assess impacts of live-fire training and testing activities and recommend options for sustained usage;
- Prioritize and assess land management activities to maximize the capability and accessibility of the land, in order to maintain training;
- Participate in training ranges land use planning (U.S. Army 2007a).

Additionally, RTLA monitors ITAM projects and recommends adaptive land management measures. Monitoring the condition of training lands is the basis for decisions regarding training intensity and land rehabilitation requirements for a specific parcel of land. McGregor Range continues to see an increase in overland training activities and therefore has received increased monitoring and focus from RTLA programs.

RTLA objectives include the following:

- Delineating and characterizing gullies in maneuver/training areas
- Assessing and tracking soil stability for directing LRAM projects
- Delineating and assessing concentrated use areas
- Assessing and tracking maneuver trail erosion
- Monitoring and prioritizing LRAM mitigation projects

3.3.1.2 Land Rehabilitation and Maintenance (LRAM)

The primary function of LRAM is to maintain training lands to ensure its capability to support the mission. LRAM mitigates mission, training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices to reduce the impacts of training and testing on an installation. It includes training area redesign and/or reconfiguration to meet training requirements (USAEC 2010).

3.3.2 Fort Bliss Mitigation and Monitoring Plan

The Fort Bliss Mitigation and Monitoring Plan identifies measures undertaken by the Army to mitigate impacts associated with training-initiated land use. The Plan provides program-level guidance for implementing mitigation measures based on scientific information and proven methods, principles and standards. Initially adopted pursuant to the 2007 ROD for the Fort Bliss Mission and Master Plan Final SEIS (U.S. Army 2007c), the intent of the Mitigation and Monitoring Plan is to reduce significant training impacts, minimize environmental harm and support sustainable training lands (U.S. Army 2007d). Other tools to assist with avoiding or reducing adverse environmental impacts upon Fort Bliss include strategic siting, implementing sustainable design and construction, incorporating the Real Property Master Plan and other master planning processes and policies and conducting environmental impact analysis (U.S. Army 2010i).

The ITAM program and the Mitigation and Monitoring Plan are integral to the INRMP in order to address range sustainability issues, both in the present and in the future. The success of Fort Bliss' mission depends on the ability to coordinate and plan future and current training activities in a manner that will not only meet mission requirements but also ensure range sustainability. The Fort Bliss Range Complex Master Plan (RCMP) establishes unit training and testing requirements for ranges and identifies encroachment issues that can affect the use of FBTC. The RCMP, through use of the Army Range Requirements Model (ARRM) provides for the future development of FBTC to ensure that Fort Bliss can meet its current and future training and testing missions (U.S. Army 2010m). The INRMP, the Mitigation and Monitoring Plan and the RCMP together insure that future missions are possible through integrated planning and range sustainment.

3.4 Consultation Requirements with the US Fish and Wildlife Service (USFWS)

Natural resources consultation requirements can include the following:

- Section 7 consultation of the Endangered Species Act. Consult with the USFWS to consider the individual and cumulative impacts of actions on the viability of federally listed threatened and endangered species.
- Migratory bird consultation related to the Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703-712; 40 stat. 755), and accompanying guidance, including U.S. Army Policy Guidance on MBTA (DAIM-ED-N [200-3], August 17, 2001), and Interim Management Guidance Instruction Memorandum No.2008-050, December 18, 2007.

The ESA of 1973 establishes a Federal program to conserve, protect and restore threatened and endangered plants and animals and their habitats. The ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure that any action they authorize, fund or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are endangered or threatened and the USFWS maintains the list. Agencies having primary responsibility for the conservation of plant and animal species in New Mexico are the USFWS, under authority of the ESA; the NMDGF, under authority of the New Mexico Wildlife Conservation Act of 1974; the New Mexico Energy, Minerals and Natural Resources

Department, under authority of the New Mexico Endangered Plant Species Act. In Texas, the TPWD has statutory responsibility for the conservation of animal and plant species in accordance with Chapters 67 and 68 of the Texas Parks and Wildlife (TPW) Code and Sections 65.171 - 65.176 of Title 31 of the Texas Administrative Code (T.A.C.) for animals and Chapter 88 of the TPW Code Sections 69.01 - 69.9 of the T.A.C for plants.

Fort Bliss informally consulted with the USFWS on the biological effects described in the 2010 Fort Bliss Army Growth and Force Structure Realignment Environmental Impact Statement and on the biological effects described in the 2007 Fort Bliss, Texas and New Mexico Supplemental Programmatic Environmental Impact Statement. The USFWS concurred with both Fort Bliss assessments and determined that the impacts due to the increase in training and personnel upon Fort Bliss Training Center would not likely adversely affect endangered species including Sneed pincushion cactus, Kuenzler hedgehog cactus and northern aplomado falcons (USFWS 2007 and 2010).

The MBTA of 1918, as amended, implements international treaties, laws and conventions for the protection of migratory birds. Birds protected under the MBTA are native migratory species that occur in the U.S. and territories, including those listed in the international conventions incorporated into the act. Unless otherwise permitted by regulations, the MBTA makes it unlawful to pursue, hunt, take, capture, or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not. Take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities."

Fort Bliss has developed a **Migratory Bird Management Plan** and it is located in **Appendix F** in this INRMP.

3.5 Requirements for the Clean Water Act (CWA)

The Clean Water Act (CWA) is the primary federal law in the United States governing water pollution. The objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands (33 U.S.C. 1251).

CWA requirements for Fort Bliss include obtaining:

- Permits for activities that could affect wetlands and/or floodplains relating to Section 404 of the CWA, EO 11990, Protection of Wetlands; or EO 11988, Floodplain Management.
- Permits related to Section 401 of the CWA such as water quality certification; and storm water, sediment, and erosion control plans and permits.

Very few of the arroyo-riparian drainages and none of the playa lakes on Fort Bliss are regulated as jurisdictional wetlands. A stormwater retention pond on the Cantonment is considered a jurisdictional wetland by USACE (U.S. Army 2010i). Wetlands are regulated pursuant to Section 404 of the Clean Water Act (CWA). The USACE is responsible for making jurisdictional determinations and regulating wetlands under Section 404 of the CWA. In addition, Section 404 of the CWA also grants states with sufficient resources the right to assume these responsibilities in certain waters within state jurisdiction.

EO 11990, Protection of Wetlands (May 24, 1977) directs agencies to consider alternatives to avoid adverse effects and incompatible development in wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practical alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. EO 11988, Floodplain Management (May 24, 1977) directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains (that area subject to a 1 percent or greater chance of flooding in any given year).

Section 401 of the CWA gives the states and regional boards the authority to regulate through water quality certification any proposed federally permitted activity that could result in a discharge to water bodies, including wetlands. The Texas Commission on Environmental Quality (TCEQ) is responsible for conducting Section 401 certification reviews of USACE Section 404 permit applications. As such, TCEQ is the lead Texas state agency to administer Section 401 certification for projects on Fort Bliss, Texas, and evaluates the proposed discharge for compliance with Texas Surface Water Quality Standards. The New Mexico Environment Department (NMED) administers Section 401 certification for projects on Fort Bliss in New Mexico and evaluates the proposed discharge for compliance with the New Mexico Water Quality Act.

3.6 NEPA Compliance

The National Environmental Policy Act (NEPA), established in 1969, created for the protection, maintenance, and enhancement of the environment requires all federal agencies to use every practical means to maintain environmental quality. NEPA stresses the need for environmental considerations in planning and development of federal lands. The act is premised on the assumption that providing timely information to the decision maker and the public concerning the potential environmental consequences of proposed actions will improve the quality of federal decisions. Thus, the NEPA process includes a systematic, interdisciplinary evaluation of the potential environmental consequences expected to result from implementation of a proposed action.

Fort Bliss DPW-E staff decide if a proposed action on Fort Bliss will have a significant impact on natural resources. The significance of the impact, level of controversy associated with the proposed action, and existing analysis determines the level of NEPA analysis required. The NEPA process is collaborative by nature and public participation is required. Requirements are met by establishing comment periods, sending the document to pertinent organizations and agencies and holding public meetings. Final approval of the document is by IMCOM. Overall, NEPA provides environmental protection for federal projects and can reduce costs to the government by eliminating conflicts in projects due to improper planning and by avoiding fines resulting from noncompliance (U.S. Army 2007c).

Fort Bliss operates under 32 CFR 651, *Environmental Effects of Army Actions (AR 200-2)*, which guides implementation of NEPA regulations on U.S. Army installations. This INRMP is completed and analyzed in accordance with NEPA and AR 200-2. The effects of actions proposed in this INRMP were evaluated within the *Mission and Master Plan Supplemental Programmatic EIS* (U.S. Army 2007c) and, in the more recent *Fort Bliss Army Growth and Force Structure Realignment FEIS* (US Army 2010b). This updated version of the 2001 Fort Bliss INRMP does not propose any significant new actions that would trigger additional environmental analysis.

The proponent of an action is ultimately responsible for complying with NEPA requirements under 32 CFR 651. In the event that an action is a joint effort between several federal agencies, a lead agency supervises preparation of the environmental document. For all on-installation military actions, Fort Bliss will be the lead agency. The BLM is the lead agency for nonmilitary actions on withdrawn portions of McGregor Range under the authority of *PL 106-65* and the USFS is the lead agency for actions within portions of the Lincoln National Forest used by Fort Bliss.

3.7 Collaborative Partnerships

Effective communication among personnel from different offices ensures that activities implement as planned in the INRMP and within NEPA guidelines. An ecosystem approach to natural resources management requires managers to look beyond installation boundaries to non-DoD partners. There are agencies, organizations and institutions that can assist in implementing an INRMP. It is Army policy to encourage local and regional partnerships. The following sections discuss internal and external organizations that provide support for INRMP implementation.

3.7.1 Tribal Consulation and Collaboration

The Mescalero Apache Tribe, the Ysleta del Sur Pueblo (Tigua), the Kiowa Tribe of Oklahoma, and the Comanche Nation are all federally recognized Indian Tribes with traditional interests on land managed by Fort Bliss. These Tribes have a government-to-government relationship with Fort Bliss and consult on this level (US Army 2008). Fort Bliss has collaborated with the Tribes by conducting several surveys in order to locate plant species that are of religious and cultural significance to the Tribes. Section 4.8 in Chapter 4 further discusses these collaborations. The Mescalero Apache Tribe is granted access to Fort Bliss in order to collect agave plants (*Agave spp.)*, which are used for agave pit ceremonial purposes and the Ysleta del Sur Pueblo have expressed interest in collecting natural resources including desert tobacco, (*Nicotiana obtusifolia var. obtusifolia*) which is used in religious ceremonies (GSRC 2011).

3.7.2 Army Collaboration

Assistant Chief of Staff for Installation Management (ACSIM)

The U.S. Army Office of the ACSIM provides policy, guidance, and program management on all matters relating to overall management and resourcing of U.S. Army installations worldwide. ACSIM ensures the availability of efficient, effective base services and facilities. Functions include organizational alignments, work force, doctrine, equipment and functional responsibilities in support of the Transformation of Installation Management. The ACSIM manages installations and support services through Installation Management Command (IMCOM).

U.S. Army Installation Management Command (IMCOM)

IMCOM is directly accountable to the Chief of Staff of the Army for effective garrison support of mission activities and serves as the Army's single authority and primary provider of base support services (U.S. Army 2006c). IMCOM implements DA policies and standards for installations worldwide to support mission readiness and execution, promote the well-being of Soldiers, civilians, and family members, improve infrastructure and preserve the environment. Traditionally, installation management occurred through Installation Management Agency regional offices. Through reorganization of IMCOM and through BRAC, these offices are now located in two locations: Fort Sam Houston, Texas, and Fort Eustis, Virginia. Management of Fort Bliss falls under IMCOM-West, Ft Sam Houston, Texas.

U.S. Army Environmental Command (USAEC)

USAEC is a major subordinate command of IMCOM. The USAEC manages and executes the Army's Cleanup Program and supports the execution and implementation of the Army's Environmental Quality Programs by providing innovative and cost-effective products and services in support of Army training, operations and sound environmental stewardship.

DoD Legacy Resource Management Program

Congress instituted the DoD Legacy Resources Management Program in 1991 to promote stewardship of natural and cultural resources on military lands. The intent of the Program is to fund natural and cultural resources management projects that could go unfunded through normal funding procedures. Legacy projects typically demonstrate innovative techniques for management, conservation, and preservation of natural and cultural resources. Legacy funds can be requested annually in accordance with instructions provided by the Office of the Deputy Undersecretary of Defense for Installations and Environment (DUSD I&E).

3.7.3 Federal Agencies

US Army Corps of Engineers (USACE)

The USACE provides contract management, construction management, and technical support. Fort Bliss has the option to use USACE contracts as vehicles for natural resources management and to access USACE organizations, such as the Waterways Experiment Station and the Construction Engineering Research Laboratory for technical assistance and support for natural resources projects.

US Fish and Wildlife Service (USFWS)

USFWS is a signatory cooperator in implementation of this plan in accordance with the Sikes Act. USFWS is the agency responsible for regulating compliance with the ESA, MBTA, and the Bald and Golden Eagle Protection Act.

U.S. Environmental Protection Agency (EPA)

EPA leads the nation's environmental science, research, education, and assessment efforts. Its activities include developing and enforcing environmental regulations, providing financial assistance to state environmental programs, nonprofits, and educational institutions, performing environmental research at laboratories located nationwide, sponsoring voluntary partnerships and providing environmental education (USEPA 2009).

Natural Resources Conservation Service (NRCS)

NRCS assists in the protection and conservation of soil resources throughout the United States and assists Fort Bliss to manage and conserve its soils. An Interagency Agreement exists between Fort Bliss and NRCS to assist in implementation of training area land rehabilitation.

U.S. Department of Agriculture – Wildlife Services (USDA-WS)

USDA-WS provides Federal leadership in managing problems caused by wildlife by helping to solve problems that occur when human activity and wildlife are in conflict with one another (USDA-WS 2009). USDA-WS is contracted to monitor and control nuisance wildlife.

U.S. Geological Survey (USGS)

USGS is a multidisciplinary organization that provides scientific information on biology, geography, geology, geospatial information, and water to minimize damage from natural disasters and to help manage the nation's water, biological, energy, and mineral resources. USGS assists Fort Bliss by helping design biological, water quality, and hydrologic surveys and by facilitating the integration of Fort Bliss data into national or regional databases.

Bureau of Land Management (BLM)

BLM has management authority for natural resources management on McGregor Range lands withdrawn under PL 106-65. The BLM possesses special expertise to assist in the development and implementation of natural resource sustainment goals and actions.

U.S. Forest Service (USFS)

Fort Bliss utilizes approximately 18,000 acres of the Lincoln National Forest as a secondary safety zone and as a training area. The agencies operate under a Memorandum of Understanding (MOU) between the USFS and the DA (Appendix I). The MOU establishes the USFS as the administrating agency for all nondefense land uses, directs that uses of these lands will be coordinated with Fort Bliss and that these lands will be open to all forest users when not in use by the military.

3.7.4 State Agencies

New Mexico Department of Game and Fish (NMDGF), Texas Parks and Wildlife Department (TPWD)

In 2001, through the efforts of the 3000 member groups of the Teaming With Wildlife Coalition (http://www.teaming.com), the US Congress passed legislation now known as the State and Tribal Wildlife Grants Program (SWG) and created the nation's core initiative for conserving our country's biodiversity and thereby precluding the necessity of listing more species as threatened and endangered. One of the mandates of SWG was that each state must develop and submit a Comprehensive Wildlife Conservation Strategy (CWCS) no later than October 1, 2005. To date, each of the fifty states has created a CWCS.

Each CWCS is a strategic plan intended as a blueprint to guide collaborative and coordinated wildlife conservation initiatives involving local, state, federal, and tribal governments, non-governmental organizations (NGOs) and interested individuals. Each plan was developed using eight congressionally required elements (AFWA, 2007):

1. **Wildlife-**Information on the distribution and abundance of wildlife, including low and declining populations, that describes the diversity and health of the state's wildlife.
2. **Habitats-**Descriptions of locations and relative conditions of habitats essential to species in need of conservation.
3. **Problems-**Descriptions of problems that may adversely affect species or their habitats, and priority research and survey efforts.
4. **Conservation Actions-**Descriptions of conservation actions proposed to conserve the identified species and habitats.
5. **Monitoring-**Plans for monitoring species and habitats, and plans for monitoring the effectiveness of the conservation actions and for adapting these conservation actions to respond to new information.

6. **Review-**Descriptions of procedures to review the plan at intervals not to exceed 10 years.
7. **Coordination-**Coordination with federal, state, and local agencies and Indian tribes in developing and implementing the wildlife action plan.
8. **Public Participation-**Broad public participation in developing and implementing the wildlife action plan.

Fort Bliss partners with both the TPWD and the NMDGF in order to implement conservation strategies laid out in the CWCS and has incorporated components of those plans into this INRMP (TX CAP 2012, NMDGF 2006b).

Both the New Mexico and Texas CWCS plans are found in **Appendix K** and are considered tools for implementing Fort Bliss's integrated wildlife conservation strategies. New Mexico's Comprehensive Wildlife Conservation Strategy (CWCS) focuses upon species of greatest conservation need (SGCN), key wildlife habitats, and the challenges affecting the conservation of both (NM CWCS 2005). The Texas Conservation Action Plan (TCAP) focuses on building partnerships and identifying barriers and conservation actions that will help to conserve the state's rich diversity of terrestrial and aquatic wildlife and the lands and waters on which they depend for survival (TX CAP 2012).

New Mexico Energy, Minerals and Natural Resources Department (NMEMNRD)

The Forestry Division, NMEMNRD maintains a list of all rare, endangered plants and species of concern within the State of New Mexico and issues permits for the take of these species. The state also has statutory authority to cite individuals or groups that, without authority, take any rare species (EMNRD 2012).

New Mexico Environment Department (NMED)

The Air Quality Bureau (AQB) of NMED has authority over air quality for all areas and agencies within New Mexico. This includes issuing air quality construction and operating permits and enforcing air quality regulations and permit conditions (NMED-AQB 2012).

Texas Council of Environmental Quality (TCEQ)

TCEQ has authority to enforce state regulations concerning air and water pollution and solid waste management anywhere within the state of Texas. TCEQ issues permits for activities that affect air quality, water quality and landscapes (TCEQ 2012).

3.7.5 Non-Governmental Groups

Universities can provide technical support in natural resources management and technical expertise on specific resource issues. Seven universities, six nongovernmental agencies, and seven federal agencies (including DoD) comprise the Desert Southwest Cooperative Ecosystems Studies Unit (DSCESU). The host institution for the DSCESU is the University of Arizona. The mission of the DSCESU is to provide "collaborative research, education, and technical assistance addressing desert ecosystem resource issues at local, regional, national, and international levels" (DSCESU 2009). The DSCESU was established in 2005 through development of a cooperative agreement between partners, including DoD; therefore, Fort Bliss has access to the partners in the DSCESU and can acquire their technical assistance through a task agreement.

3.7.6 Contractors

Contractors perform specialized management projects or provide technical knowledge about natural resources management. Contractors must adhere to the requirements and management actions detailed in the INRMP. Examples of contractor support to assist Fort Bliss with natural resources management and implementation include the following:

- Endangered species surveys
- Invasive species surveys
- Soil surveys
- Wetland delineations
- Technical writing
- GIS support
- Data management

3.7.7 Nonprofit Organizations

Partners in Flight (PIF)

The National Fish and Wildlife Conservation Foundation developed the PIF program in 1990 to establish international partnerships to assure long-term survival of neotropical migrant avifauna throughout the Western Hemisphere (PIF 2006). PIF has teamed with agencies at the federal, state, educational institution, and nonprofit levels, including the DoD, to develop conservation plans that integrate into ongoing management. The DoD PIF program "supports and enhances the military mission by providing a focused and coordinated approach for the conservation of migratory and resident birds and their habitats on DoD lands" (DoD PIF). The DoD PIF has developed numerous partnerships at the local to international levels and implements conservation planning, the DOD Coordinated Bird Monitoring Plan and the DoD Bird/Wildlife Aircraft Strike Hazard (BASH/WASH) program (DoD PIF). DoD PIF is included in national working groups to deal with local and regional problems. Fort Bliss can coordinate with and seek assistance from the PIF Southeast and West region working groups to manage for particular migratory bird species on the installation.

The DoD is a participant in the New Mexico chapter of PIF. New Mexico PIF released its "New Mexico Bird Conservation Plan" in 2007 that assessed bird species and habitats in New Mexico, identified priority bird species and provided management recommendations for Fort Bliss. More information is in Appendix F, Migratory Bird Management**.**

The Nature Conservancy (TNC)

TNC and DoD signed a cooperative agreement in 1988. This agreement allows installation commanders to obtain technical assistance from TNC and state heritage programs. The New Mexico Natural Heritage Program (NMNHP) has conducted extensive natural resources surveys and developed monitoring protocols for some species of concern.

3.8 Cooperative Agreements

The following is a list of collaborative agreements and partnerships that Fort Bliss has entered into to assist in the management of natural resources. Copies of the first six agreements are in Appendix I.

- *MOU between the USDA, USFS, and the USACE (1971):* Use and management of McGregor Range (formerly McGregor Missile Range), outlining responsibilities for each entity.
- *Cooperative agreement between the BLM, Fort Bliss, and New Mexico State University (1979):* Preservation of study sites on McGregor Range.
- *Interagency Agreement between Fort Bliss and the NRCS (1997):* Improvement of overall management of natural resources in support of training requirements.
- *MOA between Fort Bliss and BLM (1997):* Renewal application for the withdrawal of McGregor Range.
- *MOA between BLM and Fort Bliss (2006):* Conditions for the preparation of management plans, including a SEIS.
- *MOA between BLM and Fort Bliss (2007):* Policies, procedures, and responsibilities related to land use planning and resource management of McGregor Range.
- Fort Bliss, as part of DoD, benefits from the January 2006 MOU between DoD, USFWS, and the International Association of Fish and Wildlife Agencies for a Cooperative Integrated Natural Resources Management Program on Military Installations.
- Fort Bliss, as part of DoD, benefits from the July 2006 MOU between the USFWS and DoD to Promote the Conservation of Migratory Birds.
- Fort Bliss, as part of DoD, benefits from the November 2006 MOU between DoD and USDA NRCS signed a MOU agreeing to coordinate activities to preserve land and improve water quality on lands surrounding government-owned military bases.
- Fort Bliss, as part of DoD, benefits from the 1996 MOU between the USEPA and DoD for coordination of Integrated Pest Management (IPM) activities.
- Fort Bliss, as part of DoD, benefits from the 1996 cooperative agreement between DoD and TNC for conducting natural resources inventories at installations.

3.9 Public Access

Fort Bliss provides for a variety of overlapping military and nonmilitary uses on the FBTC.

Range Operations manages the access and activities on the FBTC in accordance with Fort Bliss Regulation 385-63 (U.S. Army 2014b). The regulation prescribes the general safety requirements and procedures for users of the training areas and ranges. Some portions of the training center are available for public recreation activities such as hunting, biking, hiking, camping, horseback riding, bird watching, wildlife observing, and use of registered motorized vehicles (Figure 3.9-1). Use of the installation is authorized in designated areas 365 days per year as long as they do not interfere with military training events. Recreation and/or hunting events that do not meet these criteria may be permitted on a case-by-case basis.

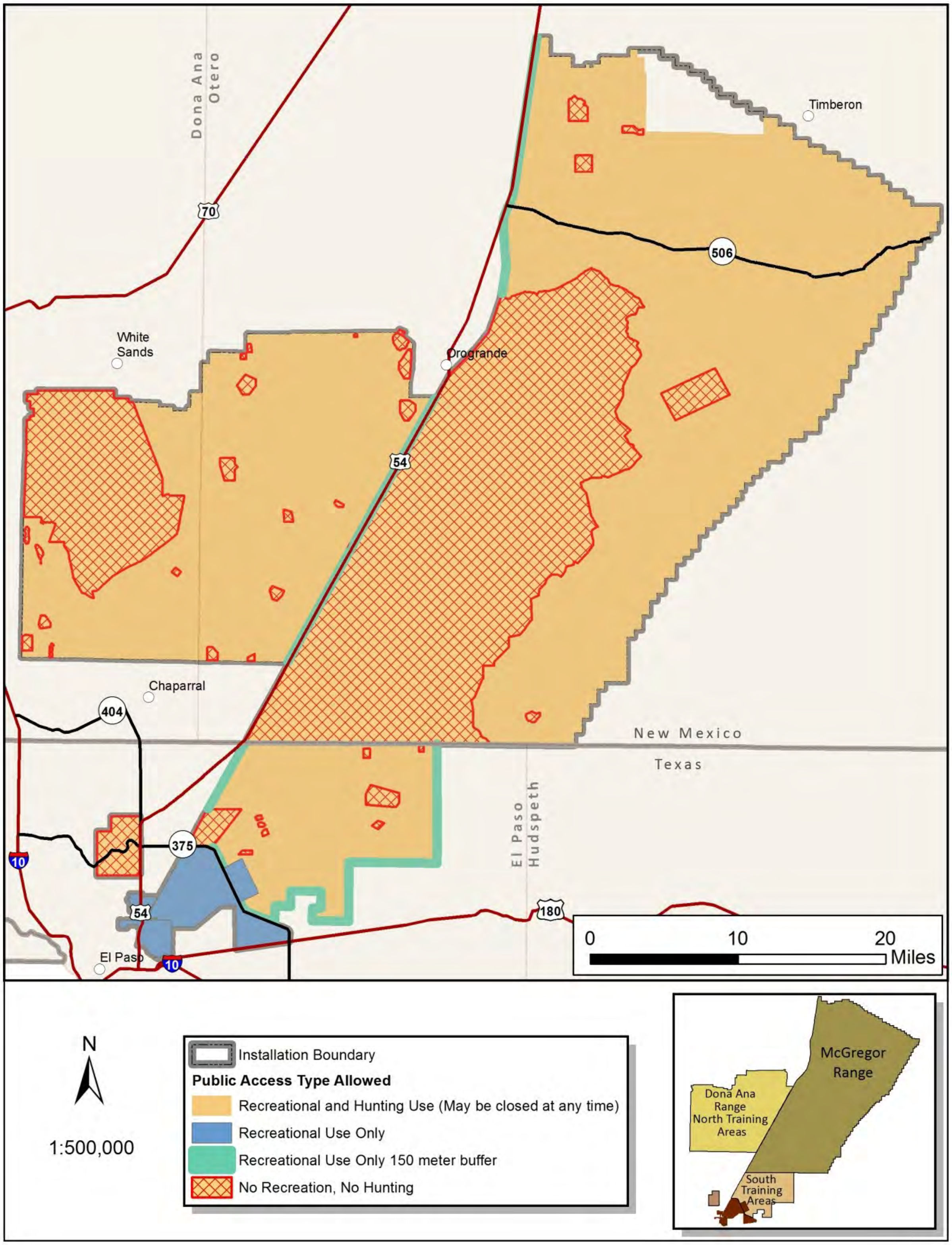
Members of the public must obtain annual FBTC Recreation Access Permits. Permit holders are responsible for complying with specific procedures for entry, use, and exit of the training areas. Current access procedures allow for certain activities. Compatible military activities such as range maintenance and resource survey activities can occur along with recreational use. When military activities are incompatible with public use, the entire training area closes to public access. Access permits are available at the pass gates at either Chaffee Gate or Buffalo Soldier Gate, or at the BLM District Office in Las Cruces, New Mexico.

All vehicle travel, including off-road vehicles (ORVs), is limited to designated roads and trails. This designation is for public safety and protection of watershed and cultural resources (USDI 1990a).

3.9.1 Trespass and Training Area Safety and Security

Portions of the Organ Mountains within Fort Bliss serve as the Doña Ana Range-North Training Areas impact area and there is no recreation access. Because the land is adjacent to BLM land, recreational users occasionally trespass into potentially dangerous areas such as previously used impact areas (U.S. Army 1999). A number of trails begin on BLM land in the Organ Mountains and cross the boundary onto Fort Bliss. Another area of concern is the Sacramento Mountains foothills that extend into the northern part of McGregor Range. Recreational users within the Lincoln National Forest occasionally trespass into potentially dangerous areas on Fort Bliss. Visible boundary markers or fences are in the Organ and Sacramento Mountains along the boundary line. Patrols, surveillance, and enforcement occur to control unauthorized access onto Fort Bliss.

The BLM and Fort Bliss have coordinated grazing access in order to prevent trespassing from cattle. The BLM has fenced cattle out of the lower reaches of Fillmore Canyon and in the Soledad Canyon area.



3659

3660 **Figure 3.9-1 Public Access**

3.9.2 Illegal Dumping

Disposal of solid waste on Fort Bliss property is difficult to regulate because of the large area of the installation; therefore, certain areas are sites of frequent illegal dumping. These sites pose threats to human safety, cost money to clean, and are aesthetically unappealing. There is also a problem with illegal dumping along U.S. Highway 54 and along the boundary between Fort Bliss and the City of El Paso.

3.10 Environmental Awareness Outreach

Environmental awareness training is a multifaceted program with the primary goal of improving land users' understanding about the impacts of their activities, including mission training and recreational activities. The environmental awareness program applies to military personnel including tactical units, leaders, and Soldiers assigned to or using Fort Bliss. It also covers tenant activities, installation staff, civilian employees, and other members of the public(DA 2007). Environmental awareness training is a coordinated effort between DPW-E and DPTMS.

Environmental awareness training promotes environmental programs such as endangered species habitat protection, spill prevention, cultural and historic resources protection and requirements for NEPA documentation. An effective environmental awareness effort is essential to implementation of a range-oriented environmental program.

The objectives of environmental awareness training are:

- To minimize damage to Fort Bliss lands and their natural resources by exposing land users to, and familiarizing them with, conservation themes and requirements.
- To enhance public relations with surrounding communities through education, involvement in area activities, and open communication lines.
- To improve working relationships between federal, state, and local regulatory agencies, non-governmental groups, clubs, and organizations and Fort Bliss, particularly in environmental and natural resource conservation projects.

These objectives are achieved through continued use and improvement of the current environmental awareness training program on Fort Bliss for military personnel, continued participation in area conservation activities, increased public awareness through implementation of a Restoration Advisory Board (RAB), and continued public forums including Good Neighbor Forums.

3.10.1 Military Personnel Environmental Awareness

Environmental awareness programs for military personnel typically consist of three elements:

- Training and educational materials
- Awareness Training Implementation Plan
- Command emphasis

Training and educational materials include general and installation-specific multimedia materials such as posters, videotapes, buttons, stickers, maps, comic books, field handbooks, reference or soldier's field cards, and other similar items.

At Fort Bliss, DPW-E is responsible for creating training and education materials, which are distributed to military personnel via unit commanders. These materials are directed at all levels of the military, including temporary and permanent military personnel, from trainees to commanders, stationed at or using Fort Bliss lands. Their purpose is to increase personnel awareness of environmental regulations pertaining to training lands. The training materials and courses of Fort Bliss include, but are not limited to, the New Unit Commanders Course, Sergeants Major Academy Training and Hazardous Materials Incident Training.

The Unit Commanders Course at Fort Bliss has expanded from a 1-hour environmental module to 8 hours and include field trips. DPW-E and ITAM instruct the course. Students receive the *Unit Leader's Handbook for Environmental Stewardship* (DA 1994), various checklists, and handouts; in addition, they visit examples of key environmental sites in the field (Cushing 1997).

Other environmental training is provided to units on request and follows the format established for the Unit Commanders Course. Training of this type is given at least once a quarter to directors, battalion commanders and command group members.Sergeants Major Academy class training is provided annually and is given by DPW-E. Class size varies from 100 to 300 new sergeant majors. Students receive DPW-E Environmental Compliance field cards and the *Unit Leader's Handbook for Environmental Stewardship* (DA 1994).

One of the keys to effective environmental stewardship and compliance is the Fort Bliss Environmental Officer (ENO) training program. ENOs, appointed by unit commanders, trained and certified by DPW-E, serve as the points of contact for environmental compliance and have day-to-day oversight responsibilities at the unit level. The ENO certification course established at Fort Bliss is a unique course that trains Soldiers and civilian employees as to the importance of environmental protection.

Because environmental awareness training is the ITAM component that is currently most visible to units and Soldiers in the field, command emphasis is necessary to convey the seriousness of environmental stewardship and to provide focus for installation-specific issues. To convey command emphasis for sustainable environmental stewardship, Fort Bliss has established its own environmental awards program to recognize units, Soldiers, and civilians that embody environmental stewardship and conservation of natural resources principles.

3.10.2 Dark Sky Initiative

A recent state law instituted in New Mexico is the Night Sky Protection Act. Its purpose is to regulate outdoor night lighting fixtures to preserve and enhance the states dark sky while promoting safety, conserving energy and preserving the environment for astronomy. The law further states that outdoors night-lights are not to shine above a horizontal plane. Fort Bliss has been an active participant in this initiative and has added hoods to many of its streetlights in the base camps as well as changing bulbs to low incandescent yellow lights to prevent moths and other night pollinators from being attracted to the light.

3.10.3 Public Awareness

Fort Bliss has an active public awareness program designed not only to inform the public, civilian employees, and military personnel of current environmental and conservation events at the installation, but also to get them involved in various Fort Bliss and community activities. The Fort Bliss public awareness program provides professional talks and presentations at conferences and seminars; prepares talks and informal presentations for local clubs, societies, organizations, and schools; provides briefs to the media on upcoming events and environmental findings; and performs guided tours of environmental interest areas on the installation including various ecosystems, recycling centers, and wildlife viewing areas.

3.10.4 Conservation Education

Fort Bliss is a leader in conservation education programs, sponsoring such programs as Good Neighbor Forums and hunter safety education in El Paso, Texas. Fort Bliss is active in National Arbor Day, National Hunting and Fishing Day and Keep El Paso Beautiful including Desert Sweep and City Sweep. Another educational activity at Fort Bliss is the Earth Day Open House that includes poetry and art contests. Hundreds of students attend this yearly event from schools on the installation and from throughout El Paso**.**

3.10.5 Restoration Advisory Board (RAB)

In order to better inform and involve the public and interested parties, Fort Bliss has implemented the Restoration Advisory Board (RAB). The purpose of the RAB is: (1) to provide a forum for representatives of the installation, Native American Tribes, state and federal agencies, members of the community and other public and private stakeholders to discuss and exchange information about the installation's environmental restoration program. (2) Educate and inform stakeholders as to past successes and future planned activities related to mitigation for hazardous waste disposal, clean up of disturbed sites on the installation and military munitions restoration projects.

Clean up of hazardous waste disposal sites and unexploded ordinance areas are examples of projects that have been successful on Fort Bliss with the aid of the RAB. The RAB began in 1997 and was composed of ten members representing the surrounding communities. The RAB is chaired in tandem by the Garrison Commander (military Co-chair) and a civilian Co-chair. The currently serving RAB members elect new civilian Board members. The RAB meets once a year.

3.10.6 Public Relations

Fort Bliss fosters good public relations with surrounding communities by having personnel active on community boards and committees, conservation and educational programs, and professional and amateur conservation organizations. The Public Affairs Office on Fort Bliss informs the public of installation environmental and conservation activities, programs, and restoration updates through articles in area and installation newspapers, newsletters, and journals, as well as press releases to local and installation television and radio stations. Fort Bliss also sponsors quarterly Good Neighbor Forums, which are open meetings dedicated to fostering awareness of Fort Bliss environmental programs. Fort Bliss also is a sponsor for Household Hazardous Waste Collection Day.

4 NATURAL RESOURCE MANAGEMENT ACTIONS

Fort Bliss natural resources management strives for biodiversity sustainment and conservation using an ecosystem-based approach within an adaptive management framework. The natural resources program consists of multiple scientific disciplines that are interconnected and share similar objectives. Projects and plans often consist of multiple program elements and management actions with several different resource professionals collaborating. This chapter describes Fort Bliss' natural resources program elements, states each program element's primary goals and objectives and includes management actions to achieve those goals and objectives

4.1 Ecosystem-Based Natural Resources Management

Ecosystem management recognizes the need to include sustainable human activities in a management program and provides a means to conduct Army missions as well as use the land for other human activities while accomplishing conservation goals (AEC, 1997). Described simply, ecosystem management is accomplished in this INRMP by:

- identifying EMUs that have similar vegetation, fauna, topography, soils, and climate;
- establishing clearly stated goals or preferred conditions for the resources in each EMU;
- identifying proposed human activities for each management unit;
- identifying or developing management or conservation actions to be taken to achieve the goals based on the best available scientific information;
- identifying scientific information that must be collected to achieve conservation goals;
- implementing the management or conservation actions;
- monitoring to ensure goals are achieved; and
- adapting the conservation and management actions based on the results of monitoring to achieve the goals.

Effective natural resources management and planning using an ecosystem management approach results in integration of management needs for natural resources with military mission needs. The resulting integration also ensures that management actions for one resource that may be detrimental to another resource are replaced with compatible actions. To minimize impacts to natural resources and military missions, land use planning, resource planning, and installation management is implemented in a manner that includes military personnel and natural resource managers.

Principles and concepts of ecosystem management have been described in many publications (e.g., Grumbine, 1994; Meffe and Carroll, 1994; USFWS, 1994; AEC, 1997). The following is a discussion of principles and concepts of ecosystem management that are most applicable to the integrated management of natural resources for Fort Bliss and includes a description of how these concepts are implemented as part of this plan.

4.1.1 Goal-oriented Management

Ecosystem management is a goal-oriented approach to resource management (AEC, 1997). Goals for the conservation of biodiversity and military and nonmilitary use of resources are to be developed based on an understanding of the ecological properties of the system (Meffe and Carrol, 1994). In contrast to traditional resource management, goals should focus on maintaining habitat or ecosystem quality, including ecological processes important for maintaining the characteristic biodiversity of an area, rather than focusing on individual species or resources.

The DoD has an overall goal with regard to ecosystem management: to preserve, improve, and enhance ecosystem integrity (DoD, 1994b). Over the long term, this approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic ecosystems while supporting sustainable economies and communities (AEC, 1997). The basic overall goal of ecosystem management is the preservation of biodiversity. This broad goal can be broken down into specific goals including protection of enough habitats for viable populations of all native species in a given region. Management must occur at regional scales large enough to accommodate natural disturbances (i.e., fire, wind, etc.). Planning must consider periods of centuries so that species and ecosystems may continue to evolve, and allow for human use and occupancy at levels that do not result in significant ecological degradations (Grumbine, 1994).

Within this INRMP, goals are identified for three scales of management. First, overall goals for integrated resource management on Fort Bliss are listed at the beginning of Section 4.2. Second, to ensure that these overall goals are achieved, goals are listed for the conservation of the resources within each EMU found on Fort Bliss. Thirdly, goals are listed for management of specific resources beginning in Section 4.3, such as rare or endangered species, timber, game animals, water quality,soils, etc. Management actions needed to achieve these goals are listed for each resource.

4.1.1.1 Conservation of Biodiversity

Biodiversity is defined by the USFWS (1994) as the variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. Wilson (1992) defined biodiversity as the variety of organisms considered at all levels, from genetic variants belonging to the same species through arrays of species to arrays of genera, families, and still higher taxonomic levels, including the variety of ecosystems, which comprise both communities or organisms within particular habitats and the physical conditions under which they live.

It is an Army goal to conserve biological diversity on Army lands within the context of its mission (AR 200-1). The Army also recognizes that habitat management is the key to effective conservation of biological diversity, and the protection of listed, proposed, and candidate species. Conserving native species in numbers and distributions that provide a high likelihood of persistence is also a crucial element of management (AR 200-1). Conserving and restoring biological diversity minimizes the number of species that must be protected by listing them as threatened and endangered species. Thus, installation commanders and natural resources planners and managers, in cooperation with other landowners, will develop and implement policies and strategies to achieve the following conservation objectives (AR 200-1):

- Maintain viable populations of the nation’s native plants and animals throughout their geographic range.
- Maintain natural genetic variability within and among populations of native species.
- Maintain functioning ecosystems, biological communities, habitats, and their ecological processes.
- Implement management solutions, which integrate human activities with the conservation of biological diversity.
- Increase scientific understanding of biological diversity and conservation.

- Increase public awareness and understanding of biological diversity.
- Encourage private sector development and application of innovative approaches to the conservation of biological diversity.

Fort Bliss is home to a wide variety of plants, animals, and other forms of life. To integrate conservation for this amount of biological diversity with mission planning and natural resource management on Fort Bliss, specific goals for each EMU are included in Section 4.2. Those goals focus on preserving rare habitats and viable populations of rare, threatened, and endangered native species, and preserving large enough representative areas of all ecosystem types present to allow normal ecosystem functioning. Meeting these goals will result in the conservation of biodiversity on the installation while allowing for the sustainment of the military training mission.

4.1.1.2 Ecological Scale of Management

Because the distribution of species, their habitats, and other resources are not bound by political and training area boundaries, and because they may extend across ecological units or ecosystems, management strategies in this plan were developed at the EMU level rather than within single species or resource disciplines. This form of planning facilitates identification of areas of overlap among resources and encourages integration of resource-specific plans towards increasing the health of the regional ecosystem (DA, 2007).

The EMUs described in Section 4.2 were developed based on natural ecological boundaries, not political or training area boundaries. To achieve the resource and biodiversity management goals listed in that section, resource management personnel on Fort Bliss must consider and incorporate management actions and natural events that occur beyond the installation and work in concert with surrounding land and resource management agencies.

Although the goals listed in this INRMP are for a 5-year planning period, they were formulated based on long-term ecological periods. These periods incorporate life cycles, recovery from major disturbances, changes due to land uses, etc., rather than following set timetables. Additionally, the adaptive nature of this ecosystem management formula allows for flexibility and facilitates modifying schedules and goals as necessary to maintain functioning ecosystems.

4.1.1.3 Integration with Mission Activities

Integration of natural resources management with military activities is accomplished primarily through the land use planning process. During this planning process, training organizations identify their scheduling, environmental, and spatial needs. Areas that meet their requirements are assigned specific types of training activities. DPW-E Conservation Branch resource professionals review the proposed activities and determine if the activities are likely to impact the natural environment to the extent that future use of the area for training is jeopardized. Managers then identify areas containing sensitive or important resources (e.g., endangered plants) that need protection from mission activities. During this planning, mitigation or conservation measures are identified based on the type of activity planned in an area and the particular natural resources of the area (e.g., seasonal adjustments of military actions required to avoid wildfires in grasslands).

Natural resources management is integrated into the daily functioning of the installation through the area access and activity approval process. Using the FB Form 88 process, DPW-E personnel review each proposed activity, including the planning and conducting of military training, construction, maintenance, repair, and including real property and/or land use decisions, to assess the potential impact on natural resources and propose measures to mitigate those impacts. For activities that are substantially different from previously reviewed projects, the new missions or actions must undergo a NEPA review. The NEPA process helps insure that the potential impacts of the new activities are identified and mitigation efforts are planned for to meet the sustainment goals for the affected natural resources.

4.2 Ecosystems Management Goals

Many of the Fort Bliss resource management goals are broad in scope; others pertain to ecological management units (EMU). Comprehensive goals are:

- Preserve, improve, and enhance integrity of existing ecosystems in support of sustainable training and other human activities.
- Maintain connectivity between ecosystem management units on and off Fort Bliss.
- Maintain viable populations and functioning habitat for native plants and animals.
- Prevent deterioration of highly erodible soil resources.
- Protect wetland resources from degradation, enhance existing wetlands, and ensure no net loss of wetland resources.
- Identify and protect unique and sensitive areas within each EMU.
- Implement ITAM Program and all of its components to assure continued protection and use of the land resources on Fort Bliss.
- Manage exotic species to control and prevent expansion of these species.
- Utilize prescribed burning as a management tool; use wildfire suppression where necessary.

It is important to understand how the EMUs defined for Fort Bliss extend beyond the boundaries of Fort Bliss (Figure 2.3-2) (U.S. Army, 2001c). This is important in attempting to meet a primary goal of maintaining ecological connectivity between Fort Bliss and the surrounding lands (Figure 2.3-3).

Specific attributes, impacts, and management objectives for each of the eight ecosystem management units follow below.

4.2.1 Basin Aeolian

Dunes formed around and stabilized by shrubby coppices of mesquite dominate this unit. These dunes formed before the Army began to utilize this land for training (U.S. Army, 1995f). Interdunal areas are low in nutrients and scarcely vegetated. In some areas within these coppice dunes are older unstabilized dunes that are characterized by a unique assemblage of sand-obligate species including sensitive briar (*Mimosa quadrivalvis*), pink plains penstemon *(Penstemon ambiguus*), sand reverchonia (*Reverchonia arenaria*), bindweed heliotropium *(Heliotropium convolvulaceum*), hoary rosemarymint (*Poliomintha incana*), shinnery oak (*Quercus havardii*), and others. The shinnery oak occurs in the northern portions of McGregor Range and represents one of the westernmost outlier stands for the species geographic distribution (Peterson and Boyd, 1998). These unstable dunes are protected by the restriction of no off-road traffic on McGregor Range and are virtually vehicle traps, as opposed to mesquite coppice dunes.

Primary Attributes

- Large areas of coppice dunes in stable disclimax

- Playas with unique biotas
- Scattered patches of grassland
- Unstabilized dunes (nondisturbance generated) with sand-obligate plants including some with shinnery oak
- Public access for hunting and recreation

Primary Mission Impacts

- Off-road vehicle maneuver in Doña Ana Range–North Training Areas and South Training Areas
- Field artillery firing points (Doña Ana Range–North Training Areas only)
- Obscurants
- Possible digging of gun emplacement and anti-tank ditches

Other Impacts

- Recreation
- Grazing

Primary management objectives

- Prevent expansion of coppice dunes
- Protect natural sand communities (shinnery oak and sand-obligates)
- Protect included playa and grassland areas and maintain unique biotas

Research Potential

- Investigations of geochronologic and paleoclimatic events
- Dune behavior, genesis of dunes, redistribution of nutrients by vehicles, role in groundwater recycling
- Resource limitations to vertebrate communities

4.2.2 Basin Alluvial

This ecosystem unit, spanning south to north over 40 miles, is found north and west of the Hueco Mountains, southwest of the Sacramento Mountains, east and south of the Organ Mountains, and west of the Otero Mesa escarpment. It comprises fans of materials deposited by distant streams or streambeds descending from the mountain ranges. These fans are dissected by arroyos. Vegetation is typically shrubby; common elements are creosote, acacia, snakeweed, tarbush, yucca, and various species of cacti. Playas are located on the basin floor and occasionally flood.

Primary Attributes

- High structural diversity in vegetation
- Arroyo riparian habitat, and corridors for neotropical migrant birds and other wildlife
- Playa depressions
- Soil type low weight bearing, highly erodible
- Good game bird habitat

Primary Mission Impact

- Limited off-road wheeled vehicle maneuver at Controlled Access FTX sites
- Obscurants
- Overflight

Other Impacts
- Grazing
- Recreation

Primary Management goals
- Protect and maintain arroyo riparian communities in natural functioning conditions
- Preserve natural integrity of shrub communities
- Maintain or enhance migratory bird corridors
- Monitor and prevent erosion

Research Potential
- Erosion studies
- Cryptogam response to maneuvers

4.2.3 Foothill Bajada Complex

Two separate areas of this unit occur on Fort Bliss, one near the western boundary of the installation, east and south of the Organ Mountains; and west and south of the Sacramento Mountains, including the Otero Mesa escarpment and portions of the Hueco Mountains.

Foothills support a diversity of shrubs such as; beargrass, sotol, feather pea bush, Mormon tea, mariola, javelina bush, acacia, mesquite, grasses such as dropseeds, gramas, and muhlies, and numerous cacti. Deep unstabilized sand dunes also occur within this unit in northern McGregor Range, just at the edge of the BLM Culp Canyon Wilderness Study Area. The dunes contain typical sand-obligate plant species including shinnery oak (*Q. havardii*).

There are high quality grama grasslands in potions of the foothill bajada EMU. These particular grasslands are not in areas currently grazed, and include black grama grasslands that are rated as globally important by The Nature Conservancy (TNC) (Leslie et al., 1996).

Primary Attributes
- High vegetation diversity provides high structural diversity
- Highest density of arroyo riparian habitat; arroyos provide framework of conduits for watershed and corridors for animals, particularly migrant birds
- Important ecotonal area between grasslands and woodlands
- High biotic diversity, high cactus diversity and abundance
- Good game bird habitat
- Relatively pristine grassland areas (portions ungrazed for decades)

Primary Mission Impacts
- Erosion of roads with faulty design
- Unlimited use by ground troops
- Firing range impact areas
- Overflights
- Wildfires

Other Impacts
- Grazing on McGregor Range
- Recreation
- Lightning-caused fires

Primary management objectives

- Protect and maintain arroyo riparian habitats in natural functioning condition as conduits for watersheds and corridors for wildlife, including neotropical birds
- Protect and maintain grasslands
- Maintain diversity of naturally functioning native shrub communities at current or better conditions as reflected in part by the presence of Sneed pincushion cactus
- Prevent erosion

Research Potential

- Baseline for ungrazed blue/black grama grassland
- Erosion studies
- Effects of fire on vegetation
- Cryptogam recovery on simulated maneuver sites
- Paleoclimate reconstruction from packrat middens

4.2.4 Franklin Mountains

This north-south oriented mountain range is south of the Organ Mountains and straddles the New Mexico/ Texas border. Castner Range, in Texas and the portion of the north end of the Franklin Mountains, in New Mexico, on Doña Ana Range are separated by several miles, but are both within this EMU.

Primary Attributes

- High diversity of cacti and other succulent plants
- Raptor nest sites

Primary Mission Impacts

- Overflight
- Dismounted training, including special operations and special forces

Other Impacts

- Trespass recreation, dumping (Castner Range)

Primary management objectives

- Maintain diversity of cacti and succulent plants
- Protect raptor nest sites

Research Potential

- Cacti survey

4.2.5 Hueco Mountains

These mountains straddle the New Mexico/Texas state line. Within the installation boundary, the highest elevation is about 5,700 feet. Succulent communities with agave, sotol, yucca, beargrass, and cacti populate the lower elevations; juniper grows sparsely on the higher slopes and in canyons. Although there are mesic canyons, there is no montane riparian or perennial water. The Hueco Mountains State Park is just outside Fort Bliss.

The Hueco Mountains of Fort Bliss contain the entire population of the Hueco Mountain rock daisy (*Perityle huecoensis*). The Hueco Mountains are also home to a regionally rare plant, the Alamo beardtongue (*Penstemon alamosensis*) (U.S. Army, 1998f). The Hueco Mountain rock daisy and the Alamo beardtongue occur on cliff faces within this EMU.

Primary Attributes
- High biodiversity
- Arroyo riparian habitat
- Unique succulent communities, high succulent diversity
- Cliff habitat important for raptors, bats, and indemic plant species
- Mesic conditions in canyons support regionally uncommon plants

Primary Mission Impacts
- Helicopter overflights
- Ground troops
- Reconnaissance sites for mounted units using lower terrain

Other Impacts
- Trespass
- Dumping
- Recreation

Primary management objectives
- Protect, maintain, and enhance the high diversity of plant communities as reflected by arroyo-riparian, succulent, and endemic flora
- Protect and maintain cliffs as habitat for bats, raptors, and endemic plants

Research Potential
- Ecology of endemics
- Packrat middens
- Survey available water for wildlife
- Surveys of biodiversity

4.2.6 Organ Mountains

These steep, rugged mountains form a portion of the western boundary of Fort Bliss. Fort Bliss controls most of the mountain range. They contain the highest elevation within the installation, at 8,820 feet. Piñon and juniper are dominant forest types, but ponderosa pine and Douglas fir stands occur at the higher elevations. Oak woodlands are found on the middle slopes along with montane grasslands. The BLM has established Wilderness Study Areas (WSAs) adjacent to Fort Bliss in the Organ Mountains. Most of the Fort Bliss portion of the Organs is rugged, lacks roads, and is used primarily as a safety buffer zone, although less than 10 percent of the Organ Mountains EMU is used as an impact area. Recent surveys show training has had minimal impacts on endemic species (U.S. Army, 1997o). Environmental management should emphasize preserving integrity and connectivity across boundaries and maintaining endemic diversity. The Organ Mountains ecosystem management unit also contains examples of rare cryptogamic plants including rare lichen (*Omphalora arizonica)* and a sparsely distributed fern (*Phanerophlebia auriculata*) (U.S. Army, 1997o).

The Organ Mountains also harbor endemic and sensitive animal species including the endemic Organ Mountains Colorado chipmunk (*Eutamias quadrivittatus australis*), and several species of woodland snails (*Ashmunella* spp.) (U.S. Army, 1997o). The Organ Mountains Colorado chipmunk was believed to occur primarily in the fragmented mixed-conifer forest habitat. However, a study by the NMNHP revealed that this chipmunk is actually found in a variety of habitats within the Organ Mountains though populations are not large (U.S. Army, 1997o). Five species of endemic land snails (*Ashmunella auriculata, Ashmunella burketti, Asmunella beasleyi, Ashmunella organensis, Ashmunella todseni)* occur within talus slopes within the Organ Mountains and recent studies by the NMNHP suggest that some populations of these snails may be declining or failing to reproduce (U.S. Army, 1997o).

The Organ Mountains also are home to endemic plant species including the Organ Mountains evening primrose (*Oenothera organensis*), Organ Mountain pincushion cactus (*Escobaria organensis*), smooth figwort (*Scrophularia laevis*), the nodding cliff daisy (*Perityle cernua*), and the whorled giant hyssop (*Agastache pringlei*) (U.S. Army, 1997o). An Indian paintbrush, (*Castilleja organorum)*, is currently under review and may be found to be a true endemic to the Organ Mountains (U.S. Army, 1997o). Additionally, many plants that are rare elsewhere are found in the Organ Mountains EMU including a rare mustard (*Draba standleyi*) found only in two other mountain ranges (Chiricahua and Davis Mountains). An orchid (*Hexalectris nitida*) rare in New Mexico; and Plank's catchfly (*Silene plankii*) which is endemic to the mountains along the Rio Grande of New Mexico and the Franklin Mountains of Texas (U.S. Army, 1997o).

Primary Attributes

- High vegetation diversity
- Desert sky island unique biotic assemblage
- Endemic biota (Organ mountain Colorado chipmunk, woodlandsnails, four plant species)
- Springs and perennial water
- Wide elevational range
- Diversity of cliff habitats and associated plants, raptor nesting sites
- Only igneous substrate on Fort Bliss

Primary Mission Impacts

- Surface Danger Zone
- Safety footprint
- Impact area in eastern 10 percent
- Ordnance and explosive hazards

Other Impacts

- Trespass cattle
- Trespass recreation

Primary management objectives

- Maintain and enhance high biodiversity
- Maintain and enhance montane riparian communities, monitor water flow and quality
- Control trespass grazing
- Maintain remnant mixed conifer stands
- Monitor fuel loads for fire potential/fire management plan, suppress fires near talus slopes with endemic snail populations
- Protect cliffs as habitat for animals and endemic plants

Research Potential
- Ecology of endemic species
- Soil erosion
- Effects of fire on communities
- Tree ring chronology, Paleoclimate research

4.2.7 Otero Mesa

The Otero Mesa EMU is a large expanse of relatively intact grasslands including black grama grasslands. The TNC rates black grama grasslands as globally important (Leslie et a1, 1996). Otero Mesa is an uplifted fault block primarily covered by grasslands including *Bouteloua spp.* (grama), *Muhlenbergia spp.* (muhly) and *Aristida spp.* (three-awn). Swale areas have coarse grasses such as Hilaria (tobosa). *Yucca* and *Opuntia* species are common in certain areas. The Otero Mesa is located south of the Sacramento Mountains. An escarpment on its western edge drops off sharply to the Tularosa Basin. Elevations on the mesa range from 4,756 to 5,248 feet. Average temperatures are cooler and rainfall several inches higher than adjacent lowlands.

This EMU is part of a grassland ecosystem that extends east past the Fort Bliss boundaries. Fort Bliss holds about 20 percent of this EMU. Grasslands and savannahs are considered the most endangered terrestrial ecosystems in the United States, with major impacts coming from agricultural activities (including grazing), fire suppression and invasion of exotic species (Noss and Cooperrider, 1994). Many historic types of grassland in New Mexico have been heavily impacted by grazing practices and are now dominated by desert shrubs (Dick-Peddie, 1993). On Fort Bliss, ungrazed sections of southern Otero Mesa are important avian habitats.

Four separate plots of land on Otero Mesa were designated by the BLM as Areas of Critical Environmental Concern (ACEC). These areas were established by New Mexico State University, Fort Bliss, and the BLM. Like the majority of Otero Mesa, they are off limits to ORV traffic. ACECs were established to ensure some portions of black grama grasslands remained intact.

Black-tailed prairie dogs *(Cynomys ludovicianus)* occur on Otero Mesa. This species on Fort Bliss is limited to the mesa grasslands on McGregor Range in the Otero Mesa EMU and is a key species because it provides holes important for burrowing owls and prey for ferruginous hawks and other raptors. Both the burrowing owl and the ferruginous hawk are USFWS species of concern. Additionally, prairie-dog towns provide habitat for a variety of vertebrate and invertebrates (Degenhardt et al., 1996; Scott, 1996), and are important components of the natural biodiversity of the grasslands of western North America. The *Resource Management Plan Amendment for McGregor Range* (USDI, 1990a) identifies objectives for black-tailed prairie dogs on McGregor Range. Objectives include providing stable habitat and populations of black-tailed prairie dogs for ecosystem sustainablity and wildlife research purposes, and nominating prairie-dog populations in Otero County as a sensitive species (USDI, 1990a; U.S. Army, 1993a).

Primary Attributes
- Intact black grama grassland
- High diversity of grassland biota: prairie-dog towns, ferruginous hawks, Baird's sparrows, Sprague's pipits, suitable aplomado falcon habitat, huntable pronghorn populations
- ACECs

- Recreational use (hunting, bird-watching)

Primary Mission Impacts
- Erosion due to military traffic on dirt roads with faulty design
- Off-road maneuver by wheeled vehicles at controlled FTX sites
- Ground troop unlimited foot travel
- Wildfires
- Low flying aircraft

Other Impacts
- Cattle grazing
- Recreation
- Natural fires

Primary management objectives
- Maintain integrity of grassland systems, especially black grama communities by minimizing military impacts to those grasslands
- Optimize road networks
- Provide access for hunting and bird watching

Research Potential
- Long-term monitoring of vegetation change; grassland response to stresses (training, grazing, drought), grassland response to fire, effects of training and grazing on cryptogams
- Road revegetation experiments
- Habitat requirements of wintering grassland migratory birds
- Prairie dog population monitoring

4.2.8 Sacramento Mountains

These mountains bound the northern extent of Fort Bliss. The entire mountain range includes coniferous forest, riparian zones and springs; however, Fort Bliss occupies only a small portion of this mountain range and is primarily piñon-juniper woodland and mountain mahogany. The highest elevation in this EMU is about 7,400 feet. There is no montane riparian, and very little ponderosa pine forest on McGregor Range. There are some ponderosa pine stands on the Lincoln National Forest portion of this EMU.

The Culp Canyon WSA is located in this EMU. The BLM management of this area is guided by the *Interim Management Policy and Guidelines for Lands Under Wilderness Review* (USDI, 1995), which require lands under wilderness review be managed so as not to impair their suitability for preservation as wilderness. Fort Bliss does not allow ORV travel or military weapons firing within this WSA. This management emphasis will continue until the area is either added to the national Wilderness Preservation System or removed from further wilderness consideration (U.S. Army, 1993a; USDI, 1995).

Primary Attributes
- Bald Eagle winter range
- Golden Eagle nesting area
- Woodland savannah
- Ecotonal area between foothill and coniferous forest areas outside Fort Bliss
- Huntable deer population

Primary Mission Impacts

- Overflight
- Range impact safety fan for missiles
- Dismounted training

Other Impacts

- Cattle grazing
- Wildfire
- Recreation

Primary management objectives

- Maintain and enhance piñon juniper woodland and associated sensitive fauna.
- Maintain and enhance woodland and forest areas through fuel management

Research Potential

- Paleoclimate studies from packrat middens
- Vertebrate species baseline surveys

4.3 Threatened and Endangered Species Management

The USFWS, NMDGF, and TPWD are consulted regarding the presence and management of threatened and endangered species (TES) on Fort Bliss in order to comply with Section 7(c) of the Endangered Species Act (16 U.S.C. 1536).

Protected species occurring on Fort Bliss property are managed by guidance contained within the **Endangered Species Management Plan (ESMP)** component of the INRMP as required in AR 200-1 (**Appendix I**). The ESMP is the component to the INRMP for listed and proposed threatened, endangered and sensitive species and critical habitat on installations. Fort Bliss has developed management plans for individual sensitive species found on Fort Bliss (Table 2.3-6) (**Appendix J**). Each plan presents information on the status and location of the species, threats to the species, conservation goals, and includes a management and monitoring plan for the species and its habitat. Habitat and species management and protection measures are included in Section 4.4.

The primary management goal for all species occurring on Fort Bliss is to protect and maintain existing populations and their habitats. Fort Bliss conducts habitat investigations for sensitive species to better define what constitutes habitat for these species. Habitat and survey information gathered from these investigations help guide surrounding land managers and wildlife management agencies. Fort Bliss has funded investigations for species habitats off-installation that have the potential to occur on the installation. Fort Bliss will continue to coordinate and collaborate with the USFWS, respective state agencies, surrounding federal land managers and species experts from various agencies and universities for the advancement of conservation efforts for all sensitive species.

Program Element goals and objectives for management of threatened and endangered species are listed as follows.

TE Goal 1 Fort Bliss uses an ecosystem-based approach that manages TES and their associated ecosystems while protecting the operational functionality of the mission.

Objective 1.1 Conserve and enhance TES species habitats, communities and ecosystems on a regional basis by reaching across boundaries and working with stakeholders.

Objective 1.2 Apply adaptive management strategies to maintain the integrity of the mission and minimize impacts of training activities to TES.

TE Goal 2 Fort Bliss remains in compliance with the Endangered Species Act and with appropriate state regulations.

Objective 2.1 Conduct periodic surveys for sensitive, rare, threatened, and endangered animal and plant species.

Objective 2.2 Maintain, update and implement the Threatened, Endangered and Species of Concern Management Plans (collectively known as ESMPs), in coordination with the USFWS, NMDGF, and TPWD.

TE Goal 3 Fort Bliss TES benefit from active management of habitats.

Objective 3.1 Maintain or mimic natural processes of succession and wildfires.

Objective 3.2 Protect rare and ecologically important species and unique or sensitive environments by designating areas for limited uses.

Objective 3.3 Minimize habitat fragmentation and promote the natural connectivity of habitats.

4.3.1 Critical Habitat

The USFWS has not designated or identified any critical habitat on Fort Bliss. Critical habitats are those areas of land, air, or water that are essential for maintaining or restoring threatened or endangered plant or animal populations. The current military mission complies with an informal consultation with the USFWS based on activities described in the Fort Bliss Mission and Master Plan SEIS (U.S. Army 2007c). Fort Bliss natural resources are managed to preclude critical habitat designation **(Appendix G, "Benefits to Federally Threatened and Endangered Species").**

4.4 Wetlands Management

Chapter 1, Section 1.8.2, this INRMP, lists the applicable laws and regulations guiding wetland management on Fort Bliss. There are no deep-water habitats on Fort Bliss. There are shallow wetlands on Fort Bliss and nearly all of them are ephemeral in nature. Wetlands generally occur during the summer monsoons and then completely disappear sometime during the following fall or winter. There are a few permanent springs with small, associated wetlands in the Organ Mountains. These are important areas for native plants and animals but they are isolated and few on Fort Bliss.

Wetlands are an important natural system because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, unique flora and fauna niche provision, storm water attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the "waters of the United States" under Section 404 of the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USACE 1987).

The Tularosa Basin is a closed basin with no navigable waters. Only waters connected to the Rio Grande, or that may cross state lines, are potential "waters of the United States." The vast majority of the installation is non-regulated ephemeral drainages. Playas and stock tanks fed by these ephemeral drainages are also non-regulated. However, these unregulated wetlands are important habitat to many species on Fort Bliss. Wetlands are designated limited use areas on Fort Bliss.

U.S. Army policy (DA 2007) promotes "no net loss" of wetlands. Fort Bliss monitors the condition of these habitats with the primary goal of maintaining vegetative cover and high water quality. If monitoring identifies a loss, management strategies seek to eliminate or offset the loss (adaptive management) in order to comply with the policy. Fort Bliss DPW-E coordinates with the USACE to ensure compliance with Section 404 of the CWA.

Goals and objectives for management of wetlands and water resources are below and specific projects for the management of these resources are contained in Appendix C, List of Projects.

WD Goal 1 Fort Bliss remains in compliance with USACE and states of New Mexico and Texas wetlands regulations.

Objective 1.1 For projects or activities planned in an area with potential for regulated wetlands, consult with the USACE to determine compliance with CWA.

Objective 1.3 Survey and identify boundaries of existing wetlands to prevent encroachment from existing activities that may occur in these areas.

WD Goal 2 Fort Bliss minimizes the operational impact of missions on wetlands and deepwater habitats

Objective 2.1 Assess the biological conditions of aquatic ecosystems on Fort Bliss.

Objective 2.2 Manage the cantonment landscape to minimize the amounts of fertilizers and nutrients applied on Fort Bliss.

Objective 2.3 Eliminate potential sources of direct pollutant discharges to waterways, where feasible.

Objective 2.4 Promote and implement alternative stormwater management approaches, including low-impact development, to minimize adverse impacts of surface runoff from impervious areas.

Objective 2.5 Prevent spills of oil and other hazardous substances through a program of education, and ensure the effectiveness of prevention and response planning.

Objective 2.6 Incorporate BMPs of limited minor impacts and wetland awareness into military operations in and around wetlands.

WD Goal 3 Functioning ecosystems enhance the wetlands of Fort Bliss

Objective 3.1 Minimize habitat fragmentation and promote the natural connectivity of wetlands and water resources to other important habitats.

Objective 3.2 Maintain or mimic natural processes of wildfire and plant succession.

Objective 3.3 Sustain healthy arroyo riparian buffers along waterways by limiting activities in these areas.

WD Goal 4 Fort Bliss has no net loss of wetland and floodplain acreage, functions, and values

Objective 4.1 Survey for baseline wetland conditions and ensure the GIS database reflects Fort Bliss wetland acreage.

Objective 4.2 Enhance the function(s) and value(s) of Fort Bliss wetlands by enforcing LUA regulations.

4.5 Natural Resource Law Enforcement

According to AR 200-1, enforcement of laws that protect natural resources should be an integral part of the installation's natural resources management program. It also states that laws are enforced in accordance with state and federal laws, particularly referring to game species and that enforcement is to be performed by natural resources law enforcement professionals and/or the Provost Marshal (DA 2007).

Fort Bliss Military Police, officers of Texas Parks and Wildlife and New Mexico Game and Fish Department and officers of the Provost Marshal's Office within the Directorate of Emergency Services have jurisdiction to enforce state and federal natural resources laws on FBTC. Fort Bliss has exclusive use of certain geographical areas outside of the FBTC for military purposes but does not have exclusive or concurrent federal jurisdiction to enforce civilian law in these areas. Areas of shared jurisdiction include Logan Heights within which the El Paso Police Department retains normal police jurisdiction and McGregor Range, within which New Mexico state and county authorities retain normal police jurisdiction. Fort Bliss and BLM Law Enforcement officials each exercise their own full authority on McGregor Range and work cooperatively to meet each agency's responsibilities (DOI 2007). Section 670e-1 of the Sikes Act, as amended in 1997, does give the Secretary of Defense enforcement authority for federal laws on all military installations, including withdrawn public lands. Other federal agencies such as USFWS and USEPA also have authority to enforce natural resource laws on military lands (US Army 2006b).

The MOU with the USFS (Appendix I) pertains to approximately 18,000 acres of the Lincoln National Forest that overlap McGregor Range. The MOU maintains the authority of the USFS to protect natural resources from fire, depredation, trespass and illegal hunting activities within the Lincoln National Forest in cooperation with the NMDGF (UDSA 1971).

Fort Bliss coordinates with the NMDGF for enforcement activities associated with hunting activities on New Mexico portions of Fort Bliss. Fort Bliss also maintains contact with law enforcement specialists with the USFWS.

Hunting is the primary natural resources activity requiring enforcement and coordination with NMDGF and TPWD and this will continue. Inquiries concerning natural resources law enforcement on Fort Bliss are directed to the Provost Marshal, or DPW-E, Conservation Branch.

4.6 Wildlife Management

For the purposes of this INRMP, wildlife management is the manipulation of the environment and wildlife populations to produce desired objectives. The primary goal of wildlife management upon Fort Bliss is to maintain game and nongame populations at levels compatible with land use objectives.

Goals and objectives for wildlife management are below and specific projects for wildlife management are contained in Appendix C:

FW Goal 1. Fort Bliss wildlife is managed with an ecosystem-based approach, rather than single-species management.

Objective 1.1 Establish and conduct planning-level surveys on the installation as deemed necessary.

Objective 1.2 Employ an adaptive management approach to manage wildlife resources, using a continuous loop process that includes inventory, monitoring, modeling, management, assessment, and evaluation.

FW Goal 2. Fort Bliss has negligible wildlife-related health and safety risks to humans.

Objective 2.1 Coordinate with Preventive Medicine and Animal Control personnel and provide expertise as needed to minimize health and safety risks to Soldiers and other Fort Bliss personnel.

Objective 2.2 Monitor for Chronic Wasting Disease (CWD) by sampling brain stem or lymphatic tissue from every mule deer and elk harvested on Fort Bliss.

FW Goal 3. Fort Bliss maintains the species diversity and habitat requirements for all native wildlife.

Objective 3.1 Maintain viable populations of native wildlife species found in Fort Bliss ecosystems through monitoring programs and adaptive management.

FW Goal 4. Fort Bliss maintains and promotes partnerships with stakeholders, agencies and groups involved in wildlife management.

Objective 4.1 Fort Bliss utilizes cooperative agreements with the USFWS, TPWD, and NMDGF to utilize their collective expertise to help implement the goals of this INRMP.

Objective 4.2 Develop a Fish and Wildlife Management Plan in coordination with state and federal agencies that identifies potential wildlife/mission conflicts.

4.6.1 Wildlife Habitat Management

The basis of managing a rich assemblage of wildlife is to provide a mosaic of habitats that are structurally and biologically diverse. In managing for a diversity of habitats, the potential exists for numerous species to occupy a particular habitat. Fort Bliss will employ the following techniques to manage wildlife and wildlife habitat.

- **Monitoring Wildlife** Data obtained from monitoring are analyzed to detect any long-term changes in population size or structure. Monitoring and updating GIS data on wildlife species will allow Fort Bliss to make informed management decisions.

- **Controlling Invasive Species** Fort Bliss will monitor and control invasive species throughout the installation.

- **Restoring Degraded Areas** Through implementation of the LRAM program, Fort Bliss will identify and restore degraded areas.

- **Continuing a Mechanical Thinning and Prescribed Burn Program** Fort Bliss and the BLM have been reducing fuel loads around the Timberon area on McGregor Range to reduce the potential for a large, destructive wildfire. This area has historically supported large populations of mule deer but current populations are only a fraction of historical numbers (Bender 2012). These declines in numbers of mule deer are attributable to declines in the quality and quantity of food, seasonal drought and decreased cover (Bender 2012). The following table (Table 4.6-1) presents guidelines for Fort Bliss to follow to help restore mule deer to preferred habitat areas of Fort Bliss.

- **Protecting Sensitive Areas** Fort Bliss will maintain the biological diversity of Training Areas by protecting sensitive areas that provide unique habitat niches. Protection measures include restricting vehicle movement around arroyos, sinkholes, and steep slopes, as well as protecting habitats of exceptional biological value by establishing protective buffers and maintaining healthy and diverse arroyo riparian zones. The SOP for Weapons Firing and Training Area Use on Fort Bliss (U.S. Army 2012d) describes several protection measures instituted to protect wildlife and vegetation on Fort Bliss. These measures are placed by Range Operations and DPW-E and are emphasized during the area access and activity approval process. The following protective measures are included in the SOP:

- No vegetation, live or dead, is used as camouflage.
- Do not dig up or collect any plants, even for camouflage. It is illegal to collect or remove cacti.
- All excavations will be backfilled by the unit making the excavation. No excavations are dug unless cleared by DPW-E.
- Hunting by personnel engaged in field training exercises prohibited.
- Do not destroy or disturb bats or bird nests. If nests are encountered in work areas, contact the S-3 who will contact DPW-E.
- Do not collect or harm animals. Leave all wildlife alone, even snakes. It is illegal to collect wildlife without a state and DPW-E permit.
- Pack out all trash. Dispose of it in dumpsters at designated sites.

- Burning or burying trash prohibited.
- No excavations dug on Otero Mesa.
- Commanders will ensure that smoke grenades, trip flares, or any other fire-causing devices are in areas approved within the Fort Bliss Integrated Wildland Fire Management Plan. Live devices will not be abandoned or discarded anywhere on Fort Bliss.
- Range Operations clearance is required prior to using tracers or pyrotechnics.
- Units must check in with Range Operations prior to occupation of training areas.
- Remove all wire and tactical obstacles after training is completed.
- Remove all ammunition, simulators, explosives, and pyrotechnics after training is completed.
- Contact Range Operations and conduct a clearance inspection before leaving the range.

4.6.1.1 Prescriptions for Enhancing Mule Deer Habitat on Fort Bliss

Excerpted from: Guidelines for management of habitat for mule deer Circular 662. Burning for Big Game Circular 657. Both by Louis C. Bender, PhD. Research Scientist, Department of Extension Animal Sciences and Natural Resources, New Mexico State University, Las Cruces, NM 88003. 2011.

Pinon juniper woodlands; Mule Deer Habitat Potential: HIGH

The following prescriptions should apply to any random 1 square mile of mule deer home range (habitat) located within the landscape:

1) 1/4 have at least a 60% pinon-juniper (PJ) cover, which is ideal for security cover;

2) 1/4 are thinned to no less than 30% PJ cover, this creates a structural state that provides both minimal cover and increased forage;

3) Remaining 2/4 should be thinned to no less than 10-15% PJ cover, which provides scattered thermal cover and optimal foraging.

Ideally, no point within the nominal 1 square mile home range would be more than 220 yards from security cover. The optimal distribution of treatments occurs when the "Rule of 4s" is applied to every 1/4 square mile of the nominal square mile home range, making 40-acre portions the focus of the different prescriptions. When these prescriptions are applied to 40-acre parcels, mule deer have been shown to use 100% of the landscape, as opposed to 70% when the prescriptions are applied to 160-acre parcels. The two 40 acre parcels with no less than 10-15% PJ cover should not be contiguous. For example, when applied to 40 acre parcels, they should only touch at the corner (ie. be the NE and SW corners of the 1/4 section rather than both on the north or south, etc.).

Establishing a desired structural state requires mechanical or fire treatments and most PJ stands need some form of mechanical pretreatment prior to introducing fire. However, it is not recommended to use a broadcast application of herbicides to decrease PJ cover. The preferred treatment of PJ is mechanical thinning, although strip removals can also be used to create the 30% PJ structural state. For the 10-15% structural state, mechanical thinning should be used exclusively. Thinning treatments should emphasize the removal of juniper when both pinon and juniper are present, unless the pinon in the area has been severely stressed by drought, insects or competition with juniper. In those cases, it is recommended to maintain an even balance of residual pinon and juniper. When treating for a 30% cover, all tree sizes should be maintained to provide both thermal (vertical) and obscurity (horizontal) cover. When treating for a 10-15% cover, large individual pinon and junipers are preferred to facilitate summer thermal cover. The primary focus when treating PJ woodlands is to reduce the overstory cover and maximize the nutritional quality of the understory while maintaining security cover.

Prescribed burning must be done with extreme care as burning in thinned PJ can result in a substantial kill of remaining trees and decreasing the residual cover below the desired levels. It is preferred that burning be done at optimal periods for mule deer nutritional management, where the nutritional benefits of understory burning are maximized and the nutrients are provided during the gestation, lactation and antler growth. These periods start in May, so burns that benefit the mule deer should occur in March or April. The frequency of such prescribed burns should be determined by the soil productivity. Sites within the landscape that have moderate soil productivity should be burned every 5-7 years, and sites with low soil productivity should be burned every 10-15 years. The broadcast burning of the entire treatment area in early spring will also increase the production of herbaceous forages and the establishment of shrub species. Also note that complete removal of PJ should not occur unless established shrub, such as oak-mountain mahogany, communities exist and are able to provide the mule deer with all required cover and food.

Oak, mountain mahogany shrublands; Mule Deer Habitat Potential: HIGH

To provide optimal use of the landscape, the following quarter-sections should be 40 acres in size:

1)1/4 of the treatment should be maintained in late succession;

2) The other 3/4 of the treatment area in earlier successional classes.

Oak-mountain mahogany (OMM) in late succession is considered as untreated where much of the browse potential is past optimal and herbaceous forage will be shaded out, but both horizontal and vertical cover are approaching optimal. Late succession requires minimal mechanical treatment of thinning when pinon-juniper (PJ) cover exceeds 10%. Early successional status of OMM is difficult to define but if the shrubs are tall enough to shield bedded deer, then the successional status is likely optimal for provision of browse, herbaceous foods and security cover. Frequent burning and mechanical treatments are required to create and maintain early successional OMM. Prescribed burning should occur every 10-15 years to create a mosaic of clones varying in age and stem densities. In areas with higher cover of oakbrush, mechanical treatments, such as cutting or crushing, are required followed by the low-intensity prescribed burn in early spring. Seeding with grass/forb mixtures following the burn or mechanical treatment but prior to the wet season (mid-July through August) will aid in increasing the production of herbaceous forages.

Arroyos; Mule Deer Habitat Potential: HIGH

Arroyos provide both great vegetative and topographic vertical and horizontal cover, thus it is crucial to maintain a 50-100 foot buffer along arroyos during other management treatments (such as conversion and prescribed burns). The buffer is used in maintaining a high structural and species diversity that provides cover in open habitats, especially in arid grasslands (AG), creosote shrublands and other xeric shrubland habitats. Individual plant treatment (mechanical or herbicide spray) may be required to remove undesirable species such as creosote.

Mesquite shrublands; Mule Deer Habitat Potential: MODERATE

(non-sand dunes only)

To provide optimal cover, the following quarter-sections should be 10-20 acres in size:

1)1/4 of treatment area in late succession and should have between 40-60% cover;

2) 1/4 should contain less than 30% cover;

3) The remaining 2/4 should contain at least 10% cover. The primary form of treatment throughout this landscape is mechanical thinning, such as cutting, crushing or chaining. Prescribed burns in late winter - early spring or during the summer season can also be used to decrease mesquite cover but use extreme care to avoid removing all mesquite.

Arid and semiarid grasslands; Mule Deer Habitat Potential: MODERATE

Primary treatment focuses on recurring fires, diversifying forage options and establishments of woody cover. Establishing a security structure in arid grasslands (AG) is crucial as only AG within 220 yards of cover (security and thermal) should be considered "used" by mule deer. Cover may be provided by PJ stands, shrubs or the topography (such as arroyos with cut sides and small or large hills). Shrub cover can be achieved by seeding forbs/shrubs or transplanting brush with the establishment area being at least 1 acre in size and the seedlings or transplants scattered through the area. Establishments should then be maintained using the management guidelines for oak-mountain mahogany (OMM) or xeric shrublands. To develop diversity in herbaceous forages, prescribed burns should occur in early spring every 5-7 years where soil productivity is moderate and in late spring every 10-15 years where soil productivity is low.

Sand sage shrublands; Mule Deer Habitat Potential: LOW

(high soil quality sites only)

The following applies to only the more fertile sites with relatively abundant herbaceous understory: 1/4 of each treatment area should remain unmanaged; 3/4 should be treated to decrease the cover of sand sage to less than 50%. Limiting the shrub densities with either mechanical treatment or prescribed burning should enhance the production of herbaceous forages while still maintaining security cover. Any prescribed burning should be restricted to the spring as burning can reduce the height of sand sage by more than 50% and cover by more than 75%. Burning in the summer or autumn seasons can reduce these attributes by more than 90%. Preservation of littleleaf sumac patches and other tall shrubs or trees is ideal as they are heavily used by mule deer in these shrublands. Once treated, sand sage landscapes should be burned every 10-15 years to maintain the sand sage if cover exceeds 50%.

Creosote shrublands; Mule Deer Habitat Potential: VERY LOW

(non-deer habitat)
Conversion to arid grassland (AG) is the best use of these shrublands if the existing mesquite, skunkbush and littleleaf sumac can be maintained. Creosote conversions usually involve aerial

spraying of herbicides, such as tebuthiuron, but an untreated buffer of 50-100 feet should be established along any arroyos within the shrubland. Arroyos and its associated habitat components are valuable to mule deer as they provide forage species, as well as, vertical and horizontal cover.

Xeric shrublands; Mule Deer Habitat Potential: VERY LOW

(mixed lowland desert scrub and other shrubland types) (non-deer habitat)

Conversion to arid grassland (AG) is the best use of these shrublands if the existing mesquite, skunkbush and littleleaf sumac can be maintained. Xeric conversions should focus on rehabilitating existing shrubs and maintaining habitat quality by prescribed burning. It is recommended to maintain PJ to a maximum of 30% cover where present and rejuvenate shrub communities through prescribed burning in early spring. Prescribed burning should occur every 10-15 years but should be done in portions (less than 20% of the landscape) annually to maintain adequate security cover.

4.6.2 Game Management

According to the Sikes Act (16 U.S.C. 670h) harvesting of wildlife from DoD installations or facilities shall be done according to the fish and game laws of the state or territory in which it is located and in accordance with the Armed Forces Code (10 U.S.C. 2671). Hunters within Fort Bliss ranges and training areas must have in their possession a current Texas or New Mexico state hunting license (depending on state in which hunting will occur). They also must have a current range access pass for hunting signed by Range Operations or their designated representative.

All hunting on U.S. Army installations is in accordance with federal and state regulations (USACE 1998). Seasons and bag limits for harvesting game animals is within the New Mexico and Texas hunting proclamations. All persons wishing to recreate, including hunting, on Fort Bliss must obtain an annual recreation and/or hunting access permit from either the Army at the Buffalo Soldier Pass Gate or the BLM District Office in Las Cruces, NM. All weapons are to be registered. AR 210-21 requires that all hunters pass a state certified or National Rifle Association hunter education class to hunt on U.S. Army-controlled land. Recreation permit holders must check in and out with Range Operations each time they enter Fort Bliss and are responsible for complying with specific Army procedures for use of the ranges.

When areas of Fort Bliss are open for hunting, U.S. Army personnel control access and assign hunters to specific hunting areas. Availability of Fort Bliss training areas for hunting is subject to those areas not in use for training. Hunters have the same restrictions as any other users in terms of entry and exit onto Fort Bliss lands, protection of cultural and historic properties, and habitat protection measures stated.

Hunting is permissible on portions of Doña Ana Range–North Training Areas, McGregor Range, and the South Training Areas. Hunting is not permissible within the cantonment area or Castner Range. Figure 2.1-4, in chapter 2, shows areas on Fort Bliss where hunting is allowed for the public and DoD personnel. Personnel engaged in training exercises (U.S. Army 2005) cannot hunt at the same time. The *McGregor Range Resource Management Plan* (DOI 1990b) and *McGregor Range Record of Decision and Resource Management Plan Amendment* (DOI 2006b) outline specific periods for hunting to minimize conflict with military activities.

The USFS portion of McGregor Range, TA 33 (Grapevine Canyon), is open for public hunting in accordance with NMDGF regulations. However, as stated in the MOU between the U.S. Army and the USFS, Fort Bliss has the right to close that area when required for safety or security reasons when conducting military missions (USDA 1971). The fall and early winter is usually a period of heavy use of McGregor Range for missile firings. TA 33 lies within the surface danger zone for the missile range and is closed during missile firings. Contact Range Operations for permission to enter TA 33 for hunting purposes.

4.6.2.1 Big Game Harvests

Native big game species present on Fort Bliss include mule deer, pronghorn antelope, javelina, turkey, elk, and bear. Non-native big game species include oryx and Barbary (Aoudad) sheep. Hunting on New Mexico portions of Fort Bliss occurs primarily through special entry permits for deer, elk, Barbary sheep, oryx, javelina and antelope on McGregor Range. Within the Organ Mountains, there is no hunting because of potential for UXO. Currently mule deer, oryx, javelina, pronghorn antelope and Barbary sheep are the big game species found on the Texas portion of Fort Bliss.

Appendix L provides harvest summaries for mule deer, antelope, elk, javelina, oryx and Barbary sheep.

4.6.2.2 Small Game Harvests

Small game species in huntable numbers include dove, quail, rabbits, and waterfowl. Seasons and bag limits are in the New Mexico and Texas game proclamations. Quail and dove are common species over most of Fort Bliss.

4.6.2.3 Exotic Wildlife Species

Currently the only exotic wildlife species that is being actively controlled (other than those listed in pest management, Section 4.9) is the oryx. Population reduction hunts for oryx occur at Doña Ana Range for Ft Bliss active duty military personnel only and in the McGregor Range equally for Fort Bliss active duty military personnel and the public. There is potential for oryx hunting in the South Training Areas, and surveys will determine if population numbers are sufficient to support a controlled hunt. At this time, no oryx hunting occurs on the Texas portion of Fort Bliss. The oryx is an exotic species rather than a game species in Texas. A state hunting license is required to hunt exotic species in Texas, but there are no closed seasons or possession limits when hunting exotic species on private or state lands.

At this time, it is unknown if oryx are causing detrimental impacts on flora and fauna at Fort Bliss. The oryx population has been growing in southern New Mexico over the past two decades and hunted off-range and on WSMR and Fort Bliss. An aerial survey of oryx on Fort Bliss conducted in 2008 assessed population size (Table 4.6-1). Any future programs and adaptive management procedures will involve an interaction between Fort Bliss DPW-E, BLM, TPWD, and NMDGF and implemented for minimizing impacts on native plants and animals.

Table 4.6-1 Results for 2008 Aerial Oryx Survey

Survey Area	Acres	Oryx Observed
Doña Ana Ranges & North Training Areas	181,745	126
South Training Areas	85,537	9
Otero Mesa	206,393	70
McGregor Basin	151,534	102
Total	625,209	307

4.6.2.3.1 Chronic Wasting Disease (CWD) Monitoring

Chronic wasting disease is a fatal neurological disease found in deer, elk and moose. It belongs to a family of diseases known as transmissible spongiform encephalopathies or prion diseases. The disease attacks the brains of infected deer, elk and moose, causing the animals to become emaciated, display abnormal behavior and incoordination, and eventually die.To date, ongoing investigations by state and federal public health officials have shown no causal relationship between CWD and human health problems.

NMDGF has designated the Game Management Units 34, 28 and 19 as Chronic Wasting Disease Control Areas. Unit 28 includes the New Mexico portions of McGregor Range on Fort Bliss. Fort Bliss DPW-E Conservation Branch biologists and NMDGF are cooperating to monitor for this deadly disease. TPWD has designated part of El Paso County as a CWD containment zone. All mule deer and elk harvested on Fort Bliss big game hunts are screened for the disease by Fort Bliss biologists who remove tissues from each brain stem or from the lymphatic system. The tissue samples are collected and sent to NMDGF for laboratory testing for the disease. To date, seven mule deer from Fort Bliss in New Mexico have tested positive for CWD (Figure 4.6-1). NMDGF and Fort Bliss rules allow hunters who take a deer or elk within Fort Bliss to transport only certain portions of the carcass outside the boundaries of the Game Management Unit from which it was taken. Those portions include:

- Meat that is cut and wrapped, either commercially or privately
- Quarters or other portions of meat with no part of the spinal column or head attached
- Meat that has been boned out
- Hides with no heads attached
- Clean skull plates with antlers attached. Clean is defined as having been immersed in a bath of at least one part chlorine bleach and two parts water, with no meat or tissue attached.
- Antlers, with or without velvet, attached to skull plate with no meat or tissue attached
- Upper canine teeth, also known as “buglers,” whistlers,” or “ivories”
- Finished taxidermied heads

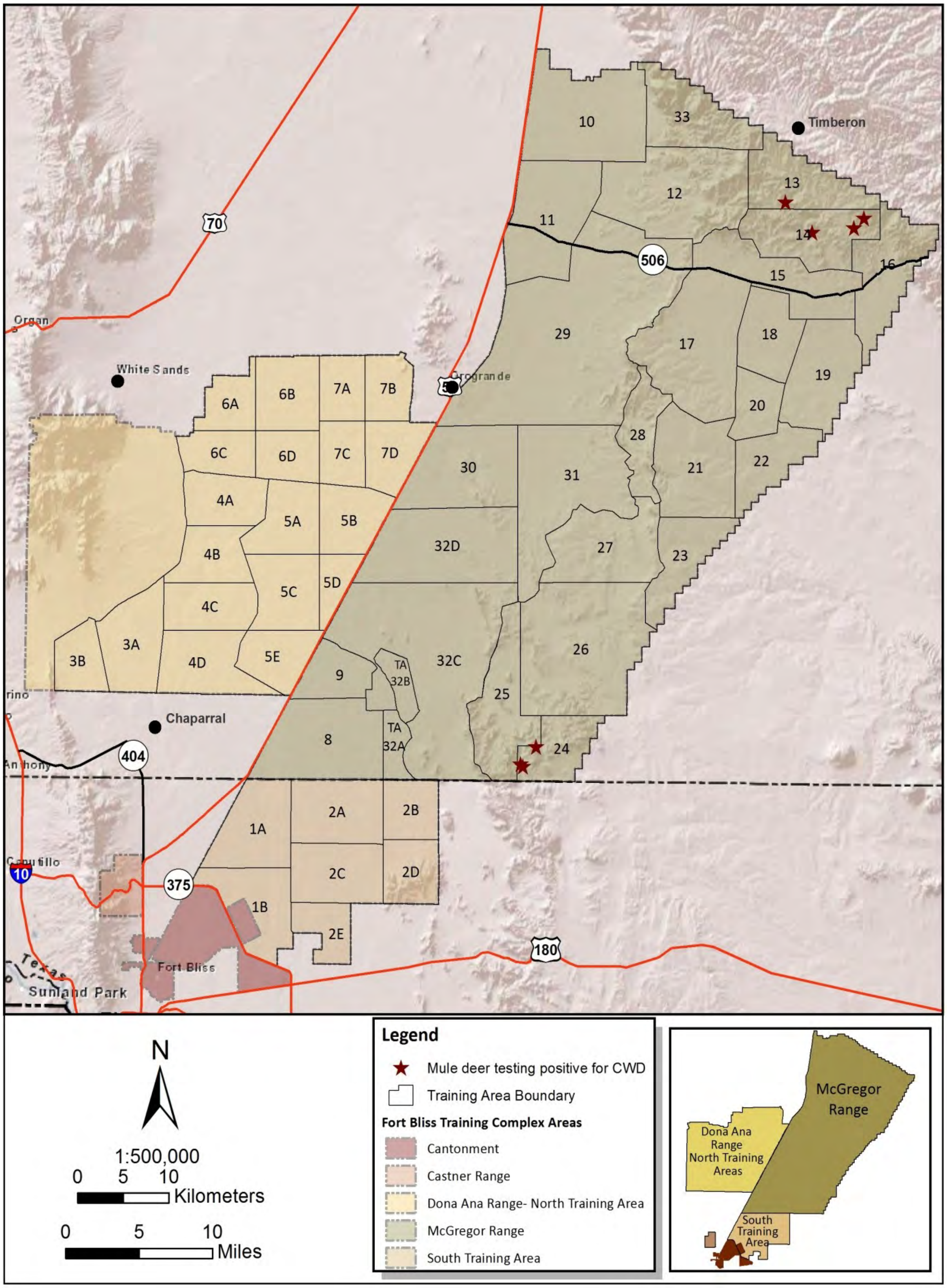


Figure 4.6-1 Confirmed Cases of Chronic Wasting Disease on Fort Bliss

4.7 Forestry Management

The Forest Management Plan (FMP) (U.S. Army 1998h) guides Forest management on Fort Bliss. The FMP describes current stands, existing fuel loads and prescribes monitoring and management actions. The FMP addresses fire and watershed management, sensitive areas, wildlife habitat, and grazing across the forested landscape.

Two forest management units exist within Fort Bliss: the Organ Mountains and the Sacramento Mountains forest management units. Forested areas within Fort Bliss consist of some or all of the following species: ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziessii*), piñon pine (*Pinus edulis*), one-seed juniper *(Juniperus monosperma)* and alligator juniper (*Juniperus deppeana*). Various species of oak (*Quercus* spp.) are also present in varying degrees within timbered stands. The forest stands in both of these management units are not suitable for commercial timber production because of poor access and low productivity. Fire management actions are concerned with manipulation of fuel loads and stand densities to reduce the probability of severe wildfire events on Fort Bliss and adjacent lands. Habitat improvement actions include thinning and prescribed burns to improve conditions for game and non-game animal species.

In 2003, hazardous fuels reduction projects began on Fort Bliss near the community of Timberon on the northern portion of McGregor Range (BLM 2003). The community of Timberon was classified as the sixth most wildfire-endangered community in New Mexico by the New Mexico State Forestry Department. Some of the homes in the community are very close to the Fort Bliss boundary. The vegetation in the forest was historically influenced by low intensity, frequent fires that maintained the traditional open park-like ponderosa pine stands and acted as a control on piñon-juniper stands. Because of fire suppression over the past 50 to 80 years, the fire regime has changed to a regime of infrequent, high-intensity wildfires and overall, vegetation in woodland areas has become denser. A joint hazard fuels reduction project between the BLM and Fort Bliss was initiated in 2004 to reduce dangerously high fuel loads and return the system to a low-intensity, low severity fire regime and thus minimize potential community-threatening wildfires. As of August 2013, prescribed fire and mechanical thinning in this area (Figure 4.7-1) have treated 4,206 acres (Cox, 2012).

All land management activities within the 18,000 acres of the Lincoln National Forest that are within the northern portion of the McGregor Range are the responsibility of the USFS. Therefore, these lands are not included for forestry management under the Fort Bliss INRMP or the Fort Bliss FMP.

Goals and objectives for forestry management are below and specific projects for the management of forests are contained in Appendix C:

FM Goal 1 Fort Bliss has a diverse system of forest stands that benefit ecosystems and wildlife habitat.

Objective 1.1 Minimize habitat fragmentation and promote the natural connectivity of habitats by limiting activities within forest stands.

Objective 1.2 Design and maintain new urban landscapes that are low maintenance and strictly incorporate native trees, shrubs, and herbaceous plants where appropriate.

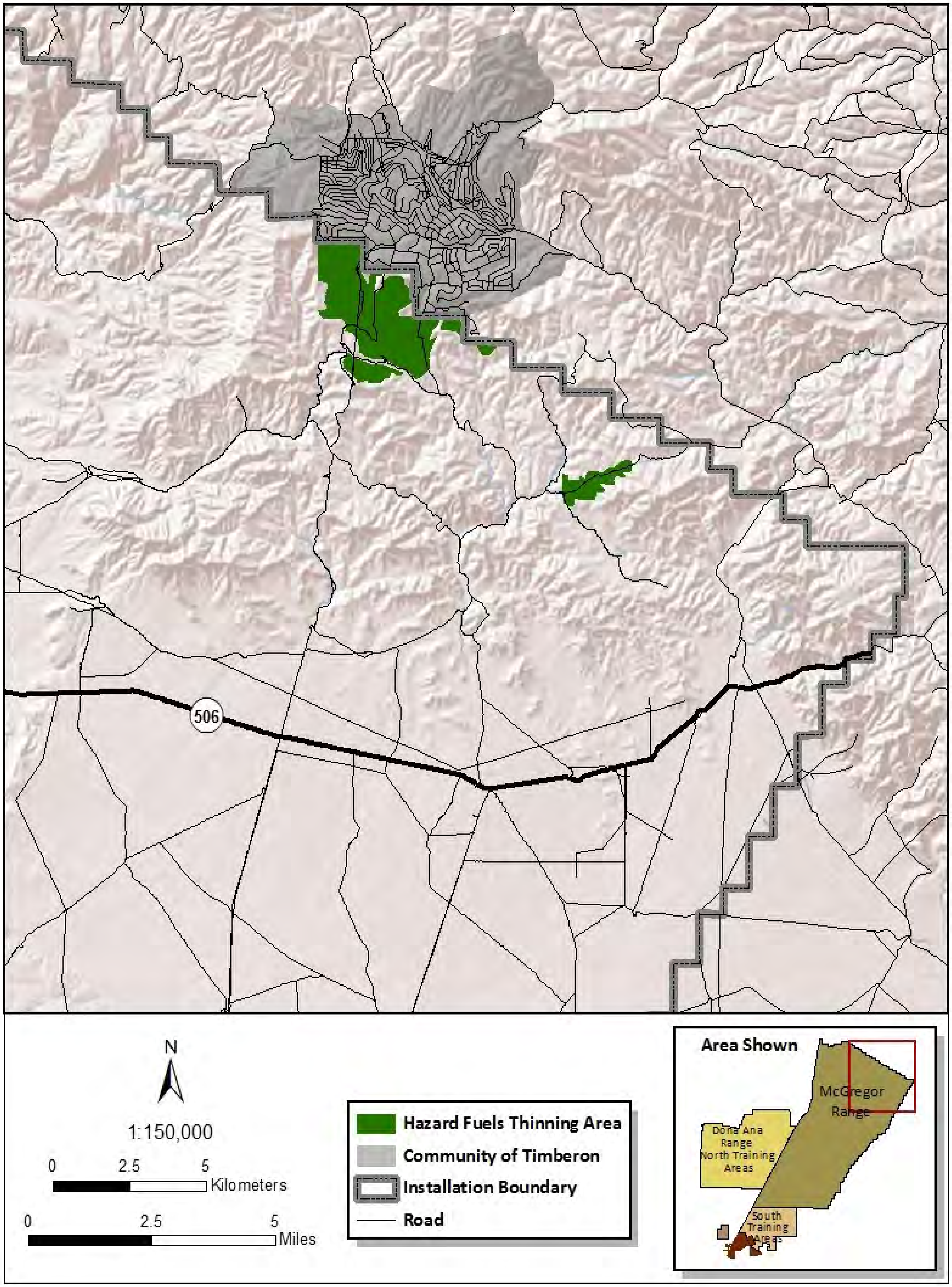


Figure 4.7-1 Hazard Fuels Reduction Areas on Fort Bliss from 2005 to 2013

Objective 1.3 Integrate native plant species into landscaping plans and minimize impacts to existing native tree species.

Objective 1.4 Implement objectives from the FMP to maintain 90 percent of the forest in the heads of canyons.

Objective 1.5 Implement objectives from the FMP to maintain 96 percent composition of young and mature mountain-mahogany plants.

Objective 1.6 Implement objective from the FMP to maintain the mountain-mahogany form class at 85 percent all available and 15 percent partly available; with 25 percent little hedging, 50 percent moderate hedging, and 25 percent severe hedging.

FM Goal 2 Fort Bliss forest stands are resilient to destructive wildfires and improve water-holding capacity.

Objective 2.1 Manage forest stands to minimize chances of catastrophic fire events.

Objective 2.2 Ensure the perpetuation of native habitats and reduce the threat of wildfire on Fort Bliss by implementing prescribed fire tresatments that reduce fuel loads in dense stands.

4.8 Vegetative Management

Vegetative or habitat management is a broad term that encompasses a whole range of management issues that affect fish and wildlife, threatened and endangered species and ecosystem goals. This section will focus specifically on training activities, grounds maintenance and construction activities' effects on sensitive species and their habitats and on the protection of native habitats. The emphasis of habitat management is to conserve biodiversity by protecting habitats and the natural ecosystem processes that maintain them. The primary method used by Fort Bliss to protect natural resources on the FBTC is through the establishment and use of designated Limited Use Areas (LUAs). The designation of Off-Limits Areas (OLAs) is more restrictive and is designated for protection of endangered species habitat, primarily Sneed's pincushion cactus and for the protection of cultural resources. LUAs are open to military training activities, but are off-limits to static vehicle positions, concentrations of vehicles, or digging. LUAs include grasslands; playas, earthen water collecting tanks (cattle tanks), water troughs and other wildlife watering locations; arroyo-riparian habitat; cultural sites; the four units of the 3,839-acre Black Grama Grassland ACEC; the 11,304-acre Culp Canyon WSA; and sensitive plant population locations. By limiting military activities within LUAs, grassland and arroyo/riparian habitats are sustained across the FBTC. There are 359,666 acres of designated LUAs for protection of natural resources on Fort Bliss.

The overall focus of vegetative management on the FBTC is to minimize impacts through land use planning and includes the use of best management practices (BMPs).

Vegetative BMPs include the following:

- Conduct brush management (mowing, brush hog, other vegetation maintenance) around structures and along roadways to reduce the risks of large destructive wildfires
- Engage in weed and noxious plant control (burning, mowing, chemical treatments)
- Conduct control burns for habitat enhancement
- Apply erosion blankets to disturbed areas

- Construct fences, install siber stakes, control access and minimize impacts through assignment of Limited Use Areas (LUAs) and Off Limits Areas (OLAs) to protect sensitive natural resources.

One habitat management practice utilized at Fort Bliss is stockpiling top or surface soils whenever large excavations occur, such as a new barrow pit to provide material for roads or highways. The topsoil is pulled off and stockpiled, then is re-used as the last layer of cover after the barrow pit is rehabilitated. This ensures that topsoil containing native seeds and natural biota important in ecological processes are present to help reestablish native vegetative cover within the area of the borrow pit.

Another vegetative management practice on Fort Bliss involved conducting surveys for Tribes to harvest natural resources used in religious ceremonies or that have cultural significance. Ysleta del Sur Pueblo showed interest in harvesting desert tobacco (*Nicotiana obtusifolia* var. *obtusifolia*) from populations located on Fort Bliss. In order to ensure that the Tribe was able to harvest what they needed, the survey focused on and met two main criteria; (1) populations large enough to sustain their numbers even after harvest; (2) road availability and accessibility (GSRC 2011). The Mescalero Apache Tribe has used agaves that are native to the Fort Bliss area for centuries and for many different purposes. In 2009, Fort Bliss employees escorted fifteen members of the Mescalero Apache Tribe to three sites on Otero Mesa. The tribal members collected twelve mature agave plants for roasting later during ceremonial rites back in Mescalero, NM.

Prescribed burning improves habitat conditions for wildlife (Section 4.17). Fencing projects protect wetland habitat in the Organ Mountains and on the main cantonment. Fences protect these sensitive habitats from trespass cattle and off-road vehicle traffic. All fences on Fort Bliss meet standards that allow wildlife to pass through or over them (USFS and BLM 1988). The majority of fencing on Otero Mesa is maintained by the BLM as an important part of their rotational grazing program (Section 4.11).

Goals and objectives for management of vegetation are as follows and projects for the management of these resources are contained in **Appendix C**:

VM Goal 1 Fort Bliss maintains the integrity and abundance of sensitive plant species

Objective 1.1 Enforce OLA and LUA regulations to minimize impacts from ground activities upon sensitive species and their associated habitats.

VM Goal 2 Fort Bliss minimizes adverse effects of training activities on vegetation

Objective 2.1 Continue to evaluate training requirements for their impacts on sensitive species and their habitats.

Objective 2.2 Monitor military activities within Limited Use Areas on Fort Bliss, particularly, within arroyo riparian areas and in grasslands for adverse impacts.

VM Goal 3 Fort Bliss maintains the diversity of native vegetative communities

Objective 3.1 Minimize habitat fragmentation and promote the natural connectivity of habitats.

Objective 3.2 Monitor military training effects to plant and habitat diversity.

Objective 3.3 Determine indicator species and monitor their diversity for overall ecosystem sustainability.

4.9 Migratory Bird Management

Fort Bliss complies with the Migratory Bird Treaty Act (MBTA) and supports the conservation of migratory birds. Conservation actions include habitat restoration, protection and enhancement, as well as the prevention and abatement of air and water pollution. One BMP used by Fort Bliss to comply with the MBTA is to conduct landscaping activities during the fall and winter to avoid impacts to nests and nesting birds. The SOP for Soldiers' use of the training areas requires that bird nests not be disturbed or destroyed. If nests are found in work areas and potential conflicts arise, then DPW-E is to be contacted for guidance (U.S. Army 2005).

Fort Bliss has funded research that shows the importance of arroyos to migratory birds. Arroyos receive protection priority across the FBTC (Kozma and Mathews 1997). The vast majority of these arroyos are at low risk of degradation because of designated protections within LUAs or because they are located where travel is restricted to roads.

The MBTA provides for year-round protection of nongame birds and prohibits the taking of migratory birds, nests, and eggs, except as permitted by the USFWS. The USFWS recommends avoiding impacts to birds protected under the MBTA by surveying for nesting birds in areas proposed for disturbance and, if necessary, waiting until the nesting and fledging process is complete. Additionally, the USFWS recommends to conduct training activities away from nesting areas or outside of the general migratory bird nesting season (March through August) to help avoid direct impacts as much as possible.

DoD is a participant in the Partners In Flight (PIF) program. PIF is a cooperative effort involving partnerships among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community and private individuals. The central premise of PIF is that resources of public and private organizations come together in order to achieve success in conserving bird populations in the western hemisphere. It is Fort Bliss and DoD policy to promote and support a partnership role in the protection and conservation of migratory birds and their habitats by protecting vital habitats, enhancing biological diversity, and maintaining healthy and productive natural systems on DoD lands consistent with the military mission.

Goals and objectives for management of migratory birds are as follows and projects for the management of these species are contained in Appendix F:

MB Goal 1 Fort Bliss employs an adaptive management approach to managing migratory birds within the framework of the Migratory Bird Treaty Act (MBTA), by using a process that includes inventory, monitoring, management, assessment and evaluation.

Objective 1.1 Ensure compliance with the MBTA in all maintenance activities occurring in Training Areas and ranges across Fort Bliss.

Objective 1.2 Conduct regular surveys of migratory bird populations to assess diversity and population numbers of migratory birds.

Objective 1.3 Monitor effects of training activities on migratory bird populations.

Objective 1.4 Enforce restrictions within limited use areas to ensure habitat quality and diversity is maintained.

MB Goal 2 Fort Bliss promotes partnerships with other agencies and groups involved in migratory bird conservation management.

Objective 2.1 Establish a cooperative agreement with the USFWS, the New Mexico Natural Heritage Program, the regional PIF representative, and other local experts to utilize their expertise to help implement the goals established in this INRMP.

4.10 Invasive Species Management

Invasive species are alien species (not native to the ecosystem) whose introduction does or is likely to cause economic or environmental harm or harm to human health. The Federal Noxious Weed Act (FNWA) and EO 13112 require federal agencies to control noxious weeds and invasive plant species on federal lands. The FNWA, enacted January 3, 1975, established a federal program to control the introduction and spread of foreign noxious weeds into the United States. Amendments in 1990 established management programs for undesirable plants (including noxious weeds) on federal lands. There are several plant species that are considered noxious on Fort Bliss and control is mandatory for those found on the federal list. EO 13112 requires that federal agencies prevent the introduction of invasive species, detect and control populations of invasive species, and restore native species and habitat conditions within ecosystems.

Surveys to inventory exotic and noxious plant species on Fort Bliss occur annually. Monitoring efforts focus on identifying new populations and monitoring expansion or reduction of current populations. The 2008 invasive species survey for Fort Bliss includes specific management recommendations for species identified on Fort Bliss. Eradication and control measures include chemical and biological control, reintroduction of native species, prescribed burning, and mechanical removal (U.S. Army 2007a).

Goals and objectives for management of invasive species are as follows and projects for the management of invasive species are in **Appendix C**:

IS Goal 1 Fort Bliss makes maximum use of native plant species and avoids introduction of invasive or exotic species in revegetation and landscaping activities.

Objective 1.1 Design new landscaped areas to be low maintenance and strictly incorporates native trees, shrubs, and plants where appropriate.

Objective 1.2 Enhance the relative health, structure, and function of existing native grassland areas by limiting activities and utilizing prescribed fire to reduce shrub encroachment.

Objective 1.3 Integrate native plant species into landscaping plans and minimize impacts to existing native habitats.

IS Goal 2 Fort Bliss complies with environmental legislation, regulations, and guidelines that address the control of non-native and nuisance plant species.

Objective 2.1 Develop and adopt proactive management measures installation-wide to control the proliferation of nuisance and non-native species.

Objective 2.2 Coordinate with state and local regulators to obtain appropriate permits for non-native and nuisance plant eradication in wetland areas.

IS Goal 3 Fort Bliss actively controls invasive species.

Objective 3.1 Prioritize areas with invasive species for eradication and subsequent native plant restoration.

Objective 3.2 Continue the eradication of non-native species, including saltcedar, utilizing methods that will cause the least disturbance to native species that might be present.

Objective 3.3 Employ an Early Detection, Rapid Response management approach by promptly containing and eradicating new infestations to reduce resource damage and costs.

4.11 Pest Management

Authority for pest management activities on Fort Bliss is established by the Integrated Pest Management Plan (IPMP) as directed under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) as amended (7 U.S.C. 136 et seq.), DoD Instruction 4150.07, DoD Pest Management Program, 29 May, 2008, and AR 200-1 (U.S. Army 2004a). Integrated pest management (IPM) is a sustainable approach that incorporates the use of multiple techniques to prevent or suppress pests in a given situation. Although IPM emphasizes the use of non-chemical strategies, chemical control is an option used in conjunction with other methods. IPM strategies depend on surveillance to establish the need for control and to monitor the effectiveness of management efforts.

The IPMP for Fort Bliss describes the installation's pest management requirements, outlines the resources necessary for surveillance and control, and describes the administrative, safety, and environmental requirements of the program. Specific aspects of the program include human health risks and environmental safety, pest identification, and the storage, transportation, use and disposal of pesticides.

Pest management requirements and activities are coordinated and monitored by the Installation Pest Management Coordinator (IPMC). At this time, the IPMC is Dr. Rafael Corral, Botanist, DPW-E, Conservation Branch. State-certified contractors perform actual pest control activities on Fort Bliss.

For a list of the pests currently found on Fort Bliss, see the Fort Bliss IPMP, 2014. The IPMP is integrated with the Fort Bliss INRMP. For a copy of the IPMP, contact Dr. Corral at Fort Bliss DPW-E, Conservation Branch. Pest control helps to maintain mission flexibility, prevents real property damage, decreases maintenance costs, and reduces the risk of injury and the transmission of diseases to personnel.

The DoD has established an MOU with the USDA Animal and Plant Health Inspection Service, Wildlife Services (APHIS-WS) (formerly APHIS Animal Damage Control) that establishes procedures for planning and conducting animal damage control activities that are not routine (DoD 1990). The MOU allows for control of animals that interfere with mission objectives, damage real property, or adversely impact personnel morale, health and safety. Because of the size of the installation and the remoteness of some TAs, Fort Bliss contracts the services of APHIS-WS as needed to prevent negative impacts to health and safety. In the past, coyotes have been an issue on the cantonment and at the base camps. DPW-E routinely posts signs and warns residents, Soldiers and employees not to feed wildlife and to secure trash bins. As necessary, DPW-E will contract with USDA-WS to remove coyotes that have become a nuisance or pose a potential health hazard.

If pests are located near threatened or endangered species, grazing land, water resources, or other sensitive areas, chemicals might not be feasible for controlling pests. Urban pest species management is coordinated with ground maintenance activities where appropriate (e.g., insects, rodents). Pest management practices and compliance is managed by the IPMC to ensure safety of personnel and protection of natural resources, and to insure compliance with environmental laws.

Goals and objectives for pest management are as follows and projects are contained in **Appendix C**:

PM Goal 1 Fort Bliss minimizes pest-related habitat damage and health risks to natural resources and people

Objective 1.1 Conduct surveys for pests that pose a potential health risk to humans or natural resources.

Objective 1.2 Promote management practices that control the damage caused by feral animals and urban wildlife, both to Fort Bliss facilities and to sensitive wildlife populations.

PM Goal 2 Fort Bliss complies with environmental legislation, regulations, and guidelines that address pest management.

Objective 2.1 Implement pest management controls from the IPMP and other pest-related guidance and plans.

Objective 2.1 Update the IPMP to ensure that the plan reflects changes in pest populations and current management issues.

4.12 Land Management

Training leaders and Soldiers are encouraged to use practices that prevent environmental degradation during training activities (AR 200-1). Implementing environmentally sound training practices, as well as considering alternatives to these practices as they are developed, limits the potential for serious alterations to natural resources and lands that are critical for providing a sustainable training environment. AR 200-1 prescribes policies, assigns responsibilities, and establishes procedures for protecting the environment and preserving natural and cultural resources. Commanders are responsible for integrating environmental management principles and environmental protection activities and programs, to the fullest extent possible, into the planning and execution of the command basic mission (AR 200-1).

DPTMS is responsible for the scheduling of training lands and range complexes, for training land management and repair and for administering the ITAM program.

LRAM is a component of ITAM. The purpose of LRAM is to repair damaged lands to facilitate military activities and to prevent further degradation of soil, water, and vegetation resources in areas designated for military activities. An important step in this process is to identify areas that are least susceptible to damage by various activities such as bivouacking and ORV training. The primary focus of LRAM includes the roads and the impact and maneuver areas of the FBTC. The LRAM program uses the Site Rehabilitation Prioritization (SiteRep) system as a means to identify and prioritize degraded training areas for potential rehabilitation based on the requirements of the training mission, environmental influences and available resources.

LRAM uses GIS and computer software to analyze relationships between training assets; threatened, endangered, or sensitive species; wetlands and riparian areas; soils; vegetation; terrain; and the National Register of Historic Places. For those projects assigned a high priority for action, the LRAM team works with available local expertise and other resources to develop a proposed rehabilitation prescription.

DPW-E reviews all proposed rehabilitation prescriptions for integration with other natural resources needs or conflicts and determines concurrence and/or the need for further management actions. Range Operations also provides concurrence after input/feedback from DPW-E and the proposed actions are prioritized by DPTMS for potential implementation. Rehabilitation of damaged sites is in accordance with the NRCS field office technical guide (http://efotg.sc.egov.usda.gov/).

The goal and objectives for land management are as follows and specific projects for the management of these resources are contained in **Appendix C**:

LM Goal 1 Fort Bliss sustains and enhances its training lands by integrating sustainable land and resource management techniques amongst all users of the FBTC.

Objective 1.1 Manage for no net loss in Fort Bliss's capability to support the military mission.

Objective 1.2 Minimize habitat fragmentation and promote the natural connectivity of habitats by maintaining LUAs.

Objective 1.3 Maintain or mimic natural processes by restoring low intensity, frequent wildland fires to the landscapes of Fort Bliss.

Objective 1.4 Ensure the perpetuation of native habitats and reduce the threat of severe wildfires on Fort Bliss through a program of prescribed fires.

Objective 1.5 Protect soil resources through erosion prevention and erosion control practices.

Objective 1.6 Maintain access and operation of roads and utilities while providing environmental stewardship by establishing a program of regular road maintenance.

4.12.1 Soil Resources Management

AR 200-1 requires that military installations' sources of dust, runoff, silt, and erosion debris be controlled to prevent damage to land, water resources, equipment, and facilities, including adjacent properties. A Soil Erosion and Sediment Control Component (SESCC) (Appendix B) to the INRMP is implemented where appropriate for Fort Bliss. Maintenance of vegetative cover is consistent with ecosystem management goals expressed earlier. Materials from offsite are to help control dust and soil erosion on sites where training activities are concentrated and include gravel, fabrics, riprap, and recycled concrete and pavement that are environmentally safe.

Goals and objectives for the management of soil resources are as follows and projects for the management of these resources are contained in **Appendix C**:

SR Goal 1 Fort Bliss keeps soil erosion from water and within tolerance limits as defined in soil surveys prepared by the U.S. Department of Agriculture (USDA), NRCS

Objective 1.1 Follow the guidelines established in the Soil Erosion and Sediment Control Component, Appendix B, Fort Bliss INRMP.

Objective 1.2 Prepare site-specific sediment and erosion control plans for all earth-moving projects on the FBTC.

SR Goal 2 Fort Bliss minimizes nonpoint source pollution of surface and groundwater

Objective 2.1 Maintain vegetative buffers on waterways/riparian corridors by includions within LUAs.

Objective 2.2 Ensure BMPs are developed as a part of the water quality monitoring program.

SR Goal 3 Fort Bliss minimizes impacts of land uses to reduce soil erosion and sedimentation when and where possible.

Objective 3.1 Locate physically intensive land disturbing activities to the Tularosa Basin which has large areas containing the least erodible soils.

4.13 Agricultural Outleasing

Fort Bliss does not currently lease any land for grazing. Livestock grazing occurs on McGregor Range and is managed by the BLM, per PL 106-65. An MOU between the U.S. Army and BLM (**Appendix H**) governs the co-use of these lands. The USFS manages grazing in Training Area (TA) 33, which is the portion of McGregor Range within the Lincoln National Forest.

Should Fort Bliss decide to lease a portion of Fort Bliss (other than McGregor Range), U.S. Army regulations require that a management plan be coordinated with the NRCS for each lease established (U.S. Army 2007). These regulations require the management plan to be coordinated with other natural resources management, including management for threatened and endangered species. Any grazing management plan will be coordinated with DPW-E natural resource professionals.

Livestock grazing occurs on portions of McGregor Range and is managed and controlled by the BLM through a yearly competitive auction of grazing contracts for 14 grazing management units (GMU). GMUs extend from U.S. Highway 54 east along Highway NM 506 south of Lincoln National Forest, and continue south along the eastern edge of McGregor Range (Figure 4.13-1; DOI 2006b). These grazing units cover approximately 270,000 acres of McGregor Range.

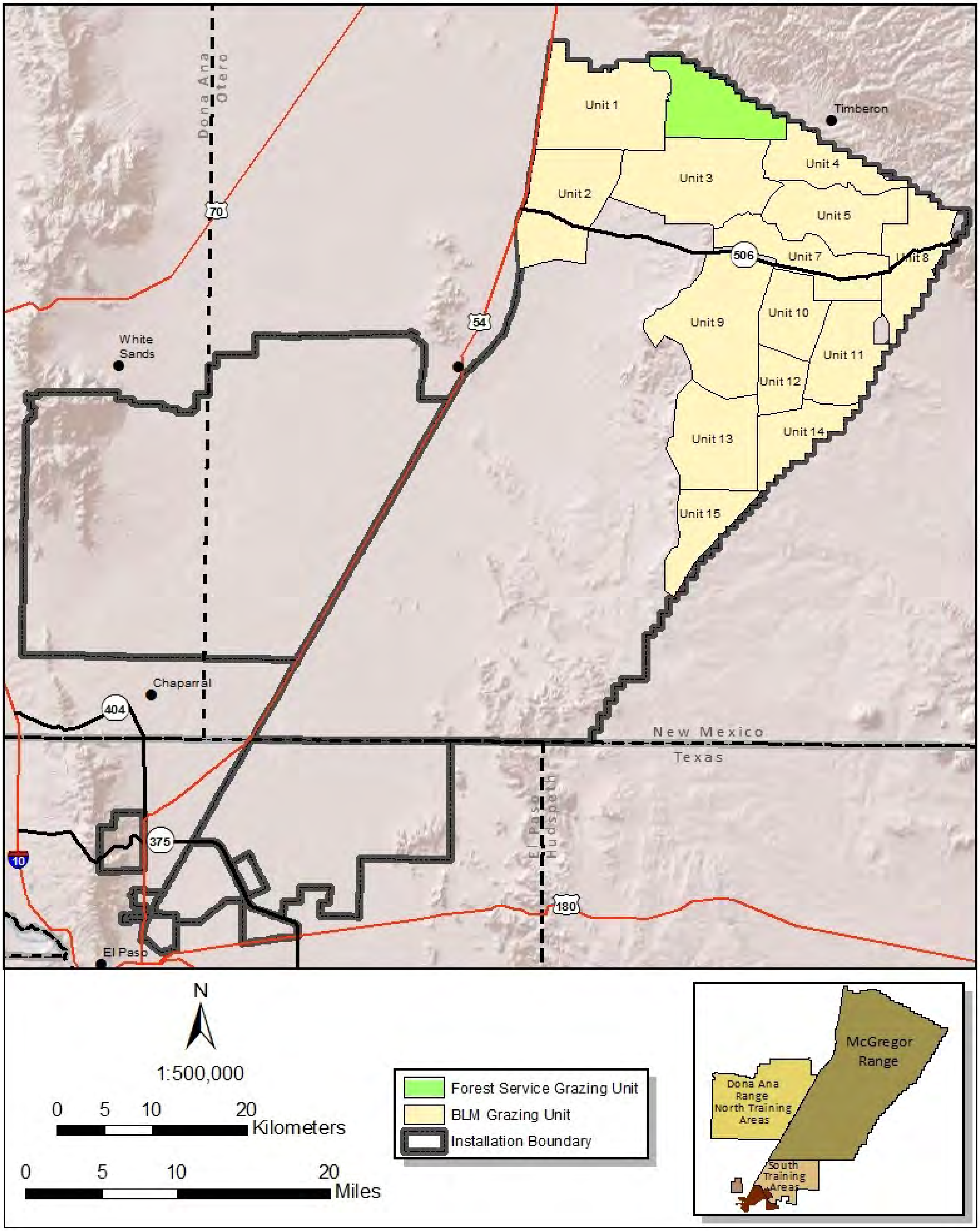
Revenues from grazing contracts are used for administrative costs and salaries of the BLM employees who are directly involved with the administration of the McGregor Range grazing program and for range improvements, fences and pipelines maintenance costs. Fort Bliss collects up to 10 percent of annual grazing revenues generated on McGregor Range based on the 10 percent of U.S. Army fee-owned land within McGregor Range (BLM 2007).

BLM is responsible for construction and maintenance of pasture fences that divide GMUs. Fort Bliss is responsible for the construction and maintenance of the Fort Bliss boundary fences.

Fort Bliss, in cooperation with BLM, retains complete control of water rights and distribution. As necessary, BLM maintains and improves pipelines and other water structures (e.g., tanks, tubs). BLM submits proposed water resources improvements/changes to Fort Bliss for approval prior to construction (DOI 2007). A more detailed list of additional BLM responsibilities related to grazing is located in the McGregor Range Resource Management Plan Amendment (DOI 2006b) and within the MOA between BLM and Fort Bliss (DOI 2007).

Fort Bliss controls construction and maintenance activities within the Training Areas on McGregor Range. Fort Bliss provides firing schedules and a check-in, check out system to the BLM to ensure that security and safety requirements are met (DOI 1990b). BLM employees and grazing contractors are issued access passes for entry to McGregor Range by Range Operations.

Grazing, rangeland management and other natural resources management activities on McGregor Range are coordinated with military training activities. The BLM and Fort Bliss meet quarterly to discuss any management issues that arise. Should Fort Bliss begin to manage grazing, U.S. Army regulations provide for the integration of grazing management with other natural resource management activities.



5138
5139 **Figure 4.13-1 Grazing Units on McGregor Range**

The goal and objectives for management of agricultural outleases are as follows and projects for the management of these leases are contained in **Appendix C**:

AG Goal 1 Fort Bliss manages grasslands for the sustainability of ecosystem components and for the economic benefits derived from grazing leases.

Objective 1.1 Manage for no net loss in Fort Bliss's capability to support the military mission.

Objective 1.2 Minimize habitat fragmentation and promote the natural connectivity of habitats by limiting off-road activities within grasslands.

Objective 1.3 Maintain or mimic natural processes by prescribed fire treatments to reduce shrub encroachment and recycle nutrients.

Objective 1.4 Protect soil resources from erosion through use of best management practices.

Objective 1.5 Manage the grazing leases so that wildlife and livestock habitat continues to improve while providing the opportunity for livestock grazing.

4.14 Geographic Information Systems (GIS) Management

GIS is an organized, computer-based set of tools that includes specialized investments in information technology such as servers and software used to host, distribute, manipulate, display and analyze spatial data related to positions on the earth's surface. GIS displays as different layers where each layer contains data on a particular kind of feature (e.g., soils, wetlands, roads). Each feature links to a position on the graphical image of a map. The data layers create maps upon which land managers perform statistical analysis, assist in ecosystem and Training Areas management and make land management decisions.Fort Bliss has an extensive Enterprise GIS SDE database.

ITAM relies heavily upon GIS to provide analysis and display of natural resources data gathered at the training site. GIS also provides support for the entire environmental program as well as the training community. Some examples of how Fort Bliss utilizes GIS for complex analyses include project siting, troop operations planning, RTLA data interpolations, endangered and sensitive species monitoring and wildfire risk assessments to name a few.

The training of DPW Environmental, Facilities Management and DPTMS staff and the allocation of their time to data entry, mapmaking, analysis of data, and interpretation of the results is integral to the success of Fort Bliss' GIS program. All GIS data is managed in accordance with federal guidelines, the Army IGI&S Guidelines and SDSFIE standards.

The goal and objectives for GIS management are below and a specific project for GIS management is contained in **Appendix C**:

GIS Goal 1 Fort Bliss augments management of natural resources on the FBTC through the management of information within a GIS database.

Objective 1.1 Collect, store, and maintain data about historical conditions, trends, and the present status for critical indicators of ecological integrity and sustainability.

Objective 1.2 Develop layers for natural resources data not currently in the Fort Bliss GIS database.

Objective 1.3 Analyze information from the GIS database to develop additional natural resource management goals and objectives.

Objective 1.4 Train personnel to ensure the accuracy and relevance of data collection and include the integration of the RTLA database into the GIS database. Develop and implement written standards and procedures for GIS administration, including managing metadata. Inventory database layers currently in Fort Bliss's GIS system and acquire needed core database layers. Develop Fort Bliss's GIS to allow for integrated presentation of management alternatives.

4.15 Outdoor Recreation

Recreational uses other than hunting occur only after U.S. Army concurrence. Other uses include sightseeing, hiking, camping (during special hunts only), picnicking, bird watching, photography, and wildflower viewing. Recreation on McGregor Range is coordinated with BLM according to the following management practices (U.S. Army 2005):

- Adhere to required SOPs.
- Adhere to Army check-in/checkout requirements.
- All scientific activities must have DPW-E concurrence.

To promote non-consumptive outdoor recreation, Fort Bliss will:

- Provide access to recreation areas by maintaining roads in passable condition.
- Cooperate with BLM to develop an information program to educate users.

Outdoor recreation activities such as hunting programs are monitored for impacts to ecosystem integrity. Additionally, special consideration is given to protection of critical areas (e.g., endangered species habitat, wilderness areas and erodible areas) from negative impacts resulting from outdoor recreation.

A large percentage of Fort Bliss lands are impact areas or impact area buffer zones; therefore, outdoor recreation opportunities are limited. After coordination through Range Operations, the public is allowed to access the South Training Areas, TAs 3 to 7 of Doña Ana Range–North Training Areas, and TAs 10 to 29 of McGregor Range (Figure 2.1-4). Currently, no legal outdoor recreational opportunities are available within Castner Range because of unexploded ordinance hazards.

The range safety and natural resources office determines recreation use boundaries that are adjacent to impact areas. Any inquiries concerning outdoor recreation on Fort Bliss are directed to Range Operations or DPW-E.

Goals and objectives for outdoor recreation are as follows and specific projects for outdoor recreation are contained in **Appendix C**:

OR Goal 1 Fort Bliss provides sustainable natural resources-related outdoor recreation opportunities.

Objective 1.1 Establish a program of quality outdoor recreational experiences while sustaining ecosystem integrity.

Objective 1.2 Develop and promote additional opportunities/sites for outdoor recreation, including watchable wildlife areas and hiking that include opportunities for handicapped or disabled individuals.

OR Goal 2 Fort Bliss ensures that outdoor recreation activities are not in conflict with mission priorities.

Objective 2.1 Establish and incorporate a public access protocol.

Objective 2.2 Monitor the recreation areas to ensure proper and legal use.

4.16 Bird/Wildlife Aircraft Strike Hazard (BASH/WASH)

Air operations, aviation safety and natural resources personnel must work together to reduce the risk of bird and wildlife strikes to aircraft on Fort Bliss. DoD continually implements and improves aviation safety programs in an effort to provide the safest flying conditions possible. One of these programs is the BASH/WASH prevention program. Throughout the military, air operations, aviation safety, and natural resources personnel work together to reduce the risk of bird and wildlife strikes through the Operational Risk Management process. Development and implementation of an effective BASH/WASH program requires constant interaction between the installation's natural resources, aviation safety, and air operations communities as well as the pilots and aircrews.

Fort Bliss has recently developed a BASH/WASH plan that is contained in the Biggs Army Airfield AOM as Appendix 16. Habitat modifications of wrapping towers in the vicinity to keep raptors from using them for perches is an integral part of the BASH/WASH plan, but understanding the behavior and movements of birds in relation to the airfield environment by pilots and aircrews is also a critical factor in reducing bird strikes. DPW-E has worked to minimize the amounts of freestanding water around Biggs Airfield, which attracts waterfowl. DPW-E also has an active coyote depredation program around the airfield. DPTMS-Aviation Division maintains and inspects the airfield fence to keep wildlife outside the airfield.

Knowing what types of birds and animals are using the airfield throughout the year is critical to reducing BASH/WASH risks. The BASH/WASH plan identifies areas of the airfield that are attractive to wildlife and provides recommendations to remove or modify the attractive features. Corrective recommendations include removing unused airfield equipment to eliminate perch sites, placing anti-perching devices on equipment to remain, placing floating plastic balls on ponds, brush/tree removal, use of pyrotechnics, and maintaining the grass/brush mowing program.

Goals and objectives for BASH/WASH prevention are as follows:

BH Goal 1 Fort Bliss minimizes BASH/WASH-related health risks, safety risks, and environmental damage.

Objective 1.1 Coordinate the current WASH Plan and BASH reduction guidance with the INRMP for habitat modification, active harassment, and bird awareness education for all personnel.

Objective 1.2 Develop strategies and actions to minimize WASH threat.

BH Goal 2 Fort Bliss complies with applicable laws and regulations.

Objective 2.1 The WASH Working Group (WWG) will review any habitat alterations to ensure that it does not affect the safety of the mission. The WWG will establish procedures to identify high hazard situations and to aid supervisors and aircrews in disseminating information, issuing alerts and altering or discontinuing flying operations when required.

Objective 2.2 Maintain BASH/WASH awareness with all proposed land use activities.

4.17 Wildland Fire Management

The Fort Bliss Directorate of Emergency Services (DES), Fire and Emergency Services (FES) Division is responsible for monitoring and suppressing all fires caused by military activities on the installation. FES will serve as the lead agency for managing all wildfires on the FBTC. Training units causing wildfires report to Range Operations and, when required, furnish personnel to extinguish ongoing wildfires. Between May and September, units have at least eight Soldiers with transportation, fire tools and communications to initial attack wildfires on live-fire ranges (U.S. Army 2005). Wildfires that are a potential hazard to installation infrastructure, surrounding communities, or sensitive natural and cultural resources are suppressed by FES firefighters. Fort Bliss may carry out a managed burn policy for natural wildfires that are burning in a way that is beneficial to the ecosystem and are not creating safety issues or interfering with the mission.

DPW-E is responsible for creating, managing and updating an Integrated Wildland Fire Management Plan (IWFMP) for Fort Bliss. The IWFMP is integral to the INRMP. The Fort Bliss IWFMP addresses fuels, topography, weather, safety considerations, training and equipment needs, interagency cooperation, wildfire strategy and tactics and proposes prescribed fire and firebreak locations.

One of the primary features of the IWFMP is the division of Fort Bliss into 52 Fire Management Units (Figure 4.17-1). FMU descriptions in the IWFMP include maps and narratives that show terrain, roads, improvements, hazardous areas, fire history and tactical considerations and designate specific guidelines, tactics and strategies for managing wildland fires. FMUs are areas of similar vegetation and mission capabilities surrounded by firebreak roads in most places. FMUs are in one of two categories for fire suppression (Figure 4.17-2).

The first category is full suppression of all wildfires within the FMU boundaries using the full wildfire suppression capabilities of the Fort Bliss FES with aid from other agencies as needed. Most of these FMUs are located in the mountainous areas of Fort Bliss, near concentrations of human activity or upon the grasslands of Otero Mesa.

The second category allows for wildfires to burn on their own within the confines of the FMU boundary. FES personnel will monitor the wildfire from firebreak roads and will suppress the wildfire only if it approaches the FMU boundary. Most of the FMUs in the second category are located on the floor of the Tularosa Basin where fuels are not abundant enough to add to wildfire spread. Wildfires are not suppressed within impact areas.

Firebreaks are nearly always along established roads on Fort Bliss. Normal use and some annual maintenance keeps firebreak roads vegetation-free and road shoulders mowed. The road surface and shoulders are usually sufficient to stop wildfire spread especially when combined with the firefighting tactic of burning out or blacklining ahead of the wildfires advance. Contractors using bulldozers have constructed additional firebreaks around the base of the Organ Mountains in the Soledad Canyon area. These firebreaks will minimize degradation of environmental impacts by helping to stop wildfires from spreading into the rugged, mountainous terrain and provides access for firefighting resources as well as providing an anchor point and a defensible position from which backfires can be ignited.

The BLM is responsible for monitoring and suppressing all natural fires (lightning-caused) on the military withdrawn lands of McGregor Range. BLM assists Ft Bliss FES as requested when military-caused wildfires occur. BLM does not enter areas below the rim of Otero Mesa which are south of Highway NM 506 because of UXO hazards, unless accompanied by FES personnel and they are restricted to travel on established roads only. BLM provides Fort Bliss with a report of suppression activities within 24 hours (DOI 2006c).

From 1990 to 2014, 432 wildfires were reported within FBTC boundaries. These wildfires burned 302,859 acres (Figure 4.17-3). The locations of wildfires during this period are in Figure 4.17-4.

Wildfire activity is a concern to military training and to natural resources management. Wildfires have several undesirable aspects including the following: they interfere with ongoing training; they make training areas unsuitable for training over the short-term; wildfires produce smoke that limits visibility, contributes to air pollution and brings complaints from neighbors. Destructive wildfires have direct and indirect impacts on habitats and wildlife species and can lead to soil erosion when vegetation is destroyed.

Pre-planned prescribed burns are a vital component of ecological maintenance within the installation and can enhance suitable habitat for many plant and animal species found on Fort Bliss. Prescribed fire can be a useful tool to help prevent destructive wildfires. Long-term monitoring is necessary to determine fire effects on vegetation, including trends of increasing or decreasing plant species abundance, the long-term mortality/fecundity of native grasses and possible increases in noxious weed species. Within areas that support sensitive plant or animal species, DPW-E should review prescribed fire plans, conduct pre-burn and post-burn species inventories and monitor species response to the burn for at least a five-year post-burn period.

Prescribed fire is a management tool that requires trained personnel for planning and implementation, special equipment for igniting and controlling wildland fire and obtainment of proper permits for smoke generation. Fire departments near the prescribed burn need to be informed and smoke permits obtained from the New Mexico Environment Division’s Air Quality Bureau or from the Texas Commission on Environmental Quality before burning. Qualified burn bosses are necessary to run the prescribed burns. Fort Bliss FES personnel are working to accomplish Prescribed Fire Burn Boss certifications.

Goals and objectives for wildland fire management are as follows and projects for wildland fire management are contained in **Appendix C**.

WM Goal 1 Fort Bliss maintains existing vegetative communities and their biodiversity by allowing wildfires to burn as needed to protect or restore at-risk environments.

Objective 1.1 Implement the guidelines within the Integrated Wildland Fire Management Plan and allow wildfires to fulfill their role within the ecosystem where and when possible.

Objective 1.2 Allow natural fires to burn under prescriptive conditions.

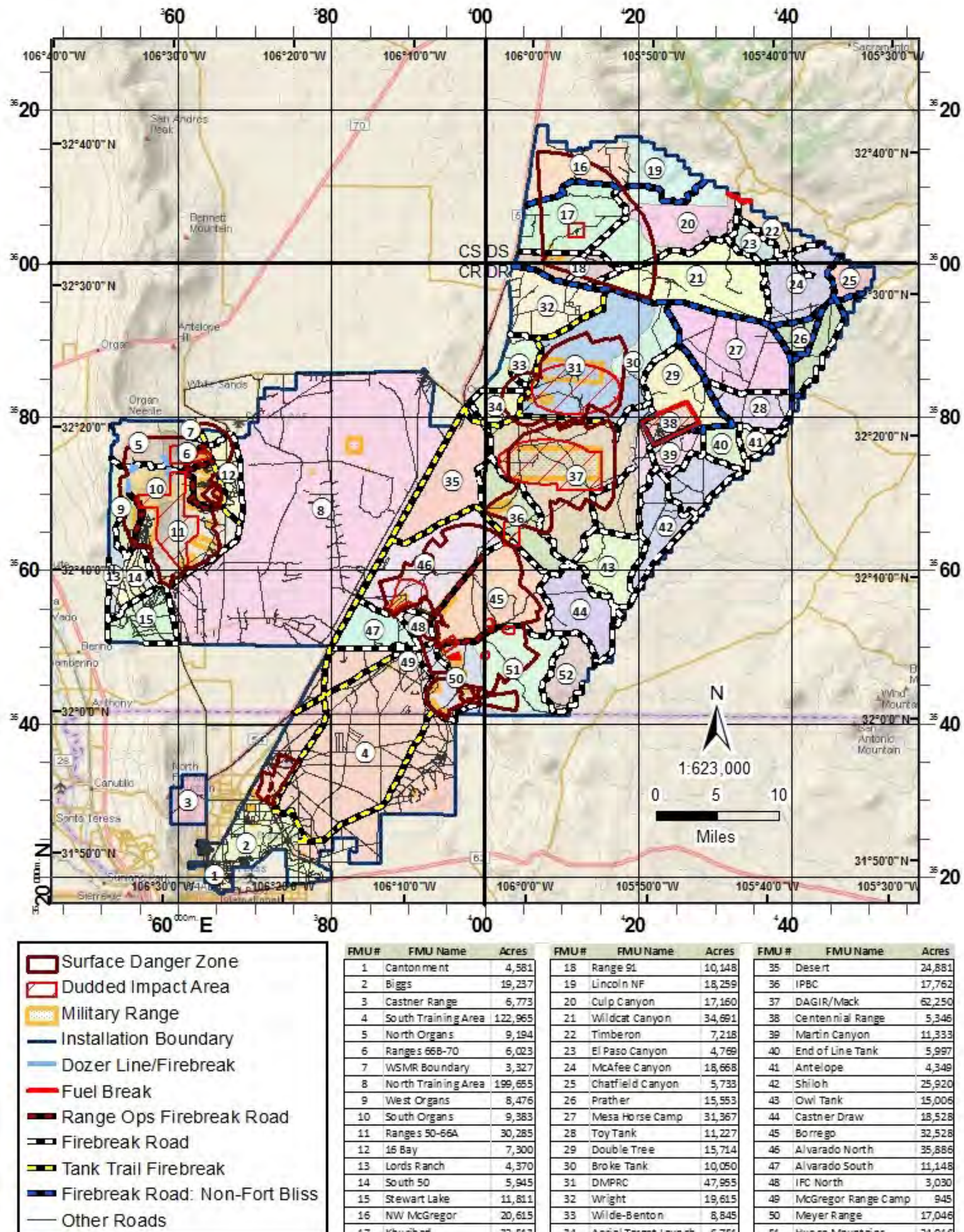
WM Goal 2 Fort Bliss implements a prescribed fire program that restores native habitats and reduces the effects of destructive wildfires on sensitive and endangered species.

Objective 2.1 DPW-E should review all prescribed fire plans for any significant habitat alterations to ensure that the burn does not affect the mission.

Objective 2.2 Inventory and monitor plant communities prior to and following prescribed fire applications.

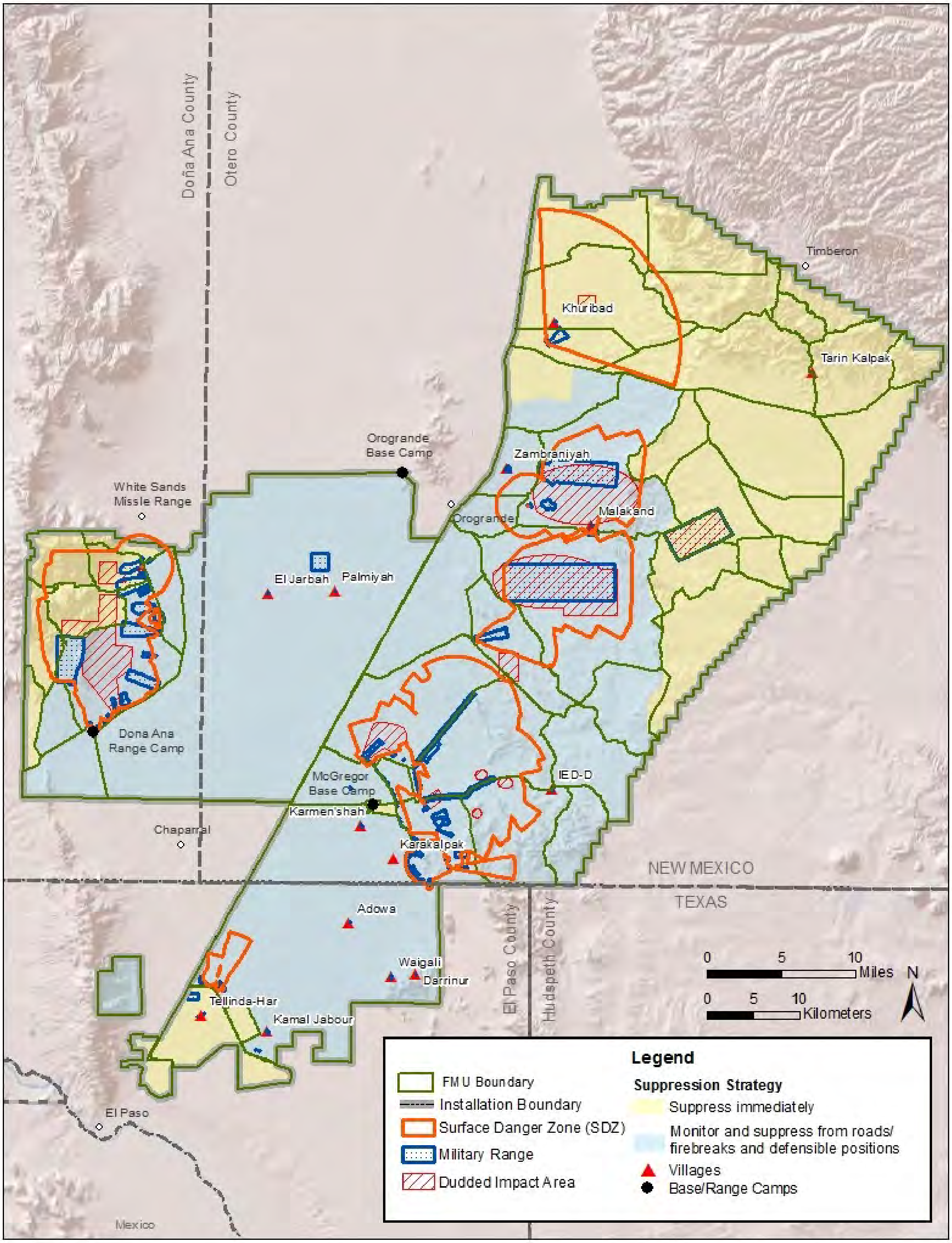
Objective 2.3 Plan and seek funding for long-term monitoring.

Objective 2.4 Move degraded vegetative communities to a healthier state through a prescribed fire program.



FMU#	FMU Name	Acres	FMU#	FMU Name	Acres	FMU #	FMU Name	Acres
1	Cantonment	4,581	18	Range 91	10,148	35	Desert	24,881
2	Biggs	19,237	19	Lincoln NF	18,259	36	IPBC	17,762
3	Castner Range	6,773	20	Culp Canyon	17,160	37	DAGIR/Mack	62,250
4	South Training Area	122,965	21	Wildcat Canyon	34,691	38	Centennial Range	5,346
5	North Organs	9,194	22	Timberon	7,218	39	Martin Canyon	11,333
6	Ranges 66B-70	6,023	23	El Paso Canyon	4,769	40	End of Line Tank	5,997
7	WSMR Boundary	3,327	24	McAfee Canyon	18,668	41	Antelope	4,349
8	North Training Area	199,655	25	Chatfield Canyon	5,733	42	Shiloh	25,920
9	West Organs	8,476	26	Prather	15,553	43	Owl Tank	15,006
10	South Organs	9,383	27	Mesa Horse Camp	31,367	44	Castner Draw	18,528
11	Ranges 50-66A	30,285	28	Toy Tank	11,227	45	Borrego	32,528
12	16 Bay	7,300	29	Double Tree	15,714	46	Alvarado North	35,886
13	Lords Ranch	4,370	30	Broke Tank	10,050	47	Alvarado South	11,148
14	South 50	5,945	31	DMPRC	47,955	48	IFC North	3,030
15	Stewart Lake	11,811	32	Wright	19,615	49	McGregor Range Camp	945
16	NW McGregor	20,615	33	Wilde-Benton	8,845	50	Meyer Range	17,046
17	Khuribad	32,513	34	Aerial Target Launch	6,751	51	Hueco Mountains	24,916
						52	East Hueco Mountains	11,100

Figure 4.17-1 Fire Management Units on Fort Bliss



5356
5357 **Figure 4.17-2 Wildfire Suppression Strategy on Fort Bliss**

5358

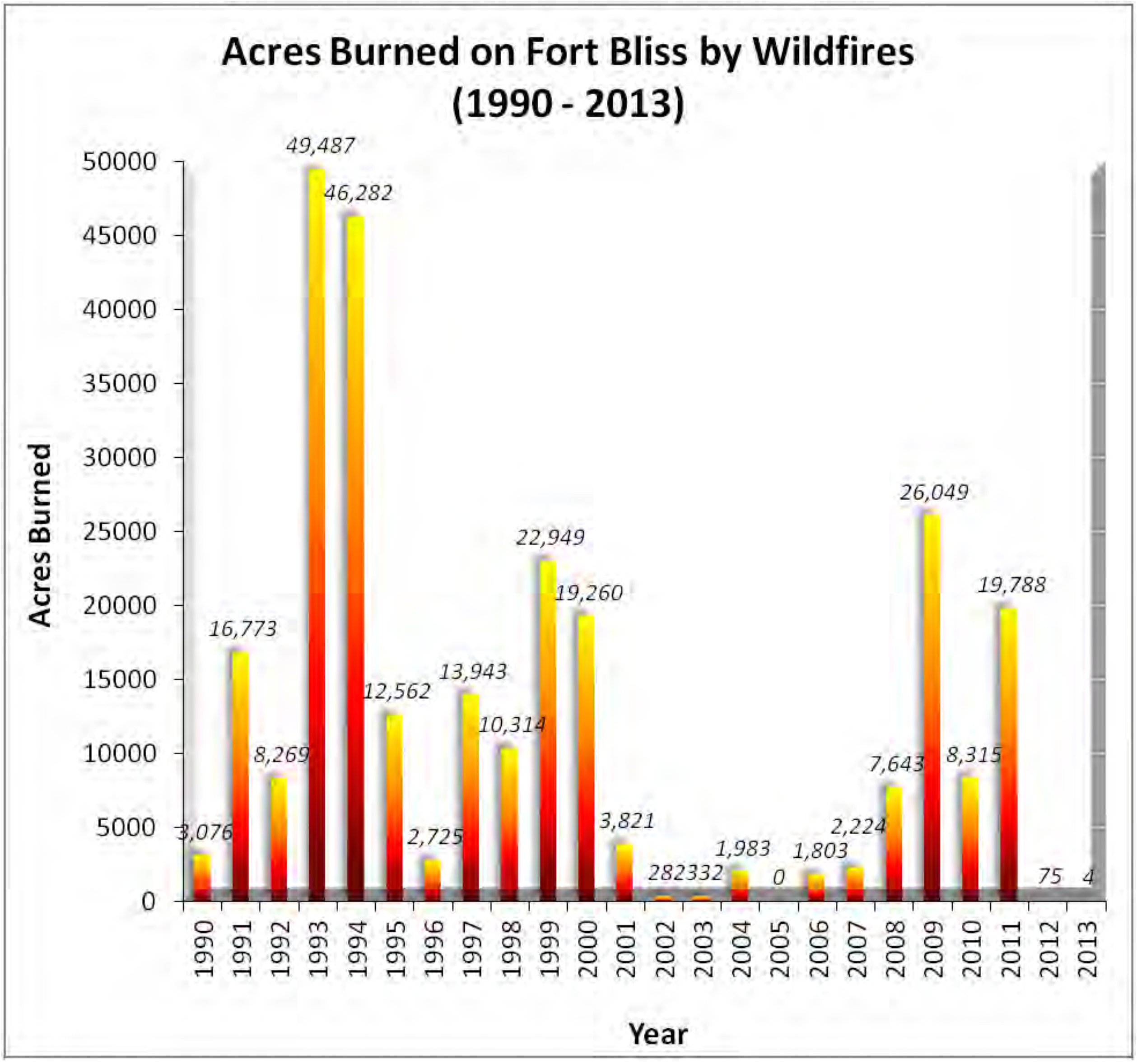
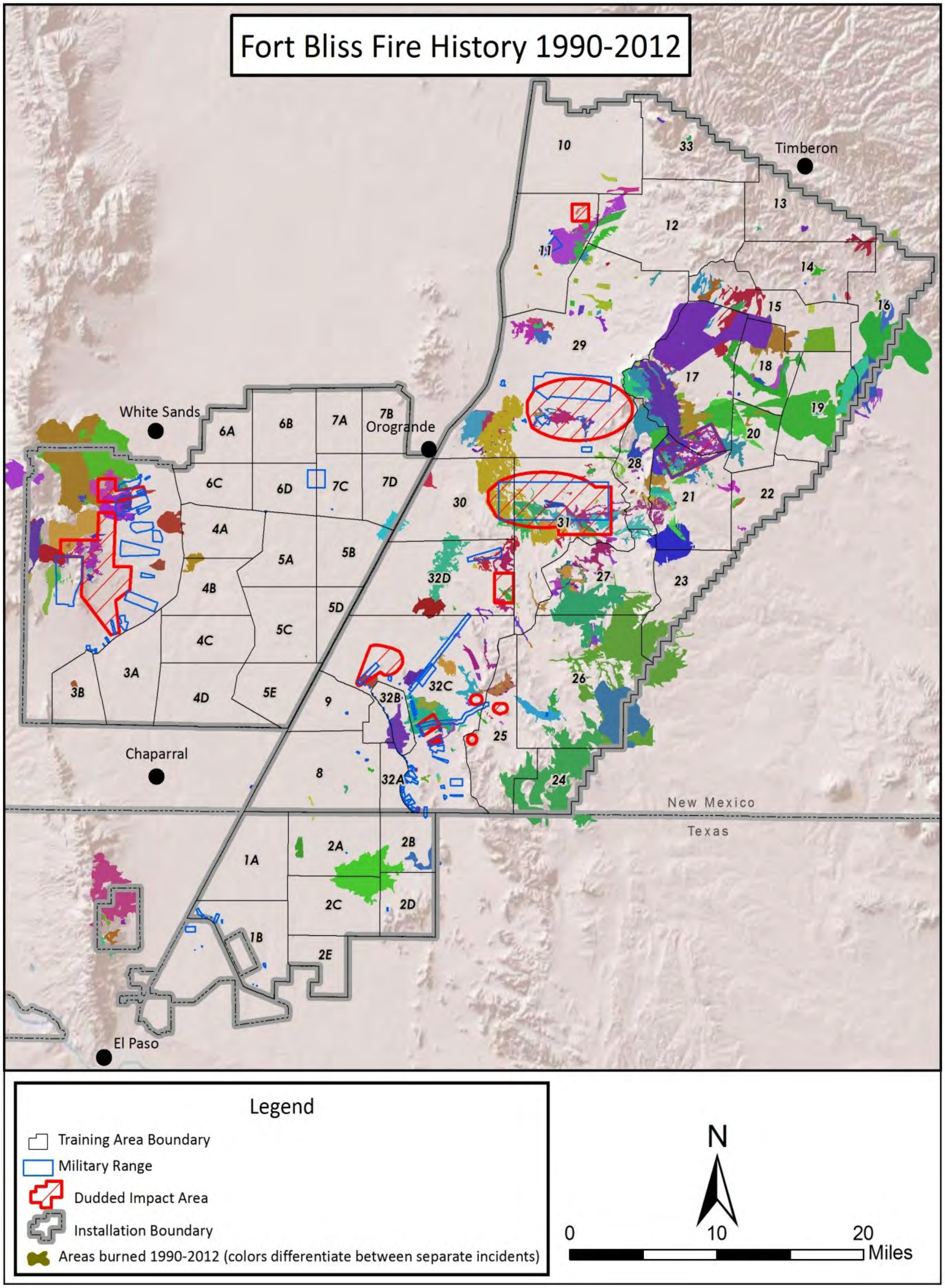


Figure 4.17-3 Acres Burned on Fort Bliss by Wildfires



5364
5365 **Figure 4.17-4 Fort Bliss Wildfire History 1990-2013**

4.18 Training

DPW-E Conservation Division, as funding allows, regularly sends at least one person to each of the following annual workshops or professional conferences: National Military Fish and Wildlife Association annual conference, North American Natural Resources Conference, ESA conferences, ITAM workshop, The Wildlife Society meetings, and PIF. Other conferences and workshops are evaluated for their usefulness, and decisions made based on appropriateness to ongoing projects and funding availability. Personnel are trained in related environmental fields. NEPA training is required for all supervisory personnel, as well as others who review or prepare NEPA documents.

The goal and subsequent objective for training are below:

TR Goal 1 Fort Bliss provides continual training for DPW-E staff regarding sustainable ecosystem-based land management principles and practices for military lands.

Objective 1.1 Provide financial support for participation at land management conferences specializing in applications for military lands and allow for continual communication with natural resources staff at other DoD facilities.

4.19 Fort Bliss Outreach and Education

Successful implementation of this INRMP relies upon educating and raising awareness about protecting and enhancing the natural environment among Fort Bliss residents, tenants, and employees. Examples of some of the outreach and education activities undertaken by Fort Bliss DPW-E:

- Participates in annual outreach events such as Earth Day,
- distributes information materials and brochures on natural resources at Fort Bliss,
- educates the military community about ecology and natural resources of Fort Bliss.

Goals and objectives for outreach and education are as follows and specific projects for outreach and education are contained in Appendix C:

OE Goal 1 Fort Bliss ensures that environmental policy and stewardship principles are implemented, maintained and communicated to all military, civilian and contracted employees.

Objective 1.1 Educate Fort Bliss Soldiers, employees, tenants, housing residents, and contractors about natural resources issues on Fort Bliss, best management practices, and Fort Bliss natural resources programs and initiatives.

Objective 1.2 Engage Fort Bliss Soldiers, employees, residents, and tenants to participate in natural resources initiatives and conservation projects.

OE Goal 2 Fort Bliss Integrates its natural resources program with local, state, and regional environmental programs and initiatives to the maximum extent practical.

Objective 2.1 Educate regional stakeholders about the Fort Bliss natural resources program.

Objective 2.2 Form partnerships and collaborate to accomplish natural resources initiatives and projects on Fort Bliss and within the surrounding region.

4.20 Floodplain Management

Floodplains are areas adjoining inland or coastal waters that are prone to flooding. These areas are reserved to discharge the 100-year flood without cumulatively increasing the water surface elevation more than a designated height. When a floodplain is established, no additional obstruction (e.g.,buildings or improvements) are placed in the floodplain that will increase the 100-year floodwater surface elevation.

EO 11988, *Floodplains Management,* requires all federal agencies to provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. In addition, if an action permits an encroachment within a floodplain that alters the flood hazards on a National Flood Insurance Rate Map (FIRM) (e.g., changes to the floodplain boundary), Fort Bliss must submit an analysis reflecting those changes to the Federal Emergency Management Agency (FEMA). Contact FEMA headquarters at 202-646-3461 to obtain booklet MT-2, *Revisions to National Flood Insurance Program Maps,* for further guidance.

Management of floodplains on Fort Bliss is through maintenance of the installation's GIS database and through compliance with EO 11988; *Floodplain Management* that requires a Finding of No Practicable Alternative (FONPA) be issued by the installation before any action can be taken affecting a floodplain. Overall management policy for floodplains on Fort Bliss consists of no disturbance in floodplain areas.

4.21 Inventory and Monitoring

The inventory and monitoring program supports an adaptive management approach by informing natural resources managers of change resulting from management actions and mission activities. The purpose of this program is to inventory the natural resources on Fort Bliss and to regularly monitor indicators of overall ecosystem integrity, mission sustainability, the status of imperiled species or communities, and other special interests in order to sustain the training mission and maintain biological integrity and diversity.

A natural resources inventory is a periodic survey of all properties to record the presence and location of a specific resource and condition of that resource or aggregate of resources in a specific area. Inventories ascertain the relative abundance and distribution of natural resources while monitoring tracks population changes and military impacts. Monitoring is systematic and often targets species with high economic or human use values or threatened or endangered species.

Inventory and monitoring are components of adaptive management and provide information describing current conditions. This information can show the need for change in management strategy. Conducting monitoring at regular intervals, and evaluating the data collected, provides a description of how resources are responding to management strategies, and a determination of the efficacy of those strategies based on the progress made toward established goals and objectives. Lack of noticeable progress or deterioration of resources requires a change in management (e.g., adaptive management).

4.21.1 Comprehensive Landscape Monitoring

Comprehensive landscape monitoring using GIS and remote sensing is an efficient way to assess the impacts of natural events and training activities on natural and cultural resources. Monitoring is a four-part process consisting of remote sensing reconnaissance, site inspections, plot sampling, and GIS analysis. Remote sensing reconnaissance scans the entire land base to monitor seasonal trends, detect impacts, and focus field investigations on high-priority areas. Field investigation quantifies intensity of impacts on natural and cultural resources. Distribution, frequency, and intensity of impacts are stored in a GIS database. This process supports enforcement of environmental laws and NEPA provisions, provides data for the ITAM program, and records cumulative impacts.

4.21.2 Range and Training Land Assessment (RTLA)

The Fort Bliss ITAM office is responsible for conducting monitoring through the RTLA protocols to provide quantitative assessments of land conditions, in particular, to include areas used for off-road vehicle maneuver. These monitoring assessments are fed into the Fort Bliss Mitigation and Monitoring Plan, which focuses on adaptive management using mitigation strategies that primarily address the impacts of off-road vehicle maneuver on physical and ecological resources, specifically soils, grasslands, arroyo-riparian habitats and threatened and endangered species.

RTLA uses a wide array of natural resources data to determine the condition of training lands and, over time, upwards or downwards trends in the condition of training lands. Procedures include random sampling, which allows statistical inferences and permits characterization of certain natural resources as a community. Sampling for soil types and land cover, which facilitates analysis of natural resources and land capability (U.S. Army 2006b). Special use plots address specific issues not addressed by core plots. Assessments include, determining the success of land rehabilitation efforts, documenting the effects of burning, characterizing and monitoring habitats of endangered species, determining locations of wetlands, assessing natural recovery of degraded lands and other site-specific needs.

Continued use of RTLA at Fort Bliss increases the ability of natural resources personnel to determine trends in general ecosystem health and changes in plant or animal species populations over time.

4.22 Adaptive Management for Climate Change

Department of Defense Manual 4715.03 requires installations to address potential impacts of climate change on natural resources and the training mission. Global climate models increasingly predict warming temperatures and changes in the timing and amount of precipitation in the southwestern U.S. These changes can permanently alter ecosystems. At the ecosystem level, effects will likely be gradual and challenging to assess. DoD efforts to assess potential impacts should be predictive in planning for probable changes.

Forecasted trends of climate change for the southwest U.S. include (USDA 2012):

- Summer temperatures and aridity increase
- Winter temperatures increase
- Decreased annual precipitation
- Increased frequency, duration, and spatial extent of drought events

- Extended fire seasons with more frequent and intense fires
- Increased susceptibility of ecosystems to invasion of non-native species

4.22.1 Vulnerability Assessment

Climatic changes in the temperature and moisture regimes of the Chihuahuan Desert of Fort Bliss could alter ecosystem composition. More drought-tolerant species and growth forms may be favored in the long-term and shrublands will likely replace grasslands. Grasslands are an important resource on Fort Bliss. They add to training land diversity and provide grazing opportunities for livestock and wildlife. The grasslands of Otero Mesa serve as wintering habitat for the Sprague's pipit, a candidate species for federal listing. Northern aplomado falcons have occasionally been observed on Otero Mesa and are a federally endangered species, as well as being state endangered in Texas and New Mexico. Northern aplomado falcons rely, in part, on small birds as prey. Loss of habitat for grassland bird species may indirectly affect Northern aplomado falcons. Other Fort Bliss threatened, endangered, or sensitive species that may be affected by grasslands converting to shrublands include the Arizona black-tailed prairie dog, Baird's sparrow, ferruginous hawk, loggerhead shrike, mountain plover, and western burrowing owl. For the status designations for these species, see Table 2.3-6. If these species lose habitat and decrease in numbers due to factors predicted with climate change, their status designations may change. If they become listed as threatened or endangered, it could mean a decrease in the amount of land available for military training because critical habitat might be designated within Fort Bliss boundaries.

Increased drought frequency and severity can negatively affect riparian habitats, which are scarce on Fort Bliss, relative to other habitat types. Gray vireos, a threatened species in New Mexico, commonly use riparian corridors for nesting and are known to occur on Fort Bliss.

In general, plant and animal species with small distributions, or species-specific timing of events such as pollination (e.g., night-blooming cereus, a New Mexico endangered species that occurs on Fort Bliss) may be altered due to climate change. Organ Mountain Colorado chipmunks occur in mesic, high-elevation woodlands and shrublands in the Organ Mountains of New Mexico, where its status has been designated as threatened. Prolonged drought that results in reduced water availability for both plant and animal communities would likely be detrimental to the Organ Mountain Colorado chipmunk.

Drought can negatively affect the installation mission. A reduction in precipitation may increase bare ground, which can lead to greater dust production and soil erosion. Down-wind vegetation becomes covered by dust, leading to further desertification and dust production. Dust can cause mechanical damage to military vehicles, clogging filters, and can also become a safety hazard as convoys become unable to see the vehicle in front of them or helicopters are unable to land. A significant loss of top soil alters the type of vegetation that an area can support and promotes coppice dune formation.

Increased fire frequency and severity due to predicted climate change is another potential threat to the installation mission. Wildfires on Fort Bliss are ignited by lightning strikes or by military ordnance. In drought conditions, wildfires may have an increased potential to cover larger areas and burn with greater intensity. On the grasslands of Otero Mesa, some species, like black grama, are not tolerant of frequent wildfires. Because of this increased fire frequency and intensity, coupled with drought, a loss of black grama grasslands may occur. Fire can be a vegetation management tool used to combat shrub encroachment upon grasslands when applied under the right prescribed conditions. However, if post-fire moisture regimes necessary to support plant recovery do not occur, desirable perennial grasses will suffer increased mortality.

Along with a loss of vegetative ground cover comes an increased amount of overland water flow. Water flowing along bare tire tracks and roads picks up sediment and carries it away, eroding the soil and affecting the nutrient properties of the remaining soil. Road pathways can become rutted or pockmarked with holes to the extent that they become impassable, thus affecting the training mission. Soil particles carried by runoff can contribute to sedimentation of playa lakes and other water catchments, filling them gradually and reducing their storage capacity as well as their value to wildlife and recreation.

Noxious, non-native plant species on Fort Bliss may spread due to effects of climate change. When vegetative communities become disturbed, the potential for invasive species increases. For instance, Lehmann's lovegrass (*Eragrostis lehmanniana*) is a non-native grass species that grows in disturbed areas on Fort Bliss. It is a very competitive species and can replace native species within a few growing seasons. Grassland bird species are less abundant in Lehmann's lovegrass areas than in the native plant communities they replace (Bock and Bock 1992). Fire intensities in stands of Lehmann lovegrass can be very high because of the concentration of plants. Most native plant species are not adapted to the intensity of fires that stands of Lehmann's lovegrass can support, and so they become replaced (Marshall et al. 2000). Buffelgrass *(Pennisetum ciliare)* and cheatgrass (*Bromus tectorum*) are two other non-native grasses that bring increased fire risks and are spreading in other areas of the Southwest but have not yet been found on Fort Bliss.

Within the past decade, New Mexico has experienced a die-off of ponderosa pine, piñon pine, and juniper trees because of bark beetles (*Ips* spp. and *Dendroctonus* spp.; New Mexico Energy, Mineral, and Natural Resources Department 2012). This increase in tree mortality coincided with harsh environmental conditions (severe drought; Norlander 2012), and illustrates the increased susceptibility of ecosystems to pests when already stressed. The tree species given in this example occur on Fort Bliss in the Organ and Sacramento Mountains, and may experience similar declines as moisture regimes are affected by climate change.

4.22.2 Mitigating Vulnerabilities

Many of the potential factors of climate change driving habitat conversion cannot be manipulated on an installation scale (e.g., decreased precipitation, increased annual mean temperatures). However, human-imposed stressors on habitats can be managed at the installation level.

Threatened, endangered, and sensitive plant and animal species populations are monitored by Fort Bliss. The survey report data from monitoring reports is used to establish OLAs and LUAs and to inform the installation for planning locations and timing of training events to help protect and sustain these species. For specific survey and monitoring actions that Fort Bliss has taken for federally listed threatened and endangered species, see **Appendix G**, "Benefits to Federally Listed Threatened and Endangered Species."

LUAs are designated in areas known to support sensitive plant and animal species. For example, off-road maneuvers on the black grama grasslands of Otero Mesa are restricted; digging, bivouac, etc. are prohibited. Similarly, only limited traffic is allowed within riparian LUAs. Proposing limited activities in certain areas can help to combat the process of desertification and aid in sustaining training lands. For more information on LUAs, see Section 3.1.1.

The Bureau of Land Management manages livestock grazing and stocking rates on McGregor Range under an MOA. A rotational grazing system is currently utilized which allows an adequate time for vegetation recovery. As drought effects persist, stocking rates are reduced and pastures are rested for longer periods to help sustain the grasslands.

Road degradation and erosion from repeated vehicular use can be mitigated by improving roads with crowning, paving or gravel. Erosion control structures such as gabions and culverts can help minimize effects from erosion. In some situations, dust control by watering heavily used roads and/or applying soil stabilization products can be helpful. The Fort Bliss ITAM program and the Department of Public Works – Operation and Maintenance (DPW O&M) monitor and maintain roads throughout the installation and are instrumental in lessening impacts from erosion and dust. To reduce disturbance and help maintain earthen water impoundments, static positions are not allowed within 300 meters of dirt tanks.

Adopting the management actions detailed in the Fort Bliss Integrated Fire Management Plan will help to ensure that fire-fighting strategies and prescribed burns are implemented that aid in sustaining training lands. Firebreaks are prescribed (some of which are already in place) that will protect cultural and natural resources. Prescribed burning is a useful management tool for controlling shrub encroachments upon grasslands. Prescribed fire can also reduce fuel loads before fire season, thereby reducing the potential for large, intensive wildfires later in the year.

4.22.3 Collaboration and Management at the Regional Scale

Fort Bliss will continue to consult and collaborate with many agencies to mitigate anticipated effects of climate change. These partners include White Sands Missile Range, Holloman Air Force Base, U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, New Mexico Department of Game and Fish, local Native American Tribes, Bureau of Land Management, U.S. Forest Service, New Mexico State University, the University of Texas-El Paso, and the Jornada Experimental Range.

Regional collaboration contributes to managing environments at the ecosystem level. One way this is accomplished is through the establishment of ecological management units (EMUs). Fort Bliss EMUs are a management tool for maintaining ecological connectivity between the installation and the surrounding lands and help with developing goals for ecosystem management. Other land management agencies identify similar or identical EMUs. Each EMU has similar vegetation, fauna, topography, soils, and climate, meaning they should respond similarly to the same natural resource management actions. Managing natural resources at the EMU level creates linkages between ecosystems, thus providing corridors for wildlife movement, seed dispersal, and other essential functions. If climate change effects are as predicted, conserving wildlife corridors may provide access to alternative habitats and help prevent the isolation of subsets of a species population. Degraded habitats may serve as a barrier to species movement or dispersal. Collaborating with regional agencies enables EMU problem or threat identification, and allows for idea exchange on management practices and their effects (e.g., vegetation response to controlled burning). In these ways, regional collaboration can help Fort Bliss prepare and react to potential climate change effects. Management by EMUs also identifies resource scarcity and promotes land sustainability for the training mission by limiting disturbances in sensitive areas.

5 NATURAL RESOURCES MANAGEMENT PLAN IMPLEMENTATION

All requirements set forth in this INRMP that require the expenditure of Fort Bliss funds are expressly subject to the availability of appropriations and the requirements of the Anti-Deficiency Act (31 U.S.C. Section 1341). No obligation undertaken by Fort Bliss under the terms of this INRMP will require or be interpreted to require a commitment to expend funds not obligated for a particular purpose.

DPW-E is the primary organization charged with implementation of this INRMP. DPW-E contains two branches:

The **Multimedia Compliance Branch** provides advisory and management services in the following areas: Air quality, pollution prevention, recycling, solid waste, storage tanks, stormwater, wastewater, water quality, spill cleanup, lead, asbestos, and hazardous waste.

The **Conservation Branch** provides advisory and management services in the following areas: Archaeology, historic properties, wildlife biology, botany, pest management, endangered species, GIS support, environmental review (NEPA), environmental liaison and environmental management. The Conservation Branch is mostly responsible for INRMP implementation. Successful implementation of the INRMP requires close coordination with ITAM and DPTMS personnel. Additionally, per the SAIA, coordination with BLM; USFS; USFWS; TPWD; NMGFD; and other Federal, state, and private agencies is required to implement and meet the goals and objectives outlined in Chapter 4 of this INRMP.

5.1 Project Development

The most recent policy on INRMP implementation is contained in the DoD Memorandum *Implementation of the Sikes Act Improvement Act: Updated Guidance.* According to the memorandum, an INRMP is considered implemented if an installation does the following (DoD 2002).

- Actively requests, receives, and uses funds for “must fund” projects and activities.
- Ensures that sufficient numbers of professionally trained, natural resources management personnel are available to perform the tasks required by the INRMP.
- Coordinates annually with all cooperating offices.
- Documents specific INRMP action accomplishments undertaken each year.

5.1.1 Personnel

Implementation of this INRMP requires sufficient numbers of professionally trained natural resources management and enforcement personnel. Natural resources personnel are professionally trained as required by AR 200-1 and SAIA (16 U.S.C. 670 et seq.). Professional staffing requirements include expertise in GIS, NEPA, threatened and endangered species management, wildlife ecology, plant ecology, and pest management. Qualifications for natural resources positions are contained in Office of Personnel Management manuals and requirements. Specific personnel assignments are contingent on available funds but are necessary for the completion of projects outlined in **Appendix C**.

5.1.2 Partner and Cooperator Assistance

Implementation of the INRMP requires active assistance from Fort Bliss partners, both signatory and otherwise. Fort Bliss will continue to utilize expertise from universities, federal and state agencies, and contractors to accomplish specific tasks.

5.1.3 Project Funding

The budget process employed by the DoD is an ongoing, continuously reviewed process called the Planning, Programming, and Budgeting System (PPBS). The process can be summarized as follows (DoD 2005):

The PPBS process consists of long-range planning to anticipate and secure requirements to meet security threats and accomplish program goals.

Resources to meet these requirements are programmed by managers in the Future Year Defense Plan (FYDP). The FYDP is a list of resource requirements for the next 6 years. Specifically, the FYDP comprises the subsequent FY budget and funding requirements projected out 5 years.

The FYDP resources are analyzed via the Programming Process. Program managers reassess their requirements, reprioritize planned activities, reevaluate existing funding guidance, and estimate their funding needs for the next budget year, and the subsequent five FYs (referred to as POMs 1–5).

The Program Objectives Memorandum (POM) process takes place within Defense Components beginning in the fall of each year. Each DoD Component submits the POM in the spring to the Office of the Secretary of Defense (OSD). OSD reviews the budget submissions and develops the President's budget which is eventually submitted to Congress. At the installation level, data submissions to support programs are passed to the Major Commands twice annually, in fall and spring.

Based on POM decisions of each Component, budget controls are issued to the field commands for budget preparation.

The time scale of an INRMP fits well into the DoD PPBS forecasting process. One full cycle of the DoD budget process includes the next budgeted FY and projections for the following 5 FYs. One full cycle of the INRMP, with upper command approval, covers a 5-year period. This means that an INRMP that is updated regularly should be able to project relatively accurate funding requirements for natural resources management for 5-year periods (DoD 2005).

The GC is responsible for ensuring that Fort Bliss has sufficient staff to implement the INRMP. DPW-E is responsible for annual coordination with USFWS and state wildlife agencies, as well as documenting INRMP management actions. DPW-E is also responsible for requesting funds for INRMP projects. The nature of federal funding is such that, from year to year some projects receive funding and some do not. Consequently, projects and schedules proposed in this INRMP are targets to facilitate natural resources program planning. When funds are not received as requested, DPW-E will re-examine its natural resources programming schedule and adapt plans, projects, and budgets accordingly.

Conservation projects are funded through the Environmental Program Requirements (EPR) system by IMCOM. Cleanup or restoration projects are funded by the USAEC.

With respect to INRMP reporting requirements for installations, the DA issued guidance on implementing INRMP metrics in the Environmental Quality Report (EQR), effective FY 2003 fourth quarter (DA 2003). These metrics include reporting requirements for funds requested and used to implement the INRMP.

5.1.4 Project Drivers

Project priority within this INRMP is determined by funding classification, as defined in DoD Instruction 4715.03 Natural Resources Conservation Program (DA 2011):

Class 0: Recurring Natural Resources Conservation Management Requirements- Includes activities needed to cover the recurring administration, personnel, and other costs associated with managing DoD's conservation program that are necessary to meet applicable compliance requirements (federal and state laws, regulations, Presidential EOs, and DoD policies) or which are in direct support of the military mission.

Class I: Current Compliance-Includes projects and activities needed because an installation is currently out of compliance (has received an enforcement action from a duly authorized federal or state agency, or local authority); has a signed compliance agreement or has received a consent order; has not met requirements based on applicable federal or state laws, regulations, standards, Presidential EOs, or DoD policies; and/ or are immediate and essential to maintain operational integrity or sustain readiness of the military mission. "Class I" also includes projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standard, DoD policies, or Presidential EOs, but deadlines have not passed or requirements are not in force) but shall be if projects or activities are not implemented in the current program year.

Class II: Maintenance Requirements-Includes those projects and activities needed that are not currently out of compliance (deadlines or requirements have been established by applicable laws, regulations, standards, Presidential EOs, or DoD policies) but deadlines have not passed or requirements are not in force, but shall be out of compliance if projects or activities are not implemented in time to meet an established deadline beyond the current program year.

Class III: Enhancement Actions, Beyond Compliance-Includes those projects and activities that enhance conservation resources or the integrity of the installation mission, or are needed to address overall environmental goals and objectives, but are not specifically required under regulation or EO and are not of an immediate nature.

5.2 Funding Sources

Management of natural resources by following accepted ecosystem management principles and practices, as outlined in this INRMP, is accomplished within the context of existing programs and activities. Natural resources management is integral to operations and training programs, environmental impact assessment activities and master plan development (Benton et al. 2008). Following are the two major sources of natural resources funding available to Fort Bliss.

5.2.1 Environmental Conservation Compliance Program

Funding allocation for natural resources projects is fundamental for complying with federal, state, and local environmental laws and regulations (Benton et al. 2008). Recurring activities (Class 0) to ensure compliance with NEPA, ESA and other environmental protection requirements have highest priority. These activities include threatened and endangered species monitoring, wetlands monitoring, updating plans and inventories, work force, equipment, training, Section 7 Consultations under the ESA, permit acquisition, overhead costs, NEPA compliance, and nonpoint source pollution monitoring (Benton et al. 2008). Funding for conservation programs comes from many different sources, although the largest source comes from Operation and Maintenance (O&M) funds allocated to each service by the U.S. Congress (Benton et al. 2008).

5.2.2 Commodity Programs

Commodity programs are programs that involve the sale of natural resources or the sale of rights to those resources to private interests outside the military and are an important source of funding for natural resources management programs (Benton et al. 2008). The only commodity program on Fort Bliss is the grazing out leases on withdrawn public land and Army fee-owned land. This grazing program is managed by BLM. Fort Bliss is entitled to direct expenditure of 10 percent of the fees collected (DOI 2007). Revenues from outleases are used for covering administrative expenses associated with leases; initiation, improvement, and perpetuation of leases; and implementation of INRMPs (Benton et al. 2008). Priorities for expenditures are as follows:

- **Priority 1 - outleasing administration and revenue investments**
- **Priority 2 - nonrevenue improvements**
- **Priority 3** - **other multiple-use management projects**

5.3 Achieving No Net Loss in Mission Capabilities

This INRMP uses an integrated, adaptive, ecosystem management approach designed for sustainability and consistency with the military missions on Fort Bliss. This INRMP protects and enhances natural resources for multiple use, sustainable yield, and biological integrity. Implementation of this INRMP and integration with the RCMP and ICRMP is imperative for increasing mission capabilities, minimizing military training constraints and maintaining maximum military flexibility.

Integrated natural resources management in an ecosystem framework promotes water quality, soil productivity, and recreational uses of natural resources and protection of biological diversity while allowing military training access to the resources needed to maintain a high degree of combat readiness. Effective sustainable use of natural resources accomplishes no net loss in the capability of an installation to support the military mission.

6 REFERENCES

6.1 Acronyms, Abbreviations, Units of Measurement

Acronyms and Abbreviations

AAF	Army Air Field
ACEC	Area of Critical Environmental Concern
ACP	Army Campaign Plan
ACSIM	Assistant Chief of Staff for Installation Management
ACUB	Army Compatible Use Buffer
AD	Armored Division
ADA	Air Defense Artillery
AFB	Air Force Base
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
AR	Army Regulation
ARPA	Archaeological Resources Protection Act
ASE	Army Strategy For the Environment
BASH	Bird/Wildlife Aircraft Strike Hazard
BLM	Bureau of Land Management
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CACTF	Combined Arms Collective Training Facility
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHPPM	Center for Health Promotion and Preventive Medicine
CIS	Capital Investment Strategy
CWA	Clean Water Act
CWCS	Comprehensive Wildlife Conservation Strategy
CX	Categorical Exclusion
DA	Department of Army
DAGIR	Digital Air Ground Integration Range
DCA	Directorate of Community Activities
DMPRC	Digital Multi-Purpose Range Complex
DMPTR	Digital Multi-Purpose Training Ranges
DOC	Directorate of Contracting
DoD	Department of Defense
DOI	Department of Interior
DES	Directorate of Emergency Services
DPTMS	Directorate of Plans, Training, Mobilizations, and Security
DPW-E	Directorate of Public Works Environmental Division
DRM	Directorate of Resource Management
DRMO	Defense Reutilization and Marketing Office
DSCESU	Desert Southwest Cooperative Ecosystems Studies Unit
DUSD(I&E)	Deputy Under Secretary of Defense for Installations and Environment
EA	Environmental Assessment
EBA	East Biggs Area

EIS	Environmental Impact Statement
EMS	Environmental Management System
EMU	Ecological Management Unit
ENO	Environmental Officer
EO	Executive Order
EPIA	El Paso International Airport
EPWU	El Paso Water Utilities
EQCC	Environmental Quality Control Committee
EQR	Environmental Quality Report
ESA	Endangered Species Act
ESMC	Endangered Species Management Component
ETZ	Extraterritorial Zone
EWRA	Emergency Wetlands Resources Act
FBTC	Fort Bliss Training Center
FCS	Future Combat Systems
FEMA	Federal Emergency Management Agency
FFID	Future Force Integration Directive
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FIRM	National Flood Insurance Rate Map
FLPMA	Federal Land Policy and Management Act
FMP	Forest Management Plan
FNWA	Federal Noxious Weed Act
FONPA	Finding of No Practicable Alternative
FORSCOM	Forces Command
FTX	Field Training Exercise
FWPCA	Federal Water Pollution Control Act
FYDP	Future Year Defense Plan
GC	Garrison Commander
GDPR	Global Defense Posture Realignment
GIS	Geographic Information Systems
GTA	Grow the Army
HBCT	Heavy Brigade Combat Team
HMMWV	High Movility Multipurpose Wheeled Vehicles
HPO	Historic Preservation Officer
HQDA	Headquarters Department of the Army
IBCT	Infantry Brigade Combat Teams
ICRMP	Integrated Cultural Resources Management Plan
IGPBS	Integrated Global Presence Basing Strategy
IMCOM	Installation Management Command
INRMP	Integrated Natural Resources Management Plan
IPM	Integrated Pest Management
IPMC	Installation Pest Management Coordinator
IPMP	Installation Pest Management Plan
ISWM	Integrated Solid Waste Management
ITAM	Integrated Training and Management
JLENS	Land Attack Cruise Missile Defense Elevated Sensor System
JTF	Joint Task Force
JTX	Joint Training Exercise
LRAM	Land Rehabilitation and Maintenance
LRC	Long Range Component
LUA	Limited Use Area
MACOM	Major Army Command
MBTA	Migratory Bird Treaty Act

MLWA	Military Lands Withdrawal Act
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
MWR	Morale, Welfare, and Recreation
NAGPRA	Native American Graves Protection and Repatriation Act
NCO	Non Commissioned Officer
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMEMNRD	New Mexico Energy, Minerals and Natural Resources Department
NMDGF	New Mexico Department of Game and Fish
NMNHP	New Mexico Natural Heritage Program
NMSA	New Mexico Statutes Annotated
NMSLO	New Mexico State Land Office
NPS	National Park Service
NRCS	Natural Resources Conservation Service
O&M	Operations and Maintenance
OLA	Off-Limits Areas
ORV	Off-Road Vehicle
OSD	Office of the Secretary of Defense
P2	Pollution Prevention
PA	Programmatic Agreement
PEIS	Programmatic Environmental Impact Statement
PEW	Palustrine Emergent Wetland
PIF	Partners in Flight
PL	Public Law
PLS	Planning Level Survey
POM	Program Objectives Memorandum
POV	Privately Owned Vehicle
PPBS	Planning, Programming, and Budgeting System
RAB	Restoration Advisory Board
RCI	Residential Communities Initiative
RCMP	Range Complex Master Plan
RCRA	Resource Conservation and Recovery Act
RFMSS	Range Facility Management Support System
RHA	River and Harbor Act
RMP	Resource Management Plan
ROD	Record of Decision
RPMP	Real Property Master Plan
RTLA	Range and Training Land Assessment
RTLP	Range and Training Land Program
SAIA	Sikes Act Improvement Act
SDWA	Safe Drinking Water Act
SDZ	Surface Danger Zone
SEIS	Supplemental Environmental Impact Statement
SHORAD	Short Range Air Defense
SHPO	State Historic Preservation Officer
SiteRep	Site Rehabilitation Prioritization System
SOP	Standard Operating Procedure
SRA	Sustainable Range Awareness
SRC	Short Range Component
SRP	Sustainable Range Program
SWG	State and Tribal Wildlife Grants Program

SWMP	Storm Water Management Plan
TA	Training Area
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
THAAD	Theater High Altitude Air Defense
TEP	Texas Environmental Profiles
TGLO	Texas General Land Office
TNC	The Nature Conservancy
TOC	Tactical Operations Centers
TPWD	Texas Parks and Wildlife Department
TRADOC	Training and Doctrine Command
TRI	Toxic Release Inventory
USAADACENFB	U.S. Army Air Defense Artillery Center and Fort Bliss
USACASBN	U.S. Army Combined Arms Support Battalion
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USAF	U.S. Air Force
USAOTC	U.S. Army Operational Test Command
USASMA	U.S. Army Sergeants Major Academy
USBR	U.S. Bureau of Reclamation
USC	United States Code
USDA	U.S Department of Agriculture
USDA-WS	USDA-Wildlife Services
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
WASH	Wildlife/Aircraft Strike Hazard
WBAMC	William Beaumont Army Medical Center
WQA	Water Quality Act
WRCC	Western Region Climate Center
WSA	Wilderness Study Area
WSMR	White Sands Missile Range
WWF	World Wildlife Fund

Units and Measurements

°C	degrees Celsius
°F	degrees Fahrenheit
af	acre-feet
afy	acre-feet per year
cm	centimeters
ft	feet
gpd	gallons per day
km/h	kilometers per hour
m	Meters
ma	million years before present
mi	Miles
m^2	square miles
mph	miles per hour
MSL	mean sea level

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List of Appendices

APPENDIX A: Regulations, Laws, and Orders that Pertain to Natural Resources

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16 USC §§ 670a-670o, September 15, 1960, as amended 1968, 1978, and 2004. Sikes Act.

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107 PL 93-205. 1973. Endangered Species Act.

108 PL 93-291. 1974. Archaeological and Historic Preservation Act

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110 PL 94-580. 1976. Resource Conservation and Recovery Act.

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114 PL 95-523. 1972. Safe Water Drinking Act.

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116 PL 96-95. 1979. Archaeological Resources Protection Act.

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119 PL 97-79. 1981. Amendments to the Lacey Act.

120 PL 99-339. 1986. Amendments to the Safe Water Drinking Act.

121 PL 99-645. 1986. Emergency Wetlands Resources Act.

122 PL 100-4. 1987. Water Quality Act.

123 PL 100-478. 1988. Amendments to the Endangered Species Act (PL 93-205).

124 PL 101-233. 1989. North American Wetlands Conservation Act.

125 PL 101-549. 1990. Amendments to the Clean Air Act (PL 95-95)

126 PL 101-601. 1990. Native American Graves Protection and Repatriation Act

127 PL 105-85. 1997. Sikes Act Improvement Act of 1997, Title XXIX, Sections 2901-2914.

128 PL 106-65. 1999. Military Lands Withdrawal Act of 1999, Title XXX.

129 PL 107-63. 2002. Department of the Interior and Related Agencies Appropriations Act.

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APPENDIX B: Soil Erosion and Sediment Control Component

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Soil Erosion and Sediment Control Component (SESCC)

Background

Soils are one of the necessary natural resource components for sustainable military training, testing and construction on installation lands. Soil disturbance from human activities causes soil erosion. Soil erosion contributes to the loss of nutrient-rich topsoil needed for vigorous plant growth, increases rehabilitation costs, reduces water quality, produces fugitive dust and can create gullies that pose hazards to troops and equipment. This document is a resource for installation proponents to use to identify potential erosion and sediment control issues and to respond appropriately to prevent or minimize associated impacts.
Army Regulation (AR) 200-1 addresses environmental responsibilities for all Army installations. AR 200-1 directs each installation's INRMP to address the management of soil resources. This Soil Erosion and Sediment Control Component (SESCC) to the Fort Bliss INRMP addresses that policy found in AR 200-1, paragraph 4-3d (1) (s) and 4-3d (3):

4-3d (1) (s)

Ensure that turbidity and sediment levels do not irreparably degrade aquatic biota and habitat from an ecosystem perspective, or significantly impact shallow ground water aquifers.

4-3d (3) Soil resources

Use the INRMP for the planned management of soil resources across the entire installation. The Soil Erosion and Sediment Control Component (SESCC) to the INRMP will address the following soils policy:

(a) Keep soil erosion from water within tolerance limits as defined in soil surveys prepared by the U.S. Department of Agriculture (USDA), NRCS, or as required by FGS or host nation authorities.

(b) Keep soil sediment, as a pollutant, in wetlands and waterways within compliance limits.

(c) Minimize the impact of land uses on soil erosion and sedimentation when and where possible, to include:

1. Locate physically intensive land disturbing activities on the least erodible soils.
2. Use climatic/seasonal changes in soil erosion as a factor in scheduling intensive mission operations and real property management activities.

Proponents of activities including intensive training maneuvers, road construction and maintenance and range facility construction will coordinate with Integrated Training Area Management (ITAM)) when selecting Best Management Practice's (BMPs) for maneuver areas. ITAM has access to the Land Rehabilitation and Maintenance (LRAM) technical reference library (TRL), which provides management techniques, including design, implementation, military applications, drawings, and photos of BMP's to prevent or reduce erosion and off-site sediment deposition.

Purpose and Context

The primary reason for minimizing soil erosion is to maintain the sustainability of land use, which for Fort Bliss is sustaining military training. Minimizing soil erosion decreases pollution of air, surface and ground water resources. Additionally, it helps to maintain ecosystems that have value as watersheds, municipal water sources, and wildlife habitats.

Fort Bliss watersheds, almost entirely, drain into the Tularosa Basin or the Salt Basin, which are closed basin systems (Watershed map Figure B-1). This means that surface water runs off and ground water drains to the lowest places in the basins where the trapped surface water sometimes collects in shallow playa lakes. Silt and dissolved minerals and salts carried by surface and ground water are trapped within the basins. This concentration of salts and minerals and soil deposition has been occurring for millions of years within these basins and is now thousands of feet in depth.

Since surface and ground water within these closed basin systems do not drain into river systems, water pollution issues are not significant factors for limiting training exercises here (Figure B-2). On the other hand, wind and water erosion can be a significant factor limiting training exercises on lands of the Tularosa Basin (Figure B-3). This is because of the soil properties of fine silt deposition, sand, and exposed caliche/calcareous soils. The fine particles of these loosely joined soils, if disturbed, can cause air pollution and soil erosion and can severely limit visibility when wind events occur. Wind events can occur at any time of the year on Fort Bliss but are particularly prevalent in the winter and spring months. Two track roads can become deep powdery dust several inches deep when military vehicles are using them during intensive ground training exercises that occur in the winter and spring. Significant rain or wind events that occur after these roads become powdered can cause serious soil losses and can lead to severe ruts limiting the use of these roads in the future. Based on these factors, the best times for ground training upon lands within the Tularosa Basin is when soil moisture is adequate from mid-June to mid-December.

On the uplands and the mountain ranges and mesas of Fort Bliss, the opposite is true. Water erosion potential of soils is moderate to high because of steep slopes and the nature of loamy, cobbley and gravelly soils. Two track roads in these soils are subject to gullying after high traffic followed by or during monsoonal moisture events. Wind erosion is less of a factor here because of heavier soil particle properties. So, conversely, in order to reduce soil impacts, the best times for ground training exercises in areas outside the Tularosa Basin is when soils are relatively dry from mid-December to mid-June.

All soil interpretations in this document are based on information developed from the Soil Survey of Fort Bliss Military Reservation, New Mexico and Texas. This survey was published in 2004 and was a joint effort by the Natural Resources Conservation Service, Fort Bliss Military Reservation, the Bureau of Land Management, the New Mexico Agricultural Experiment Station and the Texas Agriculture Experiment Station. The information for this soil survey is located on the Web and is updated and maintained online as the single authoritative source of soil survey information: Web Soil Survey.

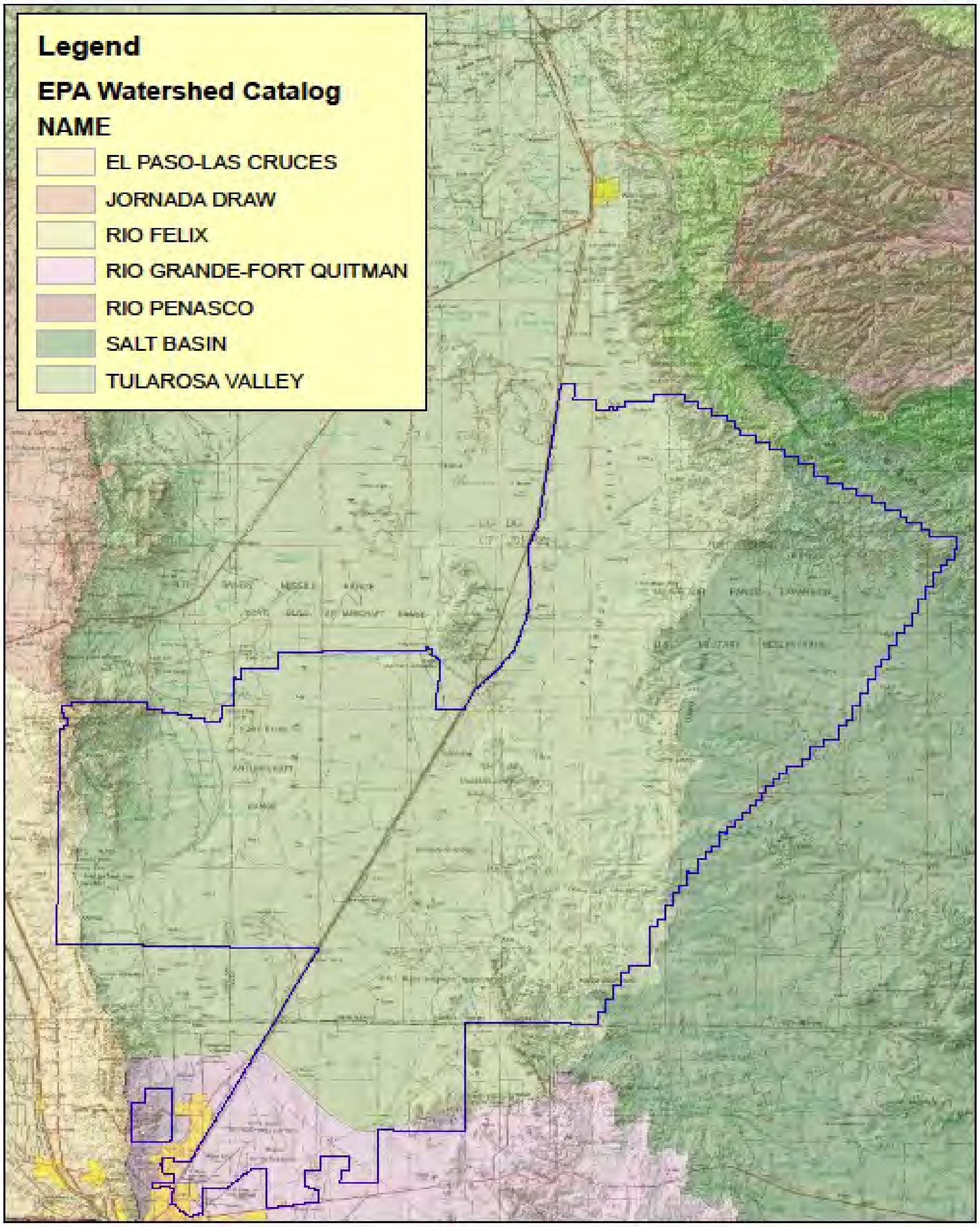

Figure B-1 Watershed Map

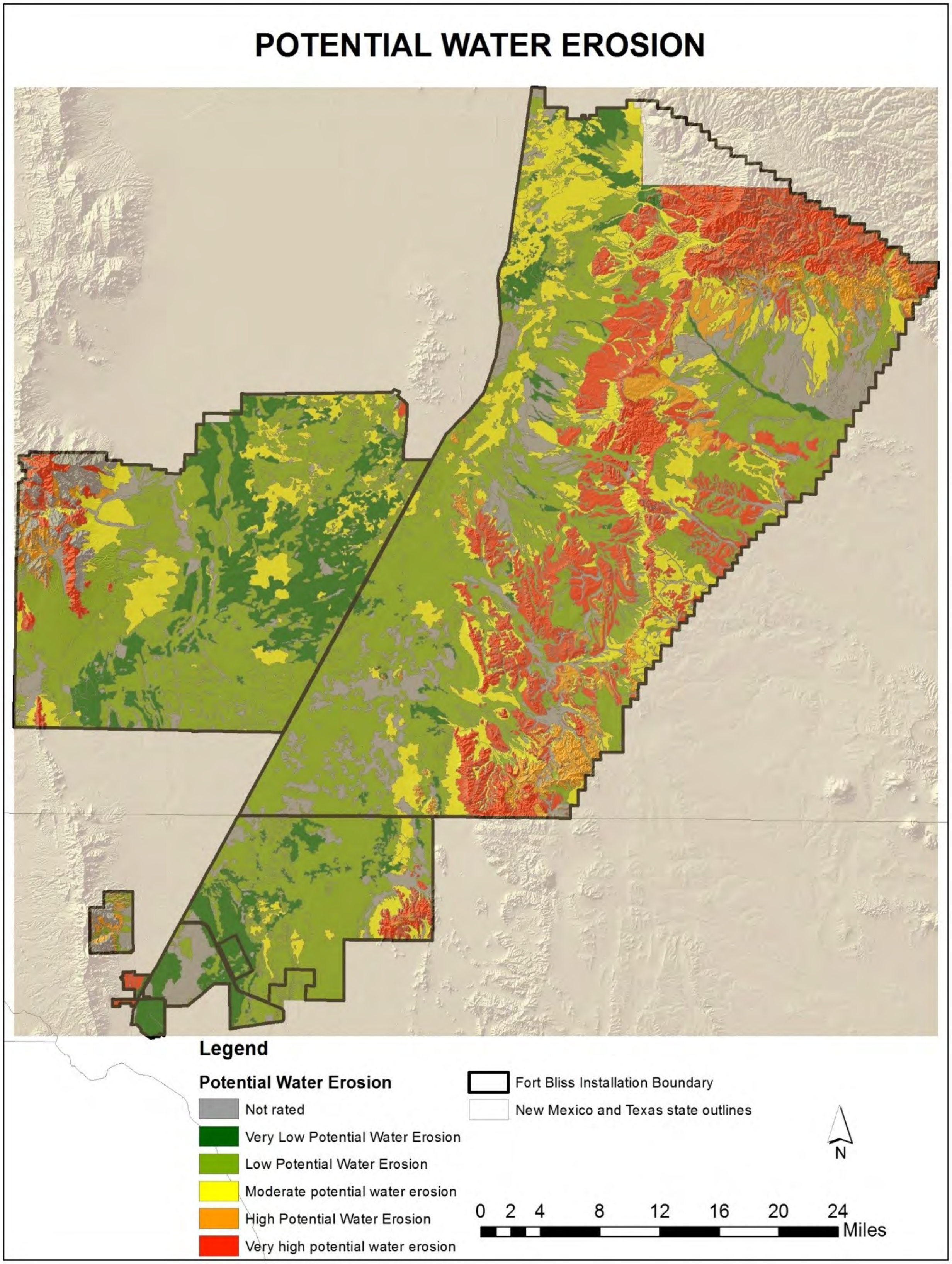

Figure B-2 Potential Water Erosion

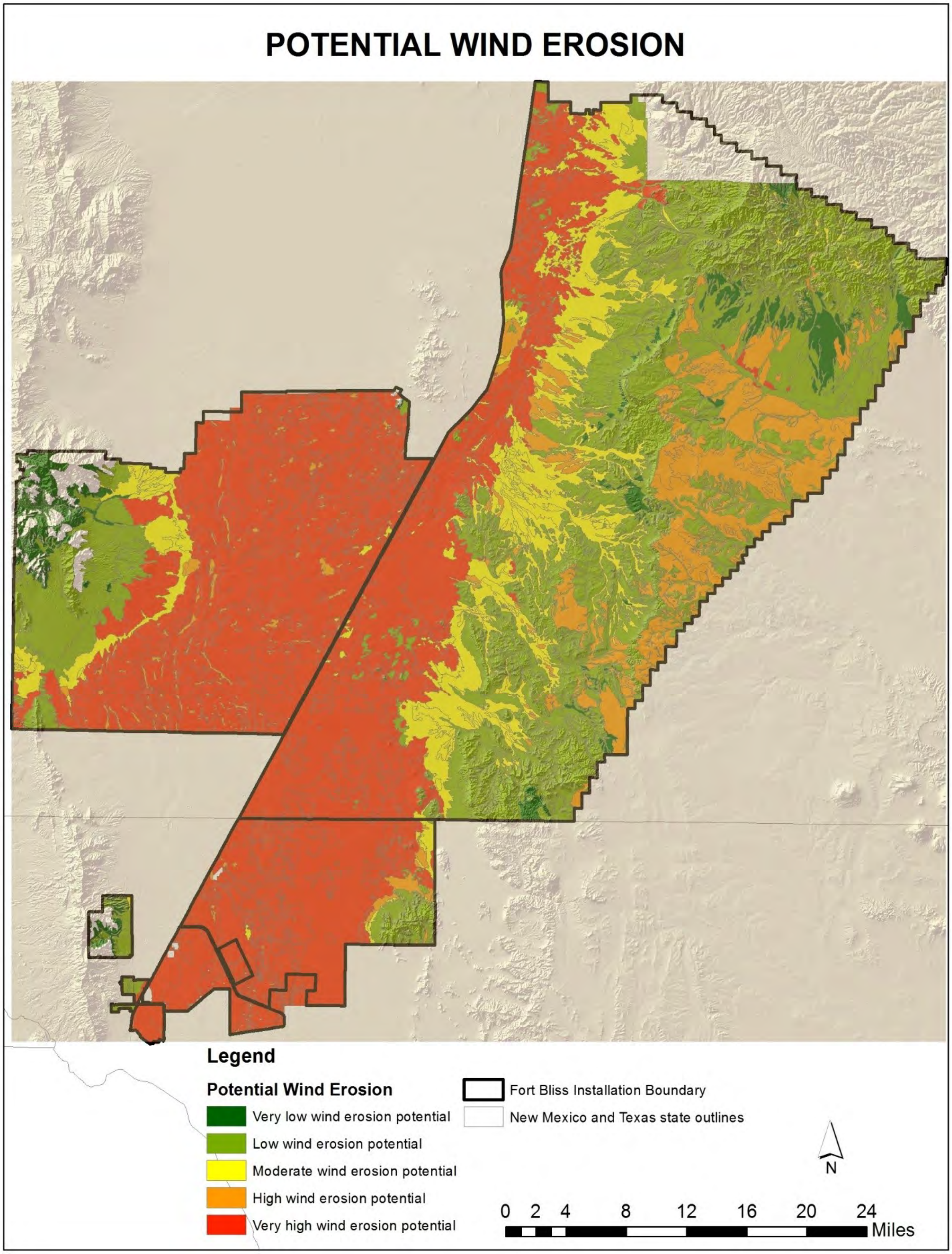

Figure B-3 Potential Wind Erosion

Erosion and Offsite Sediment Deposition

Because of the arid climate, past land uses, and general topography, many of the soils on Fort Bliss have the potential to be highly erodible. Policy in AR 200-1 requires that soil erosion is kept from water within tolerance limits as defined in soil surveys prepared by the U.S. Department of Agriculture's (USDA) Natural Resource Conservation Service (NRCS). The soil loss tolerance limit is referred to as (T), which is the maximum rate of annual soil loss (tons/acre) that will sustain soil productivity on a given soil. Erosion is greater than T if either the water (sheet & rill) erosion or the wind erosion rate exceeds the soil loss tolerance rate.

A practical method for identifying potential erosion on areas of Fort Bliss is to utilize the soil interpretations and maps (Figure B-2 and B-3) for Water and Wind Erosion Potential. These soil interpretations are used in the pre-planning process to either locate physically intensive land disturbing activities on the least erodible soils or prepare for land rehabilitation measures.

A web-based tool used to select specific areas for erosion and other soil interpretations is the Web Soil Survey (WSS). As an online application, it does not require GIS software. The WSS can generate reports using the Fort Bliss Soil Survey as an area of interest (AOI), refer to Figure B-4 as example, or for specific AOI up to 10,000 acres in size. The WSS generates reports quickly and easily on a diversity of important topics including:

- Water Erosion Potential
- Wind Erosion Potential
- Bivouac Areas
- Vehicle Trafficability
- Helicopter Landing Zones
- Excavation for Fighting Positions
- Suitability for Roads
- Potential for Damage by Fire

Best Management Practices

Preventing excessive soil erosion or off-site sediment deposition is the best option and can include controlling land uses, sequencing construction operations to periods of low erosion potential and minimizing disturbed areas. Although the prevention option is the most desirable, it is not-always feasible and land rehabilitation or conservation measures are employed when erosion or off-site sediment deposition cannot be prevented.

Land rehabilitation or conservation measures, known as Best Management Practices (BMP) are a practice or combination of practices selected as the most effective, economical, and practical means of preventing or reducing erosion or sedimentation to a level compatible with range sustainability and water quality goals. Selecting an appropriate BMP will depend upon local site conditions (land use, topography, slope, water table elevation, and geology).

A BMP to utilize for limiting soil erosion on heavily utilized two track roads is to keep the road surface damp to prevent powdering. Maintain constant soil moisture by utilizing water trucks with water spreader bars to wet down road surfaces before, during and after vehicle maneuvers.

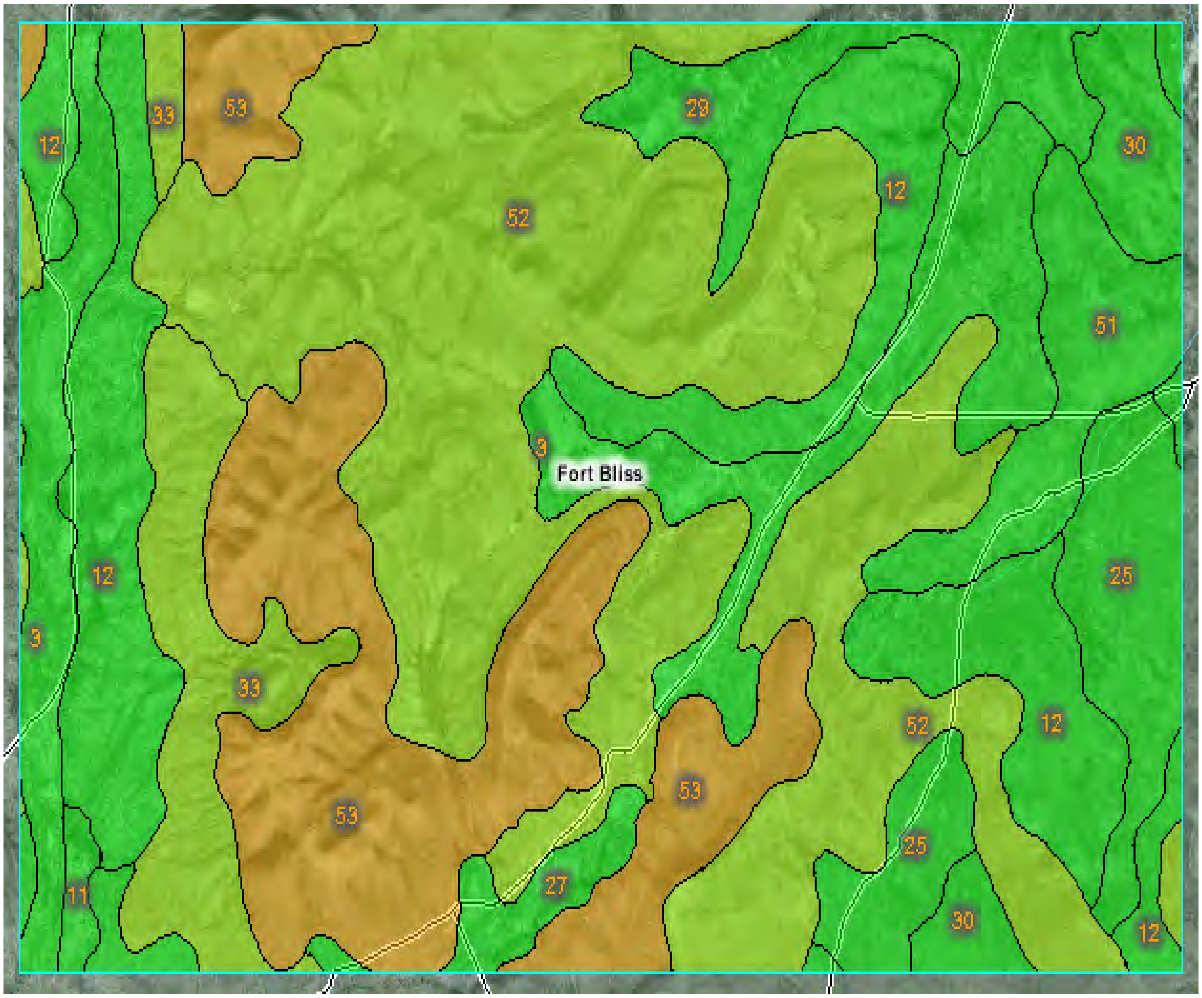

Figure B-4: Web-based soil survey example

Erosion and Sedimentation Controls on Construction Sites

Soil policy in AR 200-1 requires that soil sediment, as a pollutant, be within compliance limits. Soil sediment as a pollutant is regulated using the National Pollutant Discharge Elimination System (NPDES). Fort Bliss properties in New Mexico are permitted under the New Mexico Pollutant Discharge Elimination System (NMPDES) General Permit for Discharges from Construction Activities. Fort Bliss properties in Texas are permitted under the Texas Pollutant Discharge Elimination System (TPDES) General Permit No. TXR040000. In addition to permitting requirements, content from these permits are used to include climactic/seasonal changes in soil erosion as a factor in scheduling intensive mission operations and real property management activities. The following information briefly covers the Construction Permitting requirements on Fort Bliss (Table B-1, Table B-2)

Table B-1. Summary of Fort Bliss – Texas Construction Permitting Requirements

Area of Soil Disturbance	Regulatory Requirements
Less than 1 acre	Construction SWP3 and notice to state not required.
1 to less than 5 acres	Construction SWP3 is likely required though some short duration projects may qualify for waiver. SWP3 or waiver request must be coordinated through Environmental Division.
5 acres and greater	Construction SWP3 is required and must be coordinated through Environmental Division. NOI form and fee submitted to Texas Commission on Environmental Quality.

SWP3 = Storm Water Pollution Prevention Plan – Document following Texas Commission on Environmental Quality approved format that details the project and efforts to prevent migration of pollutants from construction site.
NOI = Notice of Intent – Texas Commission on Environmental Quality form that a construction site operator submits to the state in order to receive construction site permit coverage.

Table B- 2. Summary of Fort Bliss – New Mexico Construction Permitting Requirements

Area of Soil Disturbance	Regulatory Requirements
Less than 1 acre	Construction SWP3 and notice of intent not required.
1 to less than 5 acres	Construction SWP3 is likely required though some short duration projects may qualify for waiver. SWP3 or waiver request must be coordinated through Environmental Division.
5 acres and greater	Construction SWP3 is required and must be coordinated through Environmental Division. NOI form and fee submitted to US Environmental Protection Agency Region VI.

SWP3 = Storm Water Pollution Prevention Plan – Document following USEPA region VI approved format that details the project and efforts to prevent migration of pollutants from construction site.
NOI = Notice of Intent – Federal form that a construction site operator submits to the USEPA Region VI in order to receive construction site permit coverage.

Additional Information - Questions regarding storm water compliance on Fort Bliss are directed to Mr. Kelly Blough, Multimedia Compliance Branch, Storm Water Compliance Manager, Environmental Division, Attn: IMWE-BLS-PWE (Bldg 622, Room 110), Pleasanton & Taylor Roads, Fort Bliss, TX 79916, (915) 568-0794 (kelly.blough@us.army.mil).

Water and Wind Erosion Factors for Determining a Site's Susceptibility for Erosion

The following comes from the Soil Data Viewer Toolbar 6.0, an ArcGIS extension downloaded on 24 July 2012 from NRCS, http://soils.usda.gov/sdv/download60.html. Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Examples of soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons/acre/year. The estimates are percentages of silt, sand, and organic matter and soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kf (rock free)" indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

The T factor is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year predicted to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture also influences wind erosion (Table B-3).

Table B-3 Wind Erodibility Groups (WEG) and Index

WEG 1,3,4,5,7	Properties of Soil Surface Layer	Dry Soil Aggregates More Than 0.84 mm (wt.%)	Wind Erodibility Index (I) (tons/ac/yr)
1	Very fine sand, fine sand, sand or coarse sand[2]	1 2 3 5 7	310 250 220 180 160
2	Loamy very fine sand, loamy fine sand, loamy sand, and loamy coarse sand; very fine sandy loam and silt loam with 5 or less percent clay and 25 or less percent very fine sand; and sapric soil materials (as defined in *Soil Taxonomy*); except Folists.	10	134
3	Very fine sandy loam (but does not meet WEG criterion 2), fine sandy loam, sandy loam, and coarse sandy loam; noncalcareous silt loam that has greater than or equal to 20 to less than 50 percent very fine sand and greater than or equal to 5 to less than 12 percent clay.	25	86
4	Clay, silty clay, noncalcareous clay loam that has more than 35 percent clay and noncalcareous silty clay loam that has more than 35 percent clay; all of these do not have sesquic, parasesquic, ferritic, ferruginous, or kaolinitic mineralogy (high iron oxide content).	25	86
4L	Calcareous[6] loam, calcareous silt loam, calcareous silt, calcareous sandy clay, calcareous sandy clay loam, calcareous clay loam, and calcareous silty clay loam.	25	86
5	Noncalcareous loam that has less than 20 percent clay; noncalcareous silt loam with greater than or equal to 5 to less than 20 percent clay (but does not meet WEG criterion 3); noncalcareous sandy clay loam; noncalcareous sandy clay; and hemic soil materials (as defined in *Soil Taxonomy*).	40	56
6	Noncalcareous loam and silt loam that have greater than or equal to 20 percent clay; noncalcareous clay loam and noncalcareous silty clay loam that have less than or equal to 35 percent clay; silt loam that has parasesquic, ferritic, or kaolinitic mineralogy (high iron oxide content).	45	48
7	Noncalcareous silt; noncalcareous silty clay, noncalcareous silty clay loam, and noncalcareous clay that have sesquic,	50	38

	parasesquic, ferritic, ferruginous, or kaolinitic mineralogy (high content of iron oxide) and are Oxisols or Ultisols; and fibric soil materials (as defined in *Soil Taxonomy*).		
8	**Soils not susceptible to wind erosion because of rock and pararock fragments at the surface and/or wetness; and Folists.**	**--**	**0**

Footnotes:

For all WEGs except 1 and 2 (sands and loamy sand textures), if percent rock and pararock fragments (>2mm) by volume is 15-35, reduce "I" value by one group with more favorable rating. If percent rock and pararock fragments by volume is 35-60, reduce "I" value by two favorable groups except for sands and loamy sand textures which are reduced by one group with more favorable rating. If percent rock and pararock fragments is greater than 60, use "I" value of 0 for all textures except sands and loamy sand textures which are reduced by three groups with more favorable ratings. An example of more favorable "I" rating is next lower number: "I" factor of 160 to "I" factor of 134 or "I" factor of 86 to "I" factor of 56. The index values should correspond exactly to their wind erodibility group (e.g., "I" factor of 56 = WEG 5).

The "I" values for WEG 1 vary from 160 for coarse sands to 310 for very fine sands. Use an "I" of 220 as an average figure for WEG 1.

All material that meets criterion 3 in the required characteristics for andic soil properties as defined in the *Keys to Soil Taxonomy*, 11th edition. Such material is in WEG 2 regardless of the texture class of the fine-earth fraction.

All material that meets criterion 2, but not criterion 3, in the required characteristics for andic soil properties as defined in the *Keys to Soil Taxonomy*, 11th edition. Such material is in WEG 6, regardless of the texture class of the fine-earth fraction. The only exception to this is for Cryic Spodosols have a medial substitute class and a MAAT < 4 degrees C.; these soils are in WEG 2.

For surface layers or horizons that do not meet the required characteristics for andic soil properties but do meet Vitrandic, Vitritorrandic, Vitrixerandic, and Ustivitrandic subgroup criteria (thickness criterion excluded) move one wind erodibility group (WEG) with a less favorable rating.

Calcareous is a strongly or violently effervescent reaction (class) of the fine-earth fraction to cold dilute (1N) HCL; a paper "Computing the Wind Erodible Fraction of Soils" by D. W. Fryear et.al (1994) in the Journal of Soil and Water Conservation 49 (2) 183-188 raises a yet unresolved question regarding the effect of carbonates on wind erosion.

For mineral soils with thin "'O" horizons, the WEG is based on the first mineral horizon.

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APPENDIX C: List of Projects

Fort Bliss INRMP Projects, Schedules, and Implementation Table

Table C-1 contains natural resources projects for Fort Bliss, and includes a natural resources management area (program management, education and outreach, terrestrial habitat, water resources, or fish and wildlife management), corresponding laws or regulations, project driver (DoD Class), and proposed FY for implementing each recommendation. Chapter 5 contains a discussion of each DoD Class or project driver. A short definition of each class follows:

Class 0: Recurring conservation requirements-maintain compliance.
Class I: Non-recurring conservation requirements-fix non-compliance.
Class II: Non-recurring conservation requirement-prevent non-compliance.
Class III: Non-recurring conservation requirement-enhance environment.

The projects presented in Table APP C-1 strive to enhance natural resources on Fort Bliss without affecting other installation plans, activities, or the overall mission. Achieving these recommendations will require mission activities to be conducted in an environmentally sensitive way and requires cooperation between environmental offices, DPTMS, offices DPW O&M and Range Operations. Any future changes in mission, training activity or technology are analyzed for impacts to natural resources using the NEPA process.

Table C-1 Fort Bliss INRMP Projects and Implementation Table

Natural Resources Program Element	Recommendation	Program Element Goal	Program Element Objective	Federal, DoD or DA Law, Policy or Guidance	DoD Class	FY	Est. Cost
Threatened and Endangered Species	Conduct periodic surveys of sensitive, rare, threatened or endangered species to determine species presence, population trends and prioritize management prescriptions.	TE 1 TE 2 TE 3 TE 4	1.1 1.2 2.1 2.2 3.1 3.2 4.1 4.2	ESA, MBTA, Sikes Act, AR 200-1, AR 200-3	Class 0	Annually FY16 – FY19	$450,000 Annually
Threatened and Endangered Species	Plan, prepare and implement a prescribed burn for improving foraging habitat by reducing shrub encroachment onto grasslands for Aplomado falcon.	TE 1 TE 2 TE 3 TE 4	1.1 1.2 2.1 2.2 3.1 3.2 4.1 4.2	ESA, MBTA, Sikes Act, AR 200-1, AR 200-3	Class 3	FY 2015 and as needed	$85,000
Wetlands and Water Resources Management	Assess aquatic ecosystem on Fort Bliss. White Sands Technical Svc completed survey in 2008.	WD 2	2.1 2.2 2.3	Sikes Act, AR 200-1, AR 200-3	Class 2	Annually FY15 – FY19	$100,000 Annually
Wetlands and Water Resources Management	Conduct a comprehensive wetland inventory Current contract for ongoing work with QRI/GMI Joint Venture	WD 1 WD 2 WD 3 WD 4	1.1 1.2 2.1 2.6 3.1 3.2 3.3 4.1	CWA, EO 11990, Sikes Act, AR 200-1	Class 3	FY15	$100,000
Wetlands and Water Resources	Enhance riparian vegetation along streams, creeks, and wetlands with plantings of native species.	WD 3	3.1 3.2 3.3	Sikes Act, AR 200-1	Class 3	FY16	$50,000

Fish and Wildlife Management	Construct additional wildlife water sources for wildlife in Soledad Canyon, Long Canyon and in the basin above the Narrows.	FW 3	3.1	AR 200-1, AR 200-3	Class 3	FY15	$150,000
Fish and Wildlife Management	Modify existing fences (wire type and spacing configuration) to enhance wildlife movement. Remove net wire fencing and replace with barbed or smooth wire. Remove old barbed wire fencing that is no longer functional from across FBTC.	FW 3	3.1	AR 200-1, AR 200-3	Class 3	FY15 and FY16	$150,000
Fish and Wildlife Management	Conduct surveys of selected fauna on Fort Bliss to monitor ecosystem diversity and habitat health.	FW 1 FW 2 FW 3 FW 4	1.1 1.2 2.1 3.1 4.1 4.2	ESA, MBTA, Sikes Act, AR 200-1, AR 200-3	Class 3	FY15 – FY19	$200,000
Forestry Management	Complete a detailed physical inventory and mapping of 20,000 acres of forest and woodland stands. This includes species composition, fuel loading models, woody biomass estimates and stand structure descriptions. Conduct this inventory at 10-year intervals.	FM 1	1.1 1.4 1.5 1.6	Sikes Act, AR 200-1, AR 200-3	Class 3	FY15 – FY16	$275,000
Forestry Management	Biannually review and update the Forest Management Plan.	FM 1 FM 2	1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2	AR 200-1, AR 200-3	Class 3	FY15, FY16 and FY18	$35,000 every 2 years
Forestry Management	Implement objectives contained in the Forest Management Plan.	FM 1 FM 2	1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2	AR 200-1, AR 200-3	Class 3	Annually	$125,000 Annually
Forestry Management	Perform urban tree canopy survey.	FM 1	1.1 1.2	Sikes Act, AR 200-1	Class 3	FY16	$25,000

Forestry Management	Develop an Urban Forest Plan.	FM 1	1.1 1.2	Sikes Act, AR 200-1, AR 200-3	Class 3	FY16	$50,000
Forestry Management	Thin piñon-juniper stands on north-facing slopes in Soledad Canyon to a 50 ft^2 Basal Area/acre. Lop and scatter limbs and broadcast burn in the rainy season or in the winter	FM 1	1.1	Sikes Act	Class 3	FY 16-18	$50,000 Annually
Forestry Management	Lop and scatter small re-production of piñon and juniper seedlings within the area of the fuelbreak around the south end of the village of Timberon	FM 1	1.1	Sikes Act, AR 200-1	Class 3	FY 15-16	$40,000
Vegetation Management	Survey vegetation across Fort Bliss and establish baseline inventories for communities, vegetative alliances and fuels maps	VM 1 VM 2 VM 3	1.1 2.1 2.2 3.1 3.2 3.3	AR 200-1	Class 0	FY 15-19	$75,000 Annually
Migratory Bird Management	Schedule maintenance activities that impact wildlife species outside the nesting season.	MB 1 MB 2 MB 3	1.1 2.1 2.2 3.1 3.2 3.3	MBTA, Sikes Act, AR 200-1, AR 200-3	Class 3	Annually	$5,000 Annually
Migratory Bird Management	Conduct surveys of migratory bird population (both waterfowl and neotropical)	MB 1 MB 2	1.1 1.2 1.3 2.2	MBTA, Sikes Act, AR 200-1, AR 200-3	Class 0	Annually	$25,000 Annually
Migratory Bird Management	Minimize human presence in and physical disturbance of arroyo habitats and playas to improve nesting habitat, particularly for migratory birds.	MB 1	1.4	MBTA, Sikes Act, AR 200-1, AR 200-3	Class 3	Annually	$15,000 Annually
Migratory Bird Management	Conduct periodic breeding bird surveys for migratory and listed species.	MB 1 MB 2	1.1 1.2 1.3 1.4 2.1	ESA, MBTA, DoDPIF, Sikes Act, AR 200-1	Class 0	Annually	$50,000 Annually

Invasive Species Management	Implement the Invasive Species Management Plan, review annually and update as necessary.	IS 1 IS 2 IS 3	1.1 1.2 1.3 2.1 2.2 3.1 3.2 3.3	EO 13112, EO 13148, FNWA, Sikes Act, AR 200-1	Class 1	Annually	$100,000 Annually
Invasive Species Management	Develop a Landscaping Maintenance Plan and associated Instruction.	IS 1 IS 2 IS 3	1.1 1.2 1.3 2.1 2.2 3.1 3.2 3.3	EO 12902, EO 13148, Sikes Act, AR 200-1	Class 2	FY 15	$215,000
Pest Management	Conduct surveys of pests that could be a threat to human health or natural resources.	PM 1	1.1 1.2	Sikes Act, AR 200-1	Class 2	Annually	$60,000 Annually
Pest Management	Implement the Integrated Pest Management Plan. Implement measures to exclude or discourage animals from roosting, nesting, or otherwise inhabiting buildings on Fort Bliss. Review the plan annually and revise as necessary.	PM 2	2.1 2.2	EO 13112, EO 13148, FNWA, Sikes Act, AR 200-1	Class 1	Annually	$80,000 Annually
Land Management	Promote revegetation of headcuts in grasslands. Construct check dams to check erosion in headcuts.	LM 1	1.1 1.2 1.3 1.4 1.5 1.6	AR 200-1, AR 350.19	Class 1	Annually	$375,000 Annually
Land Management	Close redundant roads, stabilize, and reclaim roads as needed using native seed sources.	LM 1	1.1 1.2 1.3 1.4 1.5 1.6	AR 200-1, AR 350.19	Class 3	Annually	$30,000 Annually

Land Management	Reroute roads out of arroyos and other places where water collects whenever possible and feasible.	LM 1	1.1 1.2 1.3 1.4 1.5 1.6	AR 200-1, AR 350.19	Class 3	Annually	$25,000 Annually
Land Management	Rehabilitate areas with unacceptable watershed conditions using revegetation, enclosures, and erosion-control structures.	LM 1 SR 1 SR 2	1.1 1.2 1.3 1.4 1.5 1.6 2.1 2.2	AR 200-1, AR 350.19	Class 1	Annually	$150,000 Annually
Land Management	Maintain all roads with a grader annually to properly distribute runoff by wing-ditches, water bars, drain dips, and other structures intended to disperse water.	LM 1	1.1 1.2 1.3 1.4 1.5 1.6	AR 200-1, AR 350.19	Class 2	Annually	$350,000 Annually
Land Management	Rehabilitate incised arroyos with erosion-control structures.	LM 1 SR 1	1.1 1.2 1.3 1.4 1.5 1.6	AR 200-1, AR 200-3	Class 1	Annually	$50,000
Agricultural Outleasing	Revegetate and stabilize eroding pasture areas in Soledad Canyon.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY15 and FY16	$25,000 per year
Agricultural Outleasing	Maintain or establish a western boundary fence from Long Canyon, through Achenbach Canyon to Soledad Canyon to Bar Canyon to Dripping Springs to prevent livestock and human trespass.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY15-19	$125,000

Agricultural Outleasing	Develop additional permanent water for livestock.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY15, and FY16	$45,000 per year
Agricultural Outleasing	Construct enclosures on dirt tanks and manage grazing to provide suitable cover for wildlife.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY 16-18	$350,000
Agricultural Outleasing	Transplant native riparian plant species at suitable stock tanks.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY 15-17	$12,500 per year
Agricultural Outleasing	Establish an initial grazing capacity of 250 cows (3,000 Animal Unit Months) for Units 4 and 5 combined.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY 15	$75,000
Agricultural Outleasing	Establish a two-pasture grazing system with spring and summer growing season rest.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY 15	$50,000
Agricultural Outleasing	Establish a multi-year, year round grazing contract.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY 16	$30,000
Agricultural Outleasing	Construct new range improvements for the following: reroute 1.5 miles of fence between Units 4 and 5 (T. 20 S., R.12 E., Section 15), and construct one corral (T. 20 S., R. 12 E., Section 21).	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY15	$180,000

Agricultural Outleasing	Install one trough at T. 21 S., R. 12 E., Section 9.	AG 1	1.1 1.2 1.3 1.4 1.5	AR 200-1	Class 3	FY15	$35,000
GIS	Update GIS database with natural resources layers. Include raw data to ensure that future maps are updated to meet needs and promote installation-wide ecosystem planning.	GIS 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3	Class 3	Annually	$100,000
Outdoor Recreation	Provide a minimum of 75-calendar big game/small-game hunter days and a minimum of 75 calendar non-consumptive recreation days.	OR 1 OR 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	Annually	$185,000 Annually
Outdoor Recreation	Where Fillmore Canyon trail enters Fort Bliss, close the trail and erect signs warning visitors of hazards. Land exchange with BLM should eventually negate this task.	OR 1 OR 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY15	$35,000
Outdoor Recreation	Install signs on Indian Hollow Trail at Fort Bliss boundary warning hikers of no entry policy and hazards.	OR 1 OR 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY15	$35,000
Outdoor Recreation	Construct hiking trails.	OR 1 OR 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY15 and FY16	$75,000 per year
Outdoor Recreation	Develop an Outdoor Recreation Management Plan.	OR 1 OR 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY15	$125,000
BASH/WASH	Develop and implement Bird/Wildlife Aircraft Strike Hazard plan	BH 1	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 0	Annually	$50,000 per year for FY14 – FY18
Wildland Fire Management	Develop an Integrated Wildland Fire Management Plan in accordance with federal and U.S. Army wildland fire policy. Efforts began in 2009 and should be complete in FY2015.	WM 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 0	FY15	$50,000

Wildland Fire Management	Create a Fire Decision Support System database that will provide information and GIS data on fire risk across the installation. Integrate this system with existing fire information database. Annually update and refine this database and make available to Range management and planning personnel.	WM 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	FY15	$105,000
Wildland Fire Management	Continue to participate in planning efforts with Fort Bliss Range management and planning personnel to determine fire hazards and mitigation techniques for existing and future infrastructure and mission activities in order to minimize fire risk.	WM 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	Annually	$25,000 Annually
Wildland Fire Management	Prescribe burn at least 500 acres per year in order to enhance wildlife habitat and improve vegetative conditions.	WM 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	Annually	$75,000 Annually
Wildland Fire Management	Construct and maintain a fuel break in the foothills between the Organ Mountains and the North Doña Ana Training areas to reduce the risk of catastrophic wildfire during periods of extreme fire danger.	WM 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	Annually	$30,000 per year for FY14 – FY17
Wildland Fire Management	Develop and implement a policy that establishes criteria under which natural fires are managed for resource benefits.	WM 1	1.1 1.2 1.3 1.4	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	FY15	$25,000
Wildland Fire Management	Collect fire history data from a variety of sources to update Fort Bliss fire history in the natural resources database	WM 1	1.1 1.2 1.3	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	FY15	$35,000
Training	Provide opportunities for natural resources personnel to attend National Wildfire Coordinating Group (NWCG) training courses.	TR 1	1.1	AR 200-1, AR 200-3, AR 420-9, DoDI 6055.6	Class 3	Annually	$30,000 Annually
Outreach and Education	Provide Fort Bliss personnel with guidance for compliance with all laws protecting wildlife.	OE 1 OE 2	1.1 1.2 2.1 2.2	MBTA, ESA, Sikes Act, AR 200-1	Class 0	Annually	$5,000 Annually

Outreach and Education	Install nest boxes and perches.	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY15	$20,000
Outreach and Education	Engage Fort Bliss employees, residents, and tenants in natural resources initiatives and conservation projects. Projects might include stream cleanups, building and maintaining bird boxes or watchable wildlife areas, riparian buffer plantings, stenciling storm drains, removing invasive species, and outdoor educational classes.	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	Annually	$15,000 Annually
Outreach and Education	Create and distribute educational materials (i.e. flyers, and interpretive signs) on Fort Bliss natural resources and the NR program in general. Target audiences include Fort Bliss employees, tenants, housing residents, and contractors.	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	Annually	$10,000 Annually
Outreach and Education	Establish Watchable Wildlife sites	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY 15	$25,000
Outreach and Education	Participate in local or regional commissions, initiatives, workshops, colloquiums, and conservation initiatives.	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	Annually	$45,000 Annually
Outreach and Education	Collaborate with government (local, state, federal) entities and NGOs to conduct projects on Fort Bliss that contribute to regional conservation initiatives.	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	Annually	$100,000 Annually
Outreach and Education	Create signs warning against feeding wildlife as habituation to humans may cause them to lose their natural fear of humans and may cause harm to humans and the need to exterminate the animal(s).	OE 1 OE 2	1.1 1.2 2.1 2.2	Sikes Act, AR 200-1	Class 3	FY 15	$2,000

APPENDIX D: Results of Planning Level Surveys

Results of Planning Level Surveys

Introduction

Army Regulation (AR) 200-1 requires installations to conduct planning level surveys (PLSs) to serve as the foundation for natural resources management planning and decision making. Further, AR 200-1 specifies that "PLSs, with the exception of flora, will be maintained electronically as geospatial data, and will be submitted to the geographic information system (GIS) database as they are updated. PLSs should be kept current according to an installation's specific needs, but at a minimum, will be reviewed and updated if necessary prior to the INRMP's revision" (DA 2007).

The proceeding eight sections define and discuss the results, status and needs of each of the PLS s.

Topography

At a minimum, this map shows elevation, elevation contours, and associated data consistent with USGS standards and topographic map products.

Needs: Survey complete.

Wetlands

At a minimum, this survey shall describe and map the distribution and extent of wetlands consistent with the statement of work (SOW) as defined in the Army/USFWS MOA.

Status: Wetland GIS Database was developed in 2009 (Lougheed et al. 2009). Wetland Delineation Surveys conducted 2009-2010 (GSRC, 2010) as well as Planning Level Surveys (Kidd et al. 2010, GSRC).

Needs: Survey complete.

Surface Waters

At a minimum, this survey describes and maps the distribution and extent of surface waters, consistent with USGS standards.

Status: Surveys have been conducted examining surface waters on Fort Bliss, more recently Playa Surveys (Hobert et al., 2008), Hydrology Datasets Verification (Garcia et al. 2008, Miratek)

Needs: Survey complete.

Soils

Soil associations present on Fort Bliss are summarized in Section 2.2.4, and can be found in county soil surveys (USDA, 1971; 1980; 1981).

Needs: Survey complete.

Flora

At a minimum, this installation-wide vascular plant survey produces a list of plant species with verified nomenclature, classification and annotation compatible with the USDA/NRCS Plant List of Accepted Nomenclature, Taxonomy, and Symbols (PLANTS).

Status: Over 1,218 plants have been documented that occur on Fort Bliss (Fort Bliss Natural Resource Database, 2013). There are over 533 plant species expected to occur on Fort Bliss, including potential for Kuenzler's Hedgehog Cactus (*Echinocereus fendleri* var. *kuezleri*).

Needs: As part of ongoing database maintenance, there is a need to update species status and nomenclature. Update the inventory with new records of any flora previously not documented on FBTC. Continue to survey documented species to determine population trends.

Vegetation Communities

At a minimum, this survey, including field data, shall describe and map the distribution and extent of plant alliances (alliances are characterized by a diagnostic species or group of diagnostic species usually occurring in the dominant and uppermost stratum; similar to cover type). Positional and classification accuracy shall be field checked.

Status: PLS Completed. Vegetation communities' classifications were documented in the Fort Bliss Natural Resources database, including Vegetation Community Mapping and Arroyo Vegetation Community Survey. (GSRC, 2011, 2012)

Needs: Monitor documented communities to determine ecosystem sustainability trends.

Threatened and Endangered Species

At a minimum, this survey shall produce a map that shows the kinds and known distribution of federally endangered, threatened, proposed, and candidate species occurring within the installation.

Status: Complete. Surveys for listed, candidate, and other sensitive species are documented in the Fort Bliss Natural Resources database. Monitoring efforts are underway each year using field methodologies appropriate for each of these species.

Needs: Prepare compendium of distribution maps and continue monitoring for listed, candidate, and other selected sensitive species.

Fauna

At a minimum, this survey, including field data, shall describe and map the distribution and extent of sensitive species (e.g., locally rare and keystone).

Status: In progress. Field survey data exist for many species but is not complete.

Needs: As part of ongoing database maintenance, there is a need to update species status and nomenclature. Update the database with new records of any fauna previously not documented on FBTC. Continue to survey documented species to determine population trends.

Invertebrates

Status: Invertebrates are documented, both aquatic and terrestrial, but incomplete. Further survey and monitoring for endemic snails in the Organ Mountains has been undertaken.

Needs: Continue to survey for invertebrates across vegetation communities on Fort Bliss.

Amphibians and Reptiles

Status: Reptile and Amphibian surveys are complete across Fort Bliss in a variety of vegetation communities, including verifying presence of Greater Short-horned Lizard *(Phrynosoma hernandesi)* on Otero Mesa.

Needs: Rock Rattlesnake is documented on Fort Bliss, but potential for subspecies is still unknown.

Birds

Status: Surveys are completed for Baird's Sparrow and Sprague's pipit, as well as surveys for Gray Vireo in the Sacramento Mountains. All species are documented on Fort Bliss. Draft Species Management Plans are complete for Baird's Sparrow, Sprague's pipit and gray vireo.

Needs: Continue surveys for potential and rare bird species, including the Northern aplomado falcon.

Mammals

Status: Surveys for Organ Mountain Colorado Chipmunk have been conducted in the Organ Mountains. PLS surveys for bats have been completed. Keystone species such as mule deer, pronghorn and rocky mountain elk have been surveyed for several years. Surveys for bats were conducted in 2008-2009 (Zia Environmental and Engineering, 2010).

Needs: Continue monitoring rare and keystone species, such as the Organ Mountain Chipmunk and Black-tailed Prairie Dog Colonies. Long-term monitoring of bats is to continue.

Threatened and Endangered Species and Species of Concern are identified in Table D-1. Status is determined as Threatened (T), Endangered (E), and Species of Concern (SC) and identified at the Federal Level (Fed), and further identified at each state level, Texas (TX) and New Mexico (NM) if applicable.

Table D-1 Needs and Status of Threatened and Endangered Species on Fort Bliss

Species	Status	Year Surveyed	Status	Needs
Plants				
Alamo Beardtongue (*Penstemon alamosensis*)	SC-NM; SGCN-TX	2010 (Gulf South Research Corporation, 2010)	Populations show decline throughout its range.	Continue monitoring, Develop a recovery plan for declining populations.
Crested Coral-Root (*Hexalectris spicata*)	E-NM			Species exists on Fort Bliss. (Corral Communication 2013)
Desert Night Blooming Cereus (*Peniocereus greggii var. greggii*)	E-NM; SGCN-TX	2010-2011 (Gulf South Research Corporation, 2011)	Known habitat and potential habitat has been surveyed.	Continue to monitor plants in heavily used area. Plants were relocated and there is a need to monitor to see if they survived relocation.
Hueco Mountains Rock Daisy (*Perityle cernua*)	SGCN-TX	2010 (Gulf South Research Corporation, 2010)	Increasing in Population	Monitoring should continue
Kuenzler hedgehog cactus (*Echinocereus fendleri var. kuenzleri*)	E-Fed; E-NM	2011 (Gulf South Research Corporation, 2011)	None were observed	Continue surveying potential habitats on Fort Bliss.
Nodding Cliff Daisy (*Perityle cernua)*	SC-NM	2010 (Gulf South Research Corporation, 2010)	Decrease in population	Continue monitoring populations
Organ Mountain Paintbrush *(Castilleja organorum)*	SC-NM	2012 (Gulf South Research Corporation)	Plants were identified on Fort Bliss	Species survey recommended

Organ Mountains Evening Primrose (*Oenothera organensis*)	SC-NM	2010 (Gulf South Research Corporation, 2010)	Species is present on fort Bliss	Continue species survey
Organ Mountains Figwort (*Scrophularia laevis*)	SC-NM	2010 (Gulf South Research Corporation, 2010)	Population shows decline	Continue monitoring, Develop a recovery plan for declining populations.
Organ Mountains Pincushion cactus (*Escobaria organensis*)	E-NM	2010-2011(Gulf South Research Corporation, 2011)	Plants were sampled for Genetic Analysis	Pending genetic analysis. Population Survey needed
Sand Prickly Pear (Opuntia arenaria)	E-NM; SGCN-TX			Survey's have been conducted on the most Southern portions of Fort Bliss Training Center. No Plants were detected (Corral Communication 2013)
Sandhill goosefoot (*Chenopodium cycloides*)				Species is known to exist on Fort Bliss (Corral Communication 2013)
Sneed's Pincushion Cactus (*Coryphantha Sneedii var. Sneedii)*	E-Fed; E-NM; E,SGCN-TX	2011 (Gulf South Research Corporation, 2011)	Populations show decline	Pending genetic data for Rattlesnake Ridge Population. Genetic studies are to confirm the identity of some monitored specimens. Continue to survey for additional populations.
Standley whitlowgrass (*Draba standleyi*)	SC-NM; SGCN-TX	2011 (Gulf South Research Corporation, 2011)	No Populations were observed	Recovery plan is recommended for areas where populations once existed.

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Species	Status	Year Surveyed	Status	Needs
Invertebrates				
Anthony Blister Beetle (*Lytta mirifica*)	SGCN - NM	NA	NA	Surveys are needed. This species is considered Extirpated/possibly extirpated in Doña Ana County NM and El Paso County TX

Franklin Mountain Talus Snail (*Sonorella metcalfi*)	SGCN-NM; SGCN - NM	NA	NA	Population Surveys are needed
Los Olmos Tiger Beetle (*Cicindela nevadica olmosa*)	SGCN - NM; SGCN-TX	NA	NA	Surveys are needed.

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Species	Status	Year Surveyed	Status	Needs
Amphibians & Reptiles				
Gray-banded kingsnake (*Lampropeltis alterna*)	E, SGCN-NM	2003-2005 (Hartsough et al. 2007)	Expected to occur	Continued survey and monitoring, habitat conditions are suitable
Mottled Rock Rattlesnake (*Crotalus lepidus lepidus*)	T, SGCN - NM	2003-2005 (Hartsough et al. 2007)	Subspecies not identified in this survey.	Consult with Herpetologist to determine if subspecies presence on Ft. Bliss is possible
Mountain short-horned lizard (*Phrynosoma hernandezii hernandezii*)	T, SGCN-TX	2003-2005 (Hartsough et al. 2007)	Known to occur	Continued survey and monitoring
Texas Horned Lizard (*Phrynosoma cornutum*)	T, SGCN-TX	2003-2005 (Hartsough et al. 2007)	Species was Observed	
Texas lyre snake (*Trimorphodon biscutatus vilkinsoni*)	T, SGCN-TX	2003-2005 (Hartsough et al. 2007)	Species was Observed	Continued survey and monitoring

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Species	Status	Year Surveyed	Status	Needs
Birds				
Baird’s Sparrow (Ammodramus bairdii)	T,SGCN-NM; SGCN-TX	2011 (GSRC Aplomado Survey)	Species was Observed	Continue Survey and Monitoring.

Bald Eagle (Haliaeetus leucocephalus)	T,SGCN -NM; T,SGCN -TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 71 sightings are documented in the Natural Resource Database. Continue Survey and Monitoring.
Bell's Vireo (Vireo bellii)	T,SGCN -NM; T,SGCN -TX	2011 (GSRC Aplomado Survey)	Species was Observed	Continue Survey and Monitoring.
Costa's Hummingbird (Calypte costae)	T,SGCN -NM		None Observed in recent PLS	No records exist for this species, expected to migrate through
Ferruginous hawk (Buteo regalis)	SGCN-NM; SC, SGCN - TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 162 sightings are documented in the Natural Resource Database. Continue Survey and Monitoring.
Gray Vireo (Vireo vicinior)	T,SGCN -NM	2011 (Griffin et al. 2012)	Species was Observed	Recommended to continue monitoring nesting sites. Continue Survey and Monitoring.
Interior least tern (Sterna antillarum athalassos)	E-Fed; E,SGCN -NM; E, SGCN-TX		None Observed in recent PLS	Expected to migrate through? Breeds along lower Rio Grande and Pecos River in SE NM. Determine suitable habitat on Fort Bliss, Survey.
Loggerhead Shrike (Lanius ludovicianus)	S,SGCN -NM; SC, SGCN-TX	2011 (GSRC Aplomado Survey)	Species was Observed	Continue Survey and Monitoring.
Mexican Spotted Owl (Strix occidentalis lucida)	T-Fed; S, SGCN-NM; T, SGCN-TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 1 sighting is documented in the Natural Resource Database. The species was sighted on WSMR near boundary with Ft. Bliss. Continue Survey and Monitoring.
Northern Aplomado Falcon (Falco femoralis septentrionalis)	E-Fed; E,SGCN -NM; E, SGCN-TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 1 unconfirmed sighting is documented in the Natural Resource Database, near Escondida Tank. Confirm sighting, Survey.
Northern Goshawk (Accipiter gentilis)	S, SGCN-NM	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 16 sightings are documented in the Natural Resource Database. Continue Survey and Monitoring.
Peregrine falcon (Falco peregrines anatum)	T, SGCN-NM; T, SGCN-TX	2011 (Griffin et al. 2012) 2011 (GSRC)	Species was Observed	

Piping Plover (Charadius melodus)	T-Fed; T-NM; T, SGCN-TX		None Observed in recent PLS	
Southwestern Willow Flycatcher (Empidonax trailii extimus)	E-Fed; E,SGCN-NM; E-TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 5 sightings are documented in the Natural Resource Database. Continue Survey and Monitoring.
Sprague's Pipit (Anthus spragueii)	C, T/E - Fed; SGCN-NM; SC, SGCN-TX	(Gulf South Research Corporation, 2013)	Species was Observed	Monitor species.
Varied Bunting (Passerina versicolor)	T,SGCN-NM	2011 (Griffin et al. 2012)	Species was Observed	Continue Survey and Monitoring.
Western Burrowing Owl (Athene cunicularia)	SGCN-NM; SC, SGCN-TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 81 sightings are documented in the Natural Resource Database. Continue Survey and Monitoring.
Yellow-billed cuckoo (Coccyzus americanus)	C-Fed; S, SGCN-NM; SC, SGCN-TX	2012 (Griffin et al. 2012)	Species was Observed	Continue Survey and Monitoring.
Zone-tailed hawk (Buteo albonotatus)	T, SGCN-TX	(FortBlissNaturalResource Database, 2013)	None Observed in recent PLS	As of 2013, 2 sightings are documented in the Natural Resource Database. Continue Survey and Monitoring.

Species	**Status**	**Year Surveyed**	**Status**	**Needs**
		Mammals		
Arizona black-tailed prairie dog (Cynomys ludovicianus arizonensis)	S, SGCN-NM; SGCN-TX	2003 (La Tierra Environmental Consulting)	Species was detected	Periodic Surveys recommended to identify new colonies and determine dispersal characteristics (La Tierra, 2003)
Big free-tailed bat (Nyctinomops macrotis)	S-NM; SGCN-TX	2008-2009 (Zia Environmental & Engineering, 2010)	Species was detected	Long-Term Monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan.

Cave myotis (Myotis velifera)	S-NM; SC-TX	2008-2009 (Zia Environmental & Engineering, 2010)	Not detected.	
Desert Bighorn Sheep (Ovis Canadensis mexicana)	SGCN-NM	1991 (Dunn and Haussamen, NMDGF)	Not detected	Though no species was detected this report evaluated and found suitable habitat for this species to possibly exist in the Organ Mountains, either naturally or through re-introduction programs.
Fringed myotis (Myotis thysanodes)	S-NM; SGCN-TX	2008-2009 (Zia Environmental & Engineering, 2010)	Species was detected	Long-Term Monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan.
Gray-footed Chipmunk (Neotamias canipes)	S-NM; SGCN-TX	2010 (Hartsough and Burkette, Zia Environmental & Engineering)	Species was detected	Continued monitoring and surveying recommended in the Sacramento Mountains.
Long-legged myotis (Myotis volans)	S-NM; SGCN-TX	2008-2009 (Zia Environmental & Engineering, 2010)	Species was detected	Long-Term Monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan.
Occult little brown bat (Myotis occultus)	S,SGCN-NM	2008-2009 (Zia Environmental & Engineering, 2010)	Species was detected	Long-Term Monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan.
Organ Mountain Colorado Chipmunk (Neotamias quadrivittatus australis)	T-NM	2006-2007 (Hobert et al. 2008)	Species was detected.	Long-Term Monitoring. Habitat management.
Spotted Bat (Euderma maculatum)	T,SGCN-NM; T, SGCN-TX	2008-2009 (Zia Environmental & Engineering, 2010)	Species was detected	Long-Term Monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan.

Townsend's pale big-eared bat (Corynorhinus townsendii pallescens)	S-NM	2008-2009 (Zia Environmental & Engineering, 2010)	Species was detected	Long-Term Monitoring of bats should include conservation of roosting sites, foraging areas, and water resources, as well as developing a White-nose Syndrome (WNS) Readiness and Response Plan.
Yuma myotis (Myotis yumanensis)	S-NM; SGCN-TX	2008-2009 (Zia Environmental & Engineering, 2010)	Not detected	

A. Baseline List of Flora

Division I: Ascomycota

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	SubSpecies_Author	Presence
1	Ascomycota	Ascomycetes	Graphidales	Thelotremataceae	Diploschistes	scruposus	(Schreb.) Norm.			Crater lichen		Expected
2	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Acarospora	badiofusca	(Nyl.) Th. Fr.			Cracked lichen		Known
3	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Acarospora	fuscata	(Schrad.) Arn.			Cracked lichen		Known
4	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Acarospora	glaucocarpa	(Ach.) Korber			Cracked lichen		Known
5	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Acarospora	schleicheri	(Ach.) A. Massal			Schleicher's cracked lichen		Known
6	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Acarospora	smaragdula	(Wahlenb.) A. Massal.			Cracked lichen		Known
8	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Pleopsidium	chlorophanum	(Wahlenb.) Zopf			Cracked lichen		Expected
9	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Sarcogyne	clavus	(DC.) Krempelh			Sarcogyne lichen		Known
10	Ascomycota	Ascomycetes	Lecanorales	Acarosporaceae	Sarcogyne	regularis	Korber			Sarcogyne lichen		Known
11	Ascomycota	Ascomycetes	Lecanorales	Bacidiaceae	Speerschneidera	euploca	(Tuck.) Trevisan			Speerschneidera lichen		Expected
12	Ascomycota	Ascomycetes	Lecanorales	Candelariaceae	Candelaria	concolor	(Dickson) B. Stein			Lemon lichen		Expected
13	Ascomycota	Ascomycetes	Lecanorales	Candelariaceae	Candelariella	deflexa	(Nyl.) Zahlbr.			Deflexed eggyolk lichen		Known
14	Ascomycota	Ascomycetes	Lecanorales	Candelariaceae	Candelariella	rosulans	(Mull. Arg.) Zahlbr.			Eggyolk lichen		Expected
15	Ascomycota	Ascomycetes	Lecanorales	Candelariaceae	Candelariella	subdeflexa	(Nyl.) Lettau			Eggyolk lichen		Expected
16	Ascomycota	Ascomycetes	Lecanorales	Candelariaceae	Candelina	submexicana	(de Lesd.) Poelt			Candelina Lichen		Expected
17	Ascomycota	Ascomycetes	Lecanorales	Catillariaceae	Toninia	ruginosa	(Tuck.) Herre			Bruised lichen		Expected
18	Ascomycota	Ascomycetes	Lecanorales	Catillariaceae	Toninia	sedifolia	(Scop.) Timdal			Bruised lichen		Expected
19	Ascomycota	Ascomycetes	Lecanorales	Cladoniaceae	Cladonia	coniocraea	(Floerke) Sprengel			Cup lichen		Expected
20	Ascomycota	Ascomycetes	Lecanorales	Cladoniaceae	Cladonia	pyxidata	(L.) Hoffm.			Cup lichen		Expected
21	Ascomycota	Ascomycetes	Lecanorales	Coccocarpiaceae	Coccocarpia	palmicola	(Sprengel) Arv. & D. J. Galloway			Coccocarpia lichen		Expected
22	Ascomycota	Ascomycetes	Lecanorales	Coccocarpiaceae	Spilonema	revertens	Nyl.			Spilonema lichen		Expected
23	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Collema	coccophorum	Tuck.			Jelly lichen		Known
24	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Collema	conglomeratum	Hoffm.			Conglomerate jelly lichen		Expected
25	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Collema	furfuraceum	(Arnold) DuRietz			Jelly lichen		Expected
26	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Collema	polycarpon	Hoffm.			Jelly lichen		Known
27	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Collema	tenax	(Sw.) Ach.			Jelly lichen		Known
28	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Collema	texanum	Tuck.			Texas jelly lichen		Known
29	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Leptogium	denticulatum	Tuck.			Toothed skin lichen		Known
30	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Leptogium	furfuraceum	(Harm.) Sierk			Skin lichen		Expected
31	Ascomycota	Ascomycetes	Lecanorales	Collemataceae	Leptogium	saturninum	(Dickson) Nyl.			Saturn skin lichen		Known
32	Ascomycota	Ascomycetes	Lecanorales	Heppiaceae	Heppia	lutosa	(Ach.) Nyl.			Heppia		Known

33	Ascomycota	Ascomycetes	Lecanorales	Hymeneliaceae	Aspicilia	caesiocinerea	(Nyl.ex Malbr.)Arnold			Rimmed lichen		Known
34	Ascomycota	Ascomycetes	Lecanorales	Hymeneliaceae	Aspicilia	desertorum	(Kremp.) Mereschk.			Desert aspicilia		Known
35	Ascomycota	Ascomycetes	Lecanorales	Hymeneliaceae	Lobothallia	alphoplaca	(Wahlenb.) Hafellner			Lobothallia		Known
36	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	carpinea	(L.) Vainio			Rim lichen		Expected
37	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	chlarotera	Nyl.			Rim lichen		Known
38	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	garovaglii	(Korb.) Zahlbr.			Garovagi's rim lichen		Expected
39	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	impudens	Degelius			Rim lichen		Expected
40	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	muralis	(Schreb.) Rabenh.			Rim lichen		Known
41	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	saligna	(Schrad.) Zahlbr.			Rim lichen		Known
42	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	symmicta	Ach.			Rim lichen		Expected
43	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecanora	valesiaca	(Mull. Arg.) Stizenb.			Rim lichen		Known
44	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecidella	euphorea	(Florke) Hertel			Lecidella lichen		Known
45	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Lecidella	stigmatea	(Ach.) Hertel & Leuckert			Leicidella lichen		Known
46	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Omphalora	arizonica	(Tuck. ex Willey)T. Nash & Hafellner			Arizona omphalora		Not Applicable
47	Ascomycota	Ascomycetes	Lecanorales	Bacidiaceae	Tephromela	atra	(Huds.) Hafellner			Lichen tephromela		Known
48	Ascomycota	Ascomycetes	Lecanorales	Pannariaceae	Fuscopannaria	leucophaea	(Vahl) P.M. Joergensen			Fuscopannaria lichen		Expected
49	Ascomycota	Ascomycetes	Lecanorales	Pannariaceae	Pannaria	tavaresii	P.M. Joergensen			Tavares' matted lichen		Expected
50	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Parmelia	saxatilis	(L.) Ach.			Shield lichen		Expected
51	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Flavoparmelia	baltimorensis	(Gyelnik & Foriss) Hale			BaltimoreFlavoparmelia lichen		Expected
52	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Flavoparmelia	caperata	(L.) Hale			Flavoparmelia lichen		Known
53	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Flavopunctelia	flaventior	(Stirton) Hale			Flavopunctelia Lichen		Known
54	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Flavopunctelia	praesignis	(Nyl.) Hale			Flavopunctelia Lichen		Expected
55	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Flavopunctelia	soredica	(Nyl.) Hale			Flavopunctelia Lichen		Known
56	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Melanelia	elegantula	(Zahlbr.) Essl.			Elegant Melanelia lichen		Expected
57	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Melanelia	fuliginosa	(Fr. ex Duby) Esslinger			Melanelia lichen		Expected
58	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Melanelia	subolivacea	(Nyl.) Essl.			Melanelia lichen		Known
59	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Melanelia	tominii	(Oksner) Essl.			Melanelia		Known
60	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Parmotrema	praesorediosum	(Nyl.) Hale			Parmotrema lichen		Known
61	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Pseudevernia	intensa	(Nyl.) Hale & W.L. Culb.			Intense light and dark lichen		Expected
62	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Punctelia	bolliana	(Mull. Arg.) Krog.			Lichen		Expected
63	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Punctelia	perreticulata	(Ras.) G. Wilhelm & Ladd			Punctelia		Known
64	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Punctelia	rudecta	(Ach.) Krog			Punctelia		Expected
65	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Punctelia	subrudecta	(Nyl.) Krog			Punctelia		Expected

66	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Rhizoplaca	chrysoleuca	(Sm) Zopf			Golden rimmed navel lichen		Known
67	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Rhizoplaca	melanophthalma	(DC. in Lam. & DC.) Leuck. & Poelt			Rimmed navel lichen		Known
68	Ascomycota	Ascomycetes	Lecanorales	Lecanoraceae	Rhizoplaca	peltata	(Ramond) Leuckert & Poelt			Pelate rimmed navel lichen		Known
69	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Rimelia	reticulata	(Taylor) Hale & Fletcher			Netted Rimelia lichen		Expected
70	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Tuckermannopsis	coralligera	(W.A Weber) W.A Weber			Tuckermannopsis		Expected
71	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Usnea	arizonica	Motyka			Arizona beard lichen		Expected
72	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Usnea	cavernosa	Tuck.			Cavern beard lichen		Expected
73	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Usnea	hirta	(L.) F.H. Wigg.			Beard lichen		Expected
74	Ascomycota	Ascomycetes	Lecanorales	Parmeliaceae	Xanthoparmelia	psoromifera	(Kurokawa) Hale			Xanthoparmelia lichen		Known
75	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Buellia	novomexicana	B. de Lesd.			New Mexico disc lichen		Expected
76	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Buellia	retrovertens	Tuck.			Disc lichen		Expected
77	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Buellia	spuria	(Schaerer) Anzi			Disc lichen		Expected
78	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Dimelaena	oreina	(Ach.) Norman			Mountain lichen		Expected
79	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Heterodermia	albicans	(Pers.) Swinscow & Krog.			Shield lichen		Known
80	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Heterodermia	rugulosa	(Kurokawa) Wetmore			Rugulose shield lichen		Known
81	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Phaeophyscia	cernohorskyi	(Nadv.) Essl.			Cernohorsky's wreath lichen		Known
82	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Phaeophyscia	constipata	(Norrl. & Nyl.) Moberg.			Wreath lichen		Known
83	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Phaeophyscia	hirsuta	(Mereschk.) Essl.			Hairy wreath lichen		Expected
84	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Phaeophyscia	hirtella	Essl.			Wreath lichen		Expected
85	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Phaeophyscia	kairamoi	(Vain.) Moberg			Kiliman's wreath lichen		Known
86	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Phaeophyscia	orbicularis	(Neck.) Moberg			Wreath lichen		Known
87	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	aipolia	(Ehrh. ex Humb.) Furnr.			Rosette lichen		Expected
88	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	albinea	(Ach.) Nyl.			Rosette lichen		Expected
89	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	biziana	(A. Massal.) Zahlbr.			Rosette lichen		Known
90	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	callosa	Nyl.			Rosette lichen		Known
91	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	dimidiata	(Arnold) Nyl.			Rosette lichen		Expected
92	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	magnussonii	Frey			Magnusson's rosette lichen		Expected
93	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	phaea	(Tuck.) J.W. Thomson			Rosette lichen		Expected
94	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physcia	stellaris	(L.) Nyl.			Stellaris rosette lichen		Expected
95	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physciella	nepalensis	(Poelt) Esslinger			Nepal physciella		Known
96	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physconia	elegantula	Esslinger			Frosted lichen		Expected
97	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physconia	enteroxantha	(Nyl.) Poelt			Frosted lichen		Expected
98	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physconia	muscigena	(Ach.) Poelt			Frosted lichen		Expected

99	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Physconia	perisidiosa	(Erichsen) Moberg			Frosted lichen		Expected
100	Ascomycota	Ascomycetes	Lecanorales	Physciaceae	Rinodina	conradii	Korber			Conrad's rinodina lichen		Known
101	Ascomycota	Ascomycetes	Lecanorales	Psoraceae	Psora	crenata	(Tayl.) Reinke			Crenate fishscale lichen		Known
102	Ascomycota	Ascomycetes	Lecanorales	Psoraceae	Psora	icterica	(Mont.) Mull. Arg.			Fishscale lichen		Known
103	Ascomycota	Ascomycetes	Lecanorales	Psoraceae	Psora	pseudorussellii	Timdal			False Russell's fishscale lichen		Expected
104	Ascomycota	Ascomycetes	Lecanorales	Ramalinaceae	Ramalina	pollinaria	(Westring) Ach.			Cartilage lichen		Expected
105	Ascomycota	Ascomycetes	Lecanorales	Ramalinaceae	Ramalina	sinensis	Jatta			Cartilage lichen		Expected
106	Ascomycota	Ascomycetes	Lecanorales	Rhizocarpaceae	Rhizocarpon	disporum	(Naeg. ex Hepp) Mull. Arg.			Map lichen		Expected
107	Ascomycota	Ascomycetes	Lecanorales	Umbilicariaceae	Lasallia	papulosa	(Ach.) Llano			Blistered naval lichen		Expected
108	Ascomycota	Ascomycetes	Lecanorales	Umbilicariaceae	Lasallia	papulosa	(Ach.) Llano W.A. Weber	ssp.	papulosa	Blistered naval lichen	(Ach.) W. A. W	Expected
109	Ascomycota	Ascomycetes	Lecanorales	Umbilicariaceae	Lasallia	pensylvanica	(Hoff.) Llano			Pensylvania Blistered naval		Expected
110	Ascomycota	Ascomycetes	Lecanorales	Umbilicariaceae	Umbilicaria	americana	Poelt & Nash			Navel lichen		Expected
111	Ascomycota	Ascomycetes	Lecanorales	Umbilicariaceae	Umbilicaria	cinereorufescens	(Schaerer) Frey			Navel lichen		Expected
112	Ascomycota	Ascomycetes	Lecanorales	Umbilicariaceae	Umbilicaria	phaea	Tuck.			Navel lichen		Expected
113	Ascomycota	Ascomycetes	Lichinales	Lichinaceae	Lichinella	nigritella	(Lettau) Moreno & Egea			Lichinella lichen		Expected
114	Ascomycota	Ascomycetes	Lichinales	Lichinaceae	Peccania	arizonica	(Tuck.) Herre			Arizona Peccania lichen		Known
115	Ascomycota	Ascomycetes	Lichinales	Lichinaceae	Phloeopeccania	major	Henssen & Weber			Lichen		Known
116	Ascomycota	Ascomycetes	Lichinales	Lichinaceae	Phylliscum	tenue	Henssen			Phylliscum lichen		Known
117	Ascomycota	Ascomycetes	Lichinales	Lichinaceae	Thyrea	girardii	(Dur. & Mart.) Bagl. & Car.			Girardii thyrea lichen		Known
118	Ascomycota	Ascomycetes	Lichinales	Lichinaceae	Thyrea	pulvinata	(Schaer.) A. Mass.			pulvinate thyrea lichen		Expected
119	Ascomycota	Ascomycetes	Lichinales	Peltulaceae	Peltula	euploca	(Ach.) Poelt			Peltula lichen		Known
120	Ascomycota	Ascomycetes	Lichinales	Peltulaceae	Peltula	michoacanensis	(de Lesd.) Wetmore (K-)			Peltula lichen		Expected
121	Ascomycota	Ascomycetes	Lichinales	Peltulaceae	Peltula	obscurans	(Nyl.) Gyelnik			Peltula lichen		Expected
122	Ascomycota	Ascomycetes	Peltigerales	Lobariaceae	Sticta	beauvoisii	Delise			Beauvois' spotted felt lichen		Expected
123	Ascomycota	Ascomycetes	Peltigerales	Nephromataceae	Nephroma	helveticum	Ach.			Swiss kidney lichen		Expected
124	Ascomycota	Ascomycetes	Peltigerales	Nephromataceae	Nephroma	parile	(Ach.) Ach.			Kidney lichen		Expected
125	Ascomycota	Ascomycetes	Peltigerales	Peltigeraceae	Peltigera	canina	(L..) Willd.			Felt lichen		Expected
126	Ascomycota	Ascomycetes	Peltigerales	Peltigeraceae	Peltigera	didactyla	(Withering) Laundon			Felt lichen		Expected
127	Ascomycota	Ascomycetes	Peltigerales	Peltigeraceae	Peltigera	elisabethae	Gyelnik			Elizabeth's felt lichen		Expected
128	Ascomycota	Ascomycetes	Peltigerales	Peltigeraceae	Peltigera	praetextata	(Florke ex Sommerf.) Zopf			Felt lichen		Known
129	Ascomycota	Ascomycetes	Peltigerales	Peltigeraceae	Peltigera	rufescens	(Weiss) Humb.			Felt lichen		Known
130	Ascomycota	Ascomycetes	Peltigerales	Placynthiaceae	Koerberia	biformis	Mass.			Koerberia lichen		Expected
131	Ascomycota	Ascomycetes	Peltigerales	Placynthiaceae	Placynthium	nigrum	(Hudson) S. Gray			Blackthread lichen		Known

132	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	arenaria	(Pers.) Mull. Arg.			Sandwort orange lichen		Expected
133	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	arizonica	H. Magn.			Arizona Orange lichen		Expected
134	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	cerina	(Ehrh. ex Hedwig) Th. Fr.			Orange lichen		Expected
135	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	chrysopthalma	Degel.			Orange lichen		Expected
136	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	citrina	(Hoffm.) Th. Fr.			Orange Lichen		Expected
137	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	flavorubescens	(Huds.) Laundon			Orange lichen		Expected
138	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	herbidella	(Hue) Magn.			Orange lichen		Expected
139	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	microphyllina	(Tuck.) Hasse			Orange lichen		Expected
140	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	modesta	(Zahlbr.) Fink			Orange lichen		Expected
141	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	ochraceofulva	(Muell. Arg.) Jatta			Lichen		Expected
142	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	pelodella	(Nyl.) Hasse			Orange lichen		Expected
143	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	rubelliana	(Ach.) Lojka			Orange lichen		Expected
144	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	saxicola	(Hoffm.) Nordin			Orange lichen		Expected
145	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Caloplaca	ulmorum	(Fink) Fink			Orange lichen		Expected
146	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Xanthoria	elegans	(Link) Th. Fr.			Elegant orange wall lichen		Expected
147	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Xanthoria	fallax	(Hepp.) Arnold			Orange wall lichen		Expected
148	Ascomycota	Ascomycetes	Teloschistales	Teloschistaceae	Xanthoria	montana	Lindblom			Orange wall lichen		Expected
149	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Catapyrenium	chilense	(Raesanen) Breuss			Earth lichen		Known
150	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Catapyrenium	lachneum	(Ach.) R. Sant.			Earth lichen		Expected
151	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Catapyrenium	lacinulatum	(Ach.) O. Breuss			Lichen		Known
152	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Catapyrenium	squamulosum	(Ach.) O. Breuss			Earth lichen		Expected
153	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Catapyrenium	tuckermanii	(Rav. ex Mont.) J. W. Thomson			Tuckerman's earth lichen		Expected
154	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Dermatocarpon	miniatum	(L.) W. Mann			Silverskin lichen		Known
155	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Endocarpon	pusillum	Hedwig			Chalice lichen		Expected
156	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Staurothele	drummondii	(Tuck.) Tuck.			Drummond's wart lichen		Known
157	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Staurothele	effigurata	J.W. Thomson			Wart lichen		Expected
158	Ascomycota	Ascomycetes	Verrucariales	Verrucariaceae	Staurothele	verruculosa	J.W Thomson			Wart lichen		Expected

Division II: Hepaticohyta (Liverworts)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
159	Hepaticophyta	Hepaticopsida	Jungermanniales	Cephaloziellaceae	Cephaloziella	divaricata	(Sm.)Schiffn.			Liverwort		Known
160	Hepaticophyta	Hepaticopsida	Jungermanniales	Cephaloziellaceae	Cephaloziella	divaricata	(Smith) Schiffner	var.	scabra	Liverwort	M. A. Howe	Known
161	Hepaticophyta	Hepaticopsida	Jungermanniales	Geocalycaceae	Chiloscyphus	pallescens	(Ehrh. ex Hoffm.)Dumort.			Liverwort		Expected

162	Hepaticophyta	Hepaticopsida	Jungermanniales	Geocalycaceae	Chiloscyphus	pallescens	(Ehrh.ex Hoffm.) Dumort.	var.	fragilis	Liverwort	(Roth.) K. Mull	Expected
163	Hepaticophyta	Hepaticopsida	Jungermanniales	Jubulaceae	Frullania	brittoniae	Evans			Liverwort		Expected
164	Hepaticophyta	Hepaticopsida	Jungermanniales	Jubulaceae	Frullania	eboracensis	Gott.			Liverwort		Expected
165	Hepaticophyta	Hepaticopsida	Jungermanniales	Jubulaceae	Frullania	inflata	Gott.			Liverwort		Known
166	Hepaticophyta	Hepaticopsida	Jungermanniales	Jubulaceae	Frullania	riparia	Hampe ex Lehm.			Liverwort		Known
167	Hepaticophyta	Hepaticopsida	Jungermanniales	Porellaceae	Porella	platyphylla	(L.) Pfeiff.			Liverwort		Known
168	Hepaticophyta	Hepaticopsida	Marchantiales	Aytoniaceae	Asterella	bolanderi	(Austin) Underwood			Liverwort		Expected
169	Hepaticophyta	Hepaticopsida	Marchantiales	Aytoniaceae	Mannia	fragrans	(Balb) Frye & L. Clark			Liverwort		Expected
170	Hepaticophyta	Hepaticopsida	Marchantiales	Aytoniaceae	Mannia	pilosa	(Hornem.) Frye & Clark			Liverwort		Expected
171	Hepaticophyta	Hepaticopsida	Marchantiales	Aytoniaceae	Plagiochasma	rupestre	(J.R. Forst & G.Forst.) Steph.			Liverwort		Known
172	Hepaticophyta	Hepaticopsida	Marchantiales	Aytoniaceae	Plagiochasma	wrightii	Sull.			Liverwort		Known
173	Hepaticophyta	Hepaticopsida	Marchantiales	Aytoniaceae	Reboulia	hemisphaerica	(L.) Raddi			Liverwort		Known
174	Hepaticophyta	Hepaticopsida	Marchantiales	Marchantiaceae	Marchantia	polymorpha	L.			Liverwort		Expected

Division III: Bryophyta (Mosses)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
175	Bryophyta	Bryopsida	Bryales	Bartramiaceae	Anacolia	laevisphaera	(Tayl.) Flow.			Anacolia moss		Known
176	Bryophyta	Bryopsida	Bryales	Bartramiaceae	Anacolia	menziesii	(Turn.) Paris	var.	menziesii	Menzies' anacolia moss		Known
177	Bryophyta	Bryopsida	Bryales	Bartramiaceae	Philonotis	fontana	(Hedw.) Brid.	var.	caespitosa	Low philonotis moss	(Jur.) Schimp.	Known
178	Bryophyta	Bryopsida	Bryales	Bartramiaceae	Philonotis	fontana				Philonotis moss		Known
179	Bryophyta	Bryopsida	Bryales	Bryaceae	Brachymenium	systylium	(C. Mull.) Jaeg.			Brachymenium moss		Expected
180	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	andicola	Hook.			Billarder's moss		Expected
181	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	billardieri	Schwaegrichen			Billarder's moss		Expected
182	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	capillare	Hedw.			Bryum moss		Known
183	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	cyclophyllum	(Schwaegr.) Bruch & Schimp.			Byrum moss		Expected
184	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	gemmiparum	De Not.			Bryum moss		Expected
185	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	lanatum	P. Beauv			Silvergreen bryum moss		Known
186	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	pallescens	Schleich. ex Schwaegr.			Bryum moss		Known
187	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	pseudotriquetrum	(Hedw.) G. Gaertn., Meyer & Scherb.			Common green bryum moss		Expected
188	Bryophyta	Bryopsida	Bryales	Bryaceae	Bryum	turbinatum	(Hedw.) Turner			Bryum moss		Expected
189	Bryophyta	Bryopsida	Bryales	Bryaceae	Leptobryum	pyriforme	(Hedw.) Wils			Leptobryum moss		Expected
190	Bryophyta	Bryopsida	Bryales	Bryaceae	Pohlia	elongata	Hedw.			Elongate pohlia moss		Expected
191	Bryophyta	Bryopsida	Bryales	Bryaceae	Pohlia	nutans	(Hedw.) Lindb.			Pohlia moss		Expected

192	Bryophyta	Bryopsida	Bryales	Bryaceae	Pohlia	wahlenbergii	(Web. & Mohr.) Andrews			Wahlenberg's pohlia moss		Expected
193	Bryophyta	Bryopsida	Bryales	Mniaceae	Mnium	arizonicum	Amann			Arizona calcareous moss		Expected
194	Bryophyta	Bryopsida	Bryales	Mniaceae	Plagiomnium	cuspidatum	(Hedw.) T. Kop.			Toothed plagiomnium moss		Expected
195	Bryophyta	Bryopsida	Bryales	Timmiaceae	Timmia	megapolitana	Hedw.			Timmia moss		Expected
196	Bryophyta	Bryopsida	Dicranales	Ditrichaceae	Ceratodon	purpureus	(Hedw.) Brid.			Ceratodon moss		Expected
197	Bryophyta	Bryopsida	Fissidentales	Fissidentaceae	Fissidens	bryoides	Hedw.			Bryoid fissidens moss		Known
198	Bryophyta	Bryopsida	Fissidentales	Fissidentaceae	Fissidens	exiguus	Sull.	var.	apiculatus	Bryoid fissidens moss	Grout	Expected
199	Bryophyta	Bryopsida	Fissidentales	Fissidentaceae	Fissidens	obtusifolius	Wils.			Obtuseleaf fissidens moss		Expected
200	Bryophyta	Bryopsida	Funariales	Funariaceae	Entosthodon	rubiginosus	(Williams) Grout			Entosthodon moss		Expected
201	Bryophyta	Bryopsida	Funariales	Funariaceae	Entosthodon	tucsonii	(E.B. Bartram.) Grout			Tucson entosthodon moss		Known
202	Bryophyta	Bryopsida	Funariales	Funariaceae	Funaria	apiculatopilosa	Card.			Apiculate funaria moss		Known
203	Bryophyta	Bryopsida	Funariales	Funariaceae	Funaria	flavicans	Michx.			Funaria moss		Expected
204	Bryophyta	Bryopsida	Funariales	Funariaceae	Funaria	hygrometrica	Hedw.			Funaria moss		Known
205	Bryophyta	Bryopsida	Funariales	Funariaceae	Funaria	muhlenbergii	Turn.			Muhlenberg's funaria moss		Known
206	Bryophyta	Bryopsida	Funariales	Funariaceae	Physcomitrium	pyriforme	(Hedw.) Hampe			Physcomitrium moss		Expected
207	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	alpestris	(Weber & Mohr) Schleicher ex Nees			Grimmia dry rock moss		Expected
208	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	anodon	Bruch & Schimp. in B.S.G.			Grimmia dry rock moss		Expected
209	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	arizonae	Ren. & Card.			Arizona dry rock moss		Known
210	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	laevigata	(Brid.) Brid.			Grimmia dry rock moss		Expected
211	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	ovalis	(Hedw.) Lindb.			Oval dry rock moss		Expected
212	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	pilifera	P. Beauv.			Grimmia dry rock moss		Expected
213	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	poecilostoma	Card & Seb. ex Seb			Grimmia dry rock moss		Expected
214	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	pulvinata	(Hedw.) Sm.			Pulvinate dry rock moss		Known
215	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Grimmia	trichophylla	Grev.			Grimmia dry rock moss		Known
216	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Jaffueliobryum	wrightii	(Sull. in Gray) Ther.			Wright's jaffueliobryum moss		Known
217	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Schistidium	apocarpum	(Hedw.) Bruch & Schimp. In B.S.G.			Schistidium moss		Known
218	Bryophyta	Bryopsida	Grimmiales	Grimmiaceae	Schistidium	rivulare	(Brid.) Podp.			Streamside schistidium moss		Known
219	Bryophyta	Bryopsida	Grimmiales	Ptychomitriaceae	Ptychomitrium	sinense				Ptychomitrium moss		Known
220	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Amblystegium	serpens	(Hedw.) Sxhimp. in B.S. P.			Amblystegium moss		Known
221	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Amblystegium	serpens	(Hedw.) Schimp	var.	juratzkanum	Juratzk's amblystegium moss	(Schimp) Rau &	Known
222	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Amblystegium	varium	(Hedw.) Lindb.			Amblystegium moss		Known
223	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Amblystegium	varium	(Hedw.) Jenn.			Hygroamblystegium moss		Known
224	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Campylium	sophyllum	(Brid.) J. Lange			Moss		Expected

225	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Cratoneuron	filicinum	(Hedw.) Spruce			Cratoneuron moss		Known
226	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Hygrohypnum	luridum	(Hedw.) Jenn.			Hygrohypnum moss		Known
227	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Leptodictyum	riparium	(Hedw.) Warnst.			Streamside leptrodictym moss		Known
228	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Leptodictyum	trichopodium	(Schulz) Warnst.			Leptodictyum moss		Known
229	Bryophyta	Bryopsida	Hypnales	Amblystegiaceae	Platydictya	jungermannioides	(Brid.) Crum			Jungermann's platydictya moss		Expected
230	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Brachythecium	albicans	(Hedw.) Schimp. in B.S.G.			Brachythecium moss		Expected
231	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Brachythecium	collinum	(Schleich. ex C. Muell.) Schimp. in			Brachythecium moss		Known
232	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Brachythecium	fendleri	(Sull.) Jaeg.			Fendler's brachythecium		Known
233	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Brachythecium	rivulare	Schimp in B.S.G.			Brachythecium moss		Expected
234	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Brachythecium	stereopoma	(Spruce ex Mitt.) Jaeg.			Brachythecium moss		Expected
235	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Eurhynchium	hians	(Hedw.) Sande-Lacoste			Eurhynchium moss		Expected
236	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Eurhynchium	pulchellum	(Hedw.) Jenn.			Eurhynchium moss		Expected
237	Bryophyta	Bryopsida	Hypnales	Brachytheciaceae	Rhynchostegium	serrulatum	(Hedw.) Jaeg.			Steerecleus moss		Expected
238	Bryophyta	Bryopsida	Hypnales	Fabroniaceae	Fabronia	ciliaris	(Brid.) Grid.			Fabronia moss		Known
239	Bryophyta	Bryopsida	Hypnales	Fabroniaceae	Fabronia	ciliaris	(Brid.) Brid.	var.	wrightii	Wright's fabronia moss	(Sull.) Buck	Known
240	Bryophyta	Bryopsida	Hypnales	Fabroniaceae	Fabronia	pusilla	Raddi			Fabronia moss		Expected
241	Bryophyta	Bryopsida	Hypnales	Hypnaceae	Homomallium	mexicanum	Card.			Mexican homomallium moss		Known
242	Bryophyta	Bryopsida	Hypnales	Hypnaceae	Homomallium	mexicanum	Card.	var.	mexicanum	Mexican homomallium moss		Known
243	Bryophyta	Bryopsida	Hypnales	Hypnaceae	Hypnum	cupressiforme	Hedw.			Hypnum moss		Expected
244	Bryophyta	Bryopsida	Hypnales	Hypnaceae	Isopterygium	pulchella	(Hedw.) Jaeg. & Sauerb.			Isopterygium moss		Expected
245	Bryophyta	Bryopsida	Hypnales	Hypnaceae	Taxiphyllum	deplanatum	(Bruch & Schimp. ex Sull.) Fleisch.			Taxiphyllum moss		Expected
246	Bryophyta	Bryopsida	Hypnales	Hypnaceae	Taxiphyllum	taxirameum	(Mitt.) Fleisch.			Taxiphyllum moss		Expected
247	Bryophyta	Bryopsida	Hypnales	Rhytidiaceae	Rhytidium	rugosum	(Hedw.) Kindb.			Rhytidium moss		Known
248	Bryophyta	Bryopsida	Leucodontales	Hedwigiaceae	Hedwigia	ciliata	(Hedw.) P. Beauv.			Ciliate hedwigia moss		Known
249	Bryophyta	Bryopsida	Leucodontales	Leskeaceae	Anomodon	attenuatus	(Hedw.) Hueb.			Anomodon moss		Expected
250	Bryophyta	Bryopsida	Leucodontales	Leskeaceae	Anomodon	rostratus	(Hedw.) Schimp.			Anomodon moss		Expected
251	Bryophyta	Bryopsida	Leucodontales	Leskeaceae	Lindbergia	brachyptera	(Mitt.) Kindb.			Lindbergia moss		Expected
252	Bryophyta	Bryopsida	Leucodontales	Leskeaceae	Lindbergia	mexicana	(Besch.) Card.			Mexican lindbergia moss		Expected
253	Bryophyta	Bryopsida	Leucodontales	Leskeaceae	Pseudoleskeella	radicosa	(Mitt.) Macoun & Kindb.			Pseudoleskea moss		Expected
254	Bryophyta	Bryopsida	Leucodontales	Leskeaceae	Pseudoleskeella	tectorum	(Funck ex Brid.) Kindb. in Broth			Pseudoleskeella moss		Expected
255	Bryophyta	Bryopsida	Leucodontales	Neckeraceae	Neckera	pennata	Hedw.			Neckera moss		Expected
256	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	alpestre	Hornsch. in B.S.G.			Orthotrichum moss		Expected
257	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	anomalum	Hedw.			Orthotrichum moss		Expected

258	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	cupulatum	Brid.			Orthotrichum moss		Expected
259	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	diaphanum	Brid.			Orthotrichum moss		Expected
260	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	hallii	Sull. & Lesq. in Sull			Hall's orthotrichum moss		Expected
261	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	pumilum	Sw.			Orthotrichum moss		Expected
262	Bryophyta	Bryopsida	Orthotrichales	Orthotrichaceae	Orthotrichum	rupestre	Schleich. ex Schwaegr.			Orthotrichum moss		Expected
263	Bryophyta	Bryopsida	Pottiales	Encalyptaceae	Encalypta	ciliata	Hedw.			Fringed candle snuffer moss		Expected
264	Bryophyta	Bryopsida	Pottiales	Encalyptaceae	Encalypta	vulgaris	Hedw.			Common candle snuffer moss		Known
265	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Bryoerythrophyllu	recurvirostre	(Hedw.) Chen			Bryoerythrophyllum moss		Expected
266	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Crossidium	aberrans	Holz. & Bartr.			Crossidium moss		Expected
267	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Crossidium	crassinerve	(DeNot) Jur.			Crossidium moss		Expected
268	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Didymodon	luridus	[Hornsch. in Spreng. (sensu Zander)]			Didymodon moss		Expected
269	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Didymodon	revolutus	(Card.) Williams			Revolute didymodon moss		Expected
270	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Didymodon	rigidulus	Hedw.			Rigid didymodon moss		Expected
271	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Didymodon	rigidulus	Hedw.	var.	gracilis	Rigid didymodon moss	(Schleich. ex H	Expected
272	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Didymodon	tophaceus	(Brid.) Lisa			Didymodon moss		Expected
273	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Didymodon	vinealis	(Brid.) Zander			Didymodon moss		Expected
274	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Gymnostomum	aeruginosum	Sm.			Gymnostomum moss		Expected
275	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Leptodontium	flexifolium	(With.) Hampe in Lindb.			Leptodontium moss		Expected
276	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Microbryum	davallianum				Moss		Known
277	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Microbryum	davallianum	(Sm.) Zand.	var.	conicum	Stark's pottia moss	(Schleich. ex S	Known
278	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Molendoa	sendtineriana	(Bruch & Schimp. in B.S.G.) Limpr.			Sendtner's moss		Expected
279	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Pottia	arizonica	Wareh.			Arizona pottia moss		Expected
280	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Pottia	arizonica	Wareh.	var.	mucronulata	Arizona pottia moss	Wareh.	Expected
281	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Pseudocrossidium	aureum	(Bartram) Zander			Pseudocrossidium moss		Expected
282	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Pseudocrossidium	crinitum	(Schultz) Zand.			Pseudocrossidium moss		Known
283	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Pterygoneurum	subsessile	(Brid.) Jur.			Sessile pterygoneurum		Expected
284	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	bartramii	(Steere in Grout) Zander			Bartram's tortula moss		Expected
285	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	inermis	(Bridel) Burch in Huebener			Tortula moss		Known
286	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	intermedia	Brid.			Tortula moss		Known
287	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	norvegica	Weber & Mohr			Norwegian tortula moss		Expected
288	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	obtusissima	(C. Mull.) Zand.			Obtuse tortula moss		Expected
289	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	pagorum	(Milde) Amann			Tortula moss		Expected
290	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	papillosa	(Wilsonin ex Spruce) Juratzka			Papillose tortula moss		Expected

291	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Syntrichia	ruralis	(Hedw.) Web. & Mohr			Tortula moss		Known
292	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Timmiella	anomala	Bruch & Schimp. in B.S.G.			Timmiella moss		Expected
293	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Tortula	euryphylla	Zand.			Wide leaf desmatodon moss		Known
294	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Tortula	guepinii	(B.S.G.) Broth.			Guepin's desmatodon moss		Known
295	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Tortula	muralis	Hedw.			Tortula moss		Expected
296	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Tortula	plinthobia	(Sull. & Lesq.) Broth.			Desmatodon moss		Expected
297	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Tortula	ruralis	(Hedw.) GMS			Tortula moss		Expected
298	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Trichostomum	crispulum	Bruch in F. Muell.			Trichostomum moss		Expected
299	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Weissia	andersoniana	Zand.			Anderson's weissia moss		Expected
300	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Weissia	condensa	(Voit) Lindb.			Condensed weissia moss		Known
301	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Weissia	controversa	Hedw.			Controversial weissia moss		Known
302	Bryophyta	Bryopsida	Pottiales	Pottiaceae	Weissia	ligulaefolia	(Bartr.) Grout			Ligule leaf weissia moss		Known

Division IV: Lycopodiophyta (Selaquinellas)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
303	Lycopodiophyta	Lycopodiopsida	Selaginellales	Sellaginellaceae	Selaginella	mutica	D. C. Eat. ex Underw.			Bluntleaf spikemoss		Known
304	Lycopodiophyta	Lycopodiopsida	Selaginellales	Sellaginellaceae	Selaginella	neomexicana	Maxon			New Mexico spikemoss		Known
305	Lycopodiophyta	Lycopodiopsida	Selaginellales	Sellaginellaceae	Selaginella	peruviana	D. C. Eat. ex Underw.			Bluntleaf spikemoss		Known
306	Lycopodiophyta	Lycopodiopsida	Selaginellales	Sellaginellaceae	Selaginella	rupincola	Underwood			Rockloving spikemoss		Known

Section V: Equisetophyta (Horsetails)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
307	Equisetophyta	Equisetophyta	Equisetales	Equisetaceae	Equisetum	laevigatum	A. Braun			Smooth horsetail		Known

Division VI: Pteridophytes (Ferns)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
308	Pteridophyta	Filicopsida	Polypodiales	Aspelniaceae	Asplenium	resiliens	Kunze			Black-stemmed spleenwort	Underwood	Expected
309	Pteridophyta	Filicopsida	Polypodiales	Aspelniaceae	Asplenium	trichomanes				Maidenhair spleenwort		Known
310	Pteridophyta	Filicopsida	Polypodiales	Aspelniaceae	Asplenium	trichomanes	L.	var.	trichomanes	Maidenhair spleenwort		Known
311	Pteridophyta	Filicopsida	Polypodiales	Dennstaedtiaceae	Pteridium	aquilinum	(L.) Kuhn in Decken	var.	pubescens	Hairy Bracken fern		Expected
312	Pteridophyta	Filicopsida	Polypodiales	Dennstaedtiaceae	Pteridium	aquilinum	(L.) Kuhn			Western brackenfern		Known
313	Pteridophyta	Filicopsida	Polypodiales	Dryopteridaceae	Cystopteris	reevesiana	Lellinger			Reeve's bladderfern		Known
314	Pteridophyta	Filicopsida	Polypodiales	Dryopteridaceae	Dryopteris	filix-mas	(L.) Schott			Male fern		Known

315	Pteridophyta	Filicopsida	Polypodiales	Dryopteridaceae	Phanerophlebia	auriculata	Underwood			Mexican holly fern		Known
316	Pteridophyta	Filicopsida	Polypodiales	Dryopteridaceae	Woodsia	neomexicana	Windham			New Mexico cliff fern		Known
317	Pteridophyta	Filicopsida	Polypodiales	Dryopteridaceae	Woodsia	plummerae	Lemmon			Plummer's cliff fern	(Maxon) Wind	Expected
318	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Adiantum	capillus-veneris	L.			Common maidenhair		Known
319	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Argyrochosma	limitanea	(Maxon) Windham			Southwestern false cloak fern		Known
320	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Argyrochosma	limitanea	(Maxon) Windham	var.	mexicanum	Southwestern false cloak fern		Known
321	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Argyrochosma	microphylla	(Mett. ex Kuhn) Windham			Small-leaf false cloak fern		Known
322	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Astrolepis	cochisensis	(Goodding) Benham & Windham			Cochise scaly cloak fern	(Lagasca ex Sw	Known
323	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Astrolepis	integerrima	(Hooker) Benham & Windham			Wavyleaf cloak fern		Known
324	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Astrolepis	sinuata	(Lagasca ex Swartz)			Bulb lipfern		Known
325	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Astrolepis	sinuata	(Lagasca ex Swartz) Benham & Windham	var.	sinuata	Wavy scaly cloak fern		Known
326	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Bommeria	hispida	(Mett. ex Kuhn) Underwood			Copper fern		Known
327	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	alabamensis	(Buckley) Kunze			Alabama lipfern		Known
328	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	bonariensis	(Willd.) Proctor			Golden lipfern		Known
329	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	eatonii	Baker			Eaton's lipfern		Expected
330	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	feei	Moore			Slender lipfern		Known
331	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	fendleri	Hook.			Fendler's lipfern		Expected
332	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	integerrima	(Hook.) Mickel			Wavy cloak fern		Known
333	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	lindheimeri	Hook.			Lindheimer's lipfern		Known
334	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	parvifolia	(R. Tryon) Mickel			Small-leaf false cloak fern		Known
335	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	tomentosa	Link			Woolly lipfern		Known
336	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	villosa	Davenp. ex Maxon			Scaly lipfern		Not Applicable
337	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	wootonii	Maxon			Beaded lipfern		Known
338	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Cheilanthes	wrightii	Hook.			Wright's lipfern		Known
339	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Notholaena	sinuata	(Lag. ex Stwart) Kaulf.	subsp.	sinuata	Wavy Scaly Cloakfern		Known
340	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Notholaena	standleyi	Maxon			Star cloak fern		Known
341	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Pellaea	atropurpurea	(L..) Link			Purple cliffbrake		Known
342	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Pellaea	intermedia	Mett. ex Kuhn			Intermediate cliffbrake		Known
343	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Pellaea	ternifolia	(Cav.) Link			Wright's cliffbrake		
344	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Pellaea	truncata	Goodd.			Spiny cliffbrake		
345	Pteridophyta	Filicopsida	Polypodiales	Pteridaceae	Pellaea	wrightiana	Hook.			Wright's cliffbrake	SubSpecies_A	Presence

Division VII: Coniferophyta (Pines)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
346	Coniferophyta	Pinopsida	Pinales	Cupressaceae	Juniperus	coahuilensis	(Martinez) Gaussen ex R. P. Adams			Redberry juniper		
347	Coniferophyta	Pinopsida	Pinales	Cupressaceae	Juniperus	deppeana	Steud.			Alligator juniper	SubSpecies_Au	Presence
348	Coniferophyta	Pinopsida	Pinales	Cupressaceae	Juniperus	monosperma	(Engelm.) Sarg.			One-seeded juniper		Known
349	Coniferophyta	Pinopsida	Pinales	Pinaceae	Abies	concolor	(Gord. & Glend.) Hildebr.			White fir		Not Applicable
350	Coniferophyta	Pinopsida	Pinales	Pinaceae	Pinus	edulis	Engelm.			Twoneedle pinyon		Known
351	Coniferophyta	Pinopsida	Pinales	Pinaceae	Pinus	ponderosa	P. & C. Lawson			Ponderosa pine	S. Wats.	Expected
352	Coniferophyta	Pinopsida	Pinales	Pinaceae	Pseudotsuga	menziesii	(Mirb.) Franco	var.	glauca	Rocky Mountain douglas-fir		Known
353	Coniferophyta	Pinopsida	Pinales	Pinaceae	Pseudotsuga	menziesii	(Mirbel) Franco			Rocky Mountains douglas-fir		Known

Division VIII: Gnetophyta (Ephedras)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
354	Gnetophyta	Gnetopsida	Ephedrales	Ephedraceae	Ephedra	aspera	Engelm. ex S. Wats.			Rough jointfir		Known
355	Gnetophyta	Gnetopsida	Ephedrales	Ephedraceae	Ephedra	nevadensis	(Engelm. ex Wats.) L. Benson	var.	aspera	Ephedra	(Michx.) Fern.	Known
356	Gnetophyta	Gnetopsida	Ephedrales	Ephedraceae	Ephedra	torreyana	Wats.			Torrey ephedra		Known
357	Gnetophyta	Gnetopsida	Ephedrales	Ephedraceae	Ephedra	torreyana	S. Wats.	var.	torreyana	Torrey's jointfir	(Rose) E.S. And	Not Applicable
358	Gnetophyta	Gnetopsida	Ephedrales	Ephedraceae	Ephedra	trifurca	Torr. ex S. Wats.			Longleaf jointfir		Known
												Known

Division IX: Magnoliophyta-Magnoliopsida (Dicots) — Expected

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
359	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Aletes	filifolius	Mathias, Constance & Theobald			Trans-Pecos indian parsley		Expected
360	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Cymopterus	acaulis	(Pursh) Raf.	var.	fendleri	Fendler's springparsley		Expected
361	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Cymopterus	acaulis				Plains springparsley		Expected
362	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Cymopterus	montanus	T.&G.			Mountain springparsley		Known
363	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Cymopterus	multinervatus	(Coult. & Rose) Tidestrom			Purplenerve springparsley		Expected
364	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Daucus	pusillus	Michx.			American wild carrot		Known
365	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Pseudocymopteru	montanus				Alpine false springparsley		Known
366	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Spermolepis	echinata	(Nutt. ex DC.) Heller			Bristly scaleseed		Expected
367	Magnoliophyta	Magnoliopsida	Apiales	Apiaceae	Spermolepis	inermis	(Nutt. ex DC.) Mathias & Constance			Red River scaleseed		Known
368	Magnoliophyta	Magnoliopsida	Aristolochiales	Aristolochiaceae	Aristolochia	wrightii	Seem.			Wright's dutchman's pipe		Known
369	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Achillea	millefolium	L.			Common yarrow		Known
370	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Achillea	millefolium	L.	var.	occidentalis	Western yarrow		Known

371	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Acourtia	nana	(Gray) Reveal & King			Dwarf desertpeony		Expected
372	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Acourtia	wrightii	(Gray) Reveal & King			Brownfoot		Expected
373	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Acroptilon	repens	(L.) DC.			Hardheads		Expected
374	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ageratina	herbacea	(Gray) King & H. E. Robins.			Fragrant snakeroot		Known
375	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ageratina	rothrockii	Gray			Rothrock's snakeroot		Expected
376	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ageratina	wrightii	(Gray) King & H. E. Robins.			Wright's snakeroot		Expected
377	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ambrosia	acanthicarpa	Hook.			Flatspine burr ragweed		Expected
378	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ambrosia	confertiflora	DC.			Weakleaf burr ragweed		Expected
379	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Aphanostephus	ramosissimus	DC.			Lazy daisy		Known
380	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Aphanostephus	ramosissimus	DC.	var.	humilis	Plains dozedaisy		Not Applicable
381	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Arctium	minus	Bernh.			Lesser burdock		Known
382	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Artemisia	carruthii	Wood ex Carruth			Carruth's sagewort		Known
383	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Artemisia	dracunculus	L.			Rough sagebrush		Known
384	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Artemisia	filifolia	Torr.			Sand sagebrush		Known
385	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Artemisia	franserioides				Ragweed sagebrush		Known
386	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Artemisia	ludoviciana	Nutt.			White sagebrush		Known
387	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Artemisia	neomexicana	Greene ex Rydb.			White sagebrush		Known
388	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baccharis	brachyphylla	Gray			Shortleaf baccharis		Known
389	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baccharis	pteronioides	DC.			Yerba del pasmo	(Vasey) Allred	Known
390	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baccharis	salicifolia	(Ruiz & Pavon) Pers.			Mule's fat	(Steud.) Vasey	Expected
391	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baccharis	salicina	Torr. & Gray			Great Plains false willow	(Steud.) Vasey	Known
392	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baccharis	sarothroides	Gray			Desertbroom		Known
393	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baccharis	wrightii	Gray			Wright's baccharis		Known
394	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bahia	absinthifolia	Benth.	var.	dealbata	Dealbata's bahia	(Nash) Allred	Expected
395	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bahia	absinthifolia	Benth.			Hairyseed bahia	(Vasey) Allred	Known
396	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bahia	dissecta	(Gray) Britt.			Ragleaf bahia		Known
397	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bebbia	juncea	(Benth.) Greene	var.	aspera	Rush bebbia	(Henr.) Allred	Known
398	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bahia	pedata	Gray			Bluntscale bahia		Not Applicable
399	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baileya	multiradiata	Harvey & Gray ex Gray			Desert marigold		Not Applicable
400	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Baileya	pleniradiata	Harvey & Gray ex Gray.	var.	multiradita	Woolly desert marigold		Known
401	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bebbia	juncea	(Benth.) Greene			Sweetbush		Expected
402	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Berlandiera	lyrata	Benth			Lyerleaf greeneyes		Known
403	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bidens	bigelovii	Gray			Bigelow's beggarticks		Expected

404	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Bidens	frondosa	L.			Devil's beggartick		Known
405	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	baccharidea	Gray			Resinleaf brickellbush	Herter	Not Applicable
406	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	californica	(T.& G.) Gray			California brickellbush		Expected
407	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	californica	(Torr. & Gray) Gray	var.	californica	California brickellbush	(Steud.) Allred	Expected
408	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	coulteri	Gray			Coulter's brickellbush		Known
409	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	eupatorioides	(L.) Shinners.			False boneset		Known
410	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	eupatorioides	(L.) Shinners	var.	chlorolepis	False boneset		Known
411	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	fendleri	Gray			Fendler's brickellbush		Known
412	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	grandiflora	(Hook.) Nutt.			Tasselflower brickellbush		Expected
413	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	laciniata	Gray			Splitleaf brickellbush		Known
414	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	lemmonii	Gray	var.	wootonii	Lemmon's brickellbush		Known
415	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	lemmonii	Gray			Lemmon's brickellbush		Known
416	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	parvula	Gray			Mt. Davis brickellbush		Known
417	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	rusbyi	Gray			Stinking brickellbush		Known
418	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Brickellia	venosa	(Woot. & Standl.) B. L. Robins.			Veiny brickellbush		Expected
419	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Calycoseris	wrightii	Gray			White tackstem		Expected
420	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Calyptocarpus	vialis	Less.			Straggler daisy		Known
421	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Carminatia	tenuiflora	DC.			Plumeweed		Known
422	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Carphochaete	bigelovii	Gray			Bigelow's bristlehead		Known
423	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Centaurea	melitensis	L.			Maltese star-thistle		Known
424	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chaenactis	stevioides	Hook. & Arn.			Steve's dustymaiden		Known
425	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chaetopappa	ericoides	(Torr.) Nesom			Rose heath		Known
426	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chloracantha	spinosa	(Benth.) Nesom			Spiny chloracantha		Known
427	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chrysactinia	mexicana	Gray			Damianita	(Link) Boivin	Expected
428	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chrysothamnus	baileyi	Woot. & Standl.			Bailey's rabbitbrush		Known
429	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chrysothamnus	pulchellus	(Gray) Greene			Southwestern rabbitbrush		Known
430	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Chrysothamnus	spathulatus	L. C. Anderson			Douglas rabbitbrush		Known
431	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Cirsium	neomexicanum	Gray	var.	neomexicanum	New Mexico thistle		Known
432	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Cirsium	neomexicanum	Gray			Thistle		Known
433	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Cirsium	ochrocentrum	Gray			Yellowspine thistle		Known
434	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Cirsium	undulatum	(Nutt.) Spreng.			Wavyleaf thistle		Expected
435	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Cirsium	undulatum	(Nutt.) Spreng.	var.	undulatum	Wavyleaf thistle		Known
436	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Clappia	suaedifolia	Gray			Fleshy clapdaisy		Known

437	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Conyza	bonariensis	(L.) Cronq.			Asthmaweed		Expected
438	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Conyza	canadensis	(L.) Cronq.			Canadian horseweed		Expected
439	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Cosmos	parviflorus	(Jacq.) Pers.			Southwestern cosmos		Known
440	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Dyssodia	papposa	(Vent.) A. S. Hitchc.			Fetid marigold		Known
441	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Eclipta	prostrata	(L.) L.			False daisy		Known
442	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Engelmannia	peristenia	Goodman & Lawson			Engelmann's daisy		Known
443	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ericameria	laricifolia	(Gray) Shinners			Turpentine bush		Known
444	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Erigeron	bellidiastrum	Nutt.	var.	arenarius	Sandwort daisy fleabane		Expected
445	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Erigeron	bellidiastrum	Nutt.			Western daisy fleabane		Expected
446	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Erigeron	colomexicanus	A. Nels.			Running fleabane		Expected
447	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Erigeron	divergens	Torry. & Gray			Spreading fleabane		Known
448	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Erigeron	divergens	Torr. 7 Gray	var.	divergens	Spreading fleabane		Known
449	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Erigeron	modestus	Gray			Plains fleabane	Vasey ex L. H.	Known
450	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Evax	verna	Raf.	var.	verna	Spring pigmycudweed		Known
451	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Evax	verna				Spring pygmycudweed		Expected
452	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Filago	californica	Nutt.			California cottonrose		Known
453	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Flaveria	campestris	J. R. Johnston			Alkali yellowtops		Known
454	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Flaveria	trinervia	(Spreng.) C. Mohr			Clustered yellowtops		Known
455	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Flourensia	cernua	DC.			American tarweed		Expected
456	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gaillardia	pinnatifida	Torr.			Red dome blanketflower		Not Applicable
457	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gaillardia	pulchella	Foug.			Firewheel	(J. G. Sm.) Barl	Known
458	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gaillardia	pulchella	Fong.	var.	pulchella	Firewheel		Known
459	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Galinsoga	parviflora	Cav.			Gallantsoldier		Known
460	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gnaphalium	canescens	DC.			Wright's cudweed		Known
461	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gnaphalium	stramineum	Kunth			Cottonbatting plant		Known
462	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Grindelia	nuda	Wood.	var.	aphanactis	Curlytop gumweed		Known
463	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Grindelia	nuda	Wood.			Curly-top gumweed		Known
464	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Grindelia	papposa	Nesom & Suh			Spanish gold		Known
465	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gutierrezia	microcephala	(Dc.) Gray			Threadleaf snakeweed		Known
466	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gutierrezia	sarothrae	(Pursh) Britt. & Rusby			Broom snakeweed		Known
467	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gutierrezia	sphaerocephala	A. Gray			Roundleaf snakeweed		Known
468	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Gymnosperma	glutinosum	(Spreng.) Less.			Gumhead	(Fourn.)J. Reed	Not Applicable
469	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Haploesthes	greggii	Gray.			False broomweed		Known

470	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helenium	microcephalum	DC.			Sneezeweed		Known
471	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	annuus	L.			Common sunflower		Known
472	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	ciliaris	DC.			Texas blueweed		Expected
473	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	laciniatus	Gray			Alkali sunflower	(Vasey) R. B. S	Expected
474	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	niveus	(Benth) Brandeg.			Showy sunflower		Expected
475	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	niveus	(Benth.) Brandegee	var.	canescens	Showy sunflower	(Vasey)Gould	Not Applicable
476	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	petiolaris	Nutt.			Plains sunflower		Known
477	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Helianthus	petiolaris	Nutt.	var.	fallax	Prairie sunflower		Known
478	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heliopsis	helianthoides	(L.) Sweet			Rough heliopsis		Known
479	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heliopsis	helianthoides	(L.) Sweet	var.	scabra	Rough heliopsis		Known
480	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterosperma	pinnatum	Cv.			Wingpetal		Known
481	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	canescens				Hoary false goldenaster	(Link) Arcang.	Known
482	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	fulcrata	(Greene) Shinners	var.	arizonica	Arizona false goldenaster		Known
483	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	fulcrata	(Green) Shinners			Goldenaster		Known
484	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	fulcrata	(Greene) Shinners	var.	senilis	Rockyscree false goldenaster		Known
485	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	subaxillaris	(Lam.) Britt. & Rusby			Camphorweed		Known
486	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	viscida				Cliff false goldenaster		Known
487	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	villosa	(Pursh) Shinners	var.	pedunculata	Hairy false goldenaster	(Lam.) N. Snov	Expected
488	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	villosa	(Pursh) Shinners	var.	villosa	Hairy false goldenaster		Known
489	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heterotheca	villosa	(Pursh) Shinners.	var.	hispida	Hairy false golden-aster		Known
490	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hieracium	fendleri	Schultz-Bip.			Yellow hawkweed		Known
491	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenoclea	monogyra	T. & G.			Burro-brush		Known
492	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenopappus	filifolius	Hook.	var.	cinereus	Fineleaf hymenopappus		Expected
493	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenopappus	filifolius	Hook.			Fine-leaf wolly white		Known
494	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenopappus	flavescens	Gray	var.	canotomentosu	Collegeflower		Known
495	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenopappus	flavescens	Gray			Woolly-white		Known
496	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenothrix	wislizeni	Gray			Trans-Pecos thimblehead		Expected
497	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenothrix	wrightii	Gray			Wright's thimblehead		Known
498	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenoxys	odorata	DC.			Western bitterweed		Known
499	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenoxys	quinquesquamata	Rydb.			Rincon rubberweed		Known
500	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenoxys	richardsonii	(Hook) Cockerell	var.	floribunda	Colorado rubberweed		Known
501	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenoxys	richardsonii	(Hook.) Cockll.			Pingue		Known
502	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hymenoxys	vaseyi	(Gray) Cockerell			Vasey's rubberweed		Known

503	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Isocoma	pluriflora	(Torr. & Gray)			Southern goldenbush		Known
504	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Isocoma	tenuisecta	Greene			Burroweed		Known
505	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Hedosyne	ambrosiifolia	(Gray) Gray			Ragweed marshelder		Known
506	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Leuciva	dealbata	Gray			Woolly marshelder		Expected
507	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Lactuca	serriola	L.			Prickly lettuce		Known
508	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Laennecia	coulteri	(Gray) Nesom			Conyza		Expected
509	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Laennecia	sophiifolia				Leafy marshtail		Known
510	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	asteroides	(Torr.) Greene			New Mexico tansyaster		Known
511	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	asteroides	(Torr.) Greene	var.	asteroides	New Mexico tansyaster		Known
512	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	blephariphylla	(Gray) Shinners			Texas tansyaster		Known
513	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	canescens	(Pursh) Gray	var.	glabra	Hoary tansyaster		Known
514	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	canescens	(Prush) Gray			Sand goldenweed		Known
515	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	gracilis	(Nutt.) Shinners			Slender goldenweed		Known
516	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	parviflora	Gray			Smallflower tansyaster		Known
517	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	pinatifida	(Hook) Shinners.	var.	pinatifida	Lacy tansy-aster		Known
518	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	pinnatifida	(Hook.) Shinners			Lacy tansyaster		Known
519	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Machaeranthera	tanacetifolia	(Kunth) Nees			Tansyleaf tansyaster		Known
520	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Malacothrix	fendleri	Gray			Fendler's desert dandelion		Expected
521	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Malacothrix	sonorae	W. S. Davis & Raven			Sonoran desert dandelion		Expected
522	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Melampodium	leucanthum	Torr. & Gray			Plains blackfoot		Known
523	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Microseris	lindleyi	(DC.) Nutt.			Lindley's silverpuffs		Known
524	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Microseris	linearifolia	(DC.) Sch. Bip.			Silver puffs		Expected
525	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Palafoxia	sphacelata	(Nutt. ex Torr.) Cory			Othake		Known
526	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Parthenium	confertum	Gray	var.	lyratum	Gray's feverfew		Known
527	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Parthenium	confertum	Gray			Lyreleaf parthenium		Known
528	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Parthenium	incanum	Kunth			Mariola		Known
529	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	angustifolia	Torr.			Narrowleaf pectis		Known
530	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	angustifolia	Torr.	var.	angustifolia	Narrowleaf pectis		Known
531	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	cylindrica	(Fern.) Rydh.			Sonoran cinchweed		Expected
532	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	filipes	Gray			Fivebract cinchweed		Expected
533	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	filipes	Harvey & Gray	var.	subnuda	Fivebract cinchweed		Known
534	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	papposa	Harvey & Gray	var.	grandis	Manybristle cinchweed		Known
535	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	papposa	Harvey & Gray			Many-bristle pectis		Expected

536	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pectis	prostrata	Cav.			Spreading cinchweed		Known
537	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pericome	caudata	Gray			Mountain tail-leaf		Expected
538	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Perityle	cernua				Organ Mountain rockdaisy		Known
539	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Perityle	coronopifolia	Gray			Crowfoot rockdaisy		Known
540	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Perityle	huecoensis	Powell			Hueco Mountains rockdaisy		Known
541	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Perityle	staurophylla	(Barneby) Shinners.			New Mexico rockdaisy		Known
542	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Perityle	staurophylla	(Barneby) Shinners	var.	staurophylla	New Mexico rockdaisy		Known
543	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pluchea	odorata	(L.) Cass.			Sweetscent		Known
544	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Porophyllum	gracile	Benth.			Slender poreleaf		Known
545	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Porophyllum	scoparium	Gray			Trans-Pecos poreleaf		Known
546	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Prenanthella	exigua	(Gray) Rydh.			Brightwhite		Known
547	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Psathyrotes	scaposa	Gray			Naked turtleback		Known
548	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Psilactis	asteroides	Gray			New Mexico tansyaster		Known
549	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Psilostrophe	tagetina	(Nutt.) Green	var.	cerifera	Hairy paperflower	(Nash)	Not Applicable
550	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Psilostrophe	tagetina	(Nutt.) Greene			Paper-flower		Known
551	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Psilostrophe	tagetina	(Nutt.) Greene	var.	tagetina	Woolly paperflower		Known
552	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Pyrrhopappus	pauciflorus	(D. Don) DC.			Smallflower desert-chicory		Known
553	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Rafinesquia	neomexicana	Gray			New Mexico plumeseed		Known
554	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ratibida	columnifera	(Nutt.) Woot. & Standl.			Upright prairie coneflower		Known
555	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Ratibida	tagetes	(James) Barnh.			Green prairie coneflower		Expected
556	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Sanvitalia	abertii	Gray			Albert's creeping zinnia	(Schumacher)	Expected
557	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Sartwellia	flaveriae	Gray			Threadleaf glowwort		Expected
558	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Schkuhria	anthemoidea				Wright's false threadleaf		Known
559	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Schkuhria	anthemoidea	(DC.) Coult.	var.	wrightii	Wright's false threadleaf		Known
560	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	douglasii	DC.	var.	longilobus	Threadleaf groundsel		Expected
561	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	eremophilus	Richards			Desert groundsel		Known
562	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	eremophilus	(Rydb.) Greenman	var.	kingii	King's Ragwort		Known
563	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	eremophilus	Richards.	var.	macdougalii	MacDougal's ragwort		Known
564	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	flaccidus	Less.	var.	douglasii	Douglas' ragwort		Known
565	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	flaccidus	Less.	var.	flaccidus	Threadleaf Ragwort		Known
566	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	flaccidus	Less.			Thread-leaf ragwort		Known
567	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	multicapitatus	Greenm.			Broomlike ragwort		Known
568	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	neomexicana				New Mexico groundsel		Expected

569	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	neomexicana	Gray	var.	neomexicana	New Mexico groundsel		Known
570	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	riddellii	Torr. & Gray			Riddell's ragwort		Known
571	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Senecio	vulgaris	L.			Old-man-in-the-spring		Known
572	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	canadensis				Shorthair goldenrod		Known
573	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	canadensis	L. Rydb.	var.	gilvocanescens	Shorthair goldenrod		Known
574	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	scabrida	DC.			Threenerve goldenrod		Known
575	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	velutina	Gray			Goldenrod		Expected
576	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	velutina	DC.			Threenerve goldenrod		Expected
577	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	wrightii	Gray			Wright's goldenrod		Expected
578	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Solidago	wrightii	Gray	var.	adenophora	Wright's goldenrod		Expected
579	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Sonchus	asper	(L.) Hill			Spiny sowthistle		Expected
580	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Sonchus	oleraceus	L.			Common sowthistle		Expected
581	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Stephanomeria	exigua	Nutt.			Annual mitra		Known
582	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Stephanomeria	exigua	Nutt.	var.	exigua	Small wirelettuce		Known
583	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Stephanomeria	pauciflora	(Torr.) A. Nels.			Brownplume wirelettuce		Expected
584	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Symphyotrichum	subulatum	(Michx.) Nesom			Eastern annual saltmarsh aster		Known
585	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Tagetes	micrantha	Cav.			Licorice marigold		Known
586	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Taraxacum	officinale	G. H. Weber ex Wiggers			Common dandelion		Known
587	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Tetradymia	filifolia	Greene			Threadleaf horsebrush		Known
588	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Tetraneuris	scaposa	(DC.) Greene	var.	scaposa	Clustered bitterweed		Known
589	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Tetraneuris	scaposa	(DC.) Greene.	var.	linearis	Stemmed four-nerve-daisy		Expected
590	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Tetraneuris	scaposa	(DC.) Greene			Stemmy four-nerve daisy		Known
591	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thelesperma	longipes	Gray			Longstalk greenthread		Expected
592	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thelesperma	megapotamicum	(Spreng.) Kuntze			Hopi tea greenthread		Known
593	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	acerosa	(DC.) Strother			Pricklyleaf dogweed		Known
594	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	aurea	(DC.) Greene			Manyawn dogweed		Expected
595	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	aurea	(Gray) Greene ex Britt.	var.	polychaeta	Manyawn pricklyleaf		Known
596	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	pentachaeta	(DC.) Small.	var.	belenidium	Five needle pricklyleaf		Expected
597	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	pentachaeta	(DC.) Small			Fiveneedle pricklyleaf		Known
598	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	pentachaeta	(DC.) Small	var.	pentachaeta	Fiveneedle pricklyleaf		Known
599	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	setifolia	Lag.			Texas pricklyleaf		Known
600	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Thymophylla	setifolia	Lag.	var.	radiata	Texas pricklyleaf		Known
601	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Townsendia	annua	Beaman			Annual townsend daisy		Known

602	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Townsendia	exscapa	(Richards.) Porter			Stemless townsend daisy		Known
603	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Tragopogon	dubius	Scop.			Yellow salsify		Known
604	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Trixis	californica	Kellogg			American threefold	(Rydb.) J. F. M	Known
605	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Verbesina	encelioides	(Cav.) Benth. & Hook.			Golden crownbeard		Known
606	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Heliomeris	longifolia	(M. E. Jones) Blake	var.	annua	Golden-eye		Known
607	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Viguiera	cordifolia	Gray			Heartleaf goldeneye		Known
608	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Viguiera	dentata	(Cav.) Spreng.			Toothleaf goldeneye		Known
609	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Viguiera	multiflora	(Nutt.)Blake			Showy goldeneye		Known
610	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Viguiera	stenoloba	Blake			Resin-bush		Expected
611	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Viguiera	stenoloba	Blake	var.	chihuahuensis	Skeleton goldeneye		Expected
612	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Xanthium	spinosum	L.			Spiny cocklebur	(Nutt.) LaFranl	Expected
613	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Xanthium	strumarium	L.	var.	canadense	Canada cockleburr		Known
614	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Xanthium	strumarium	L.			Cocklebur		Expected
615	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Zinnia	acerosa	(DC.) Gray			Desert zinnia		Known
616	Magnoliophyta	Magnoliopsida	Asterales	Asteraceae	Zinnia	grandiflora	Nutt.			Rocky Mountain zinnia		Expected
617	Magnoliophyta	Magnoliopsida	Campanulales	Campanulaceae	Triodanis	perfoliata				Clasping venus looking-glass		Expected
618	Magnoliophyta	Magnoliopsida	Campanulales	Campanulaceae	Triodanis	perfoliata	(L.) Nieuw.	var.	perfoliata	Clasping venus looking-glass		Expected
619	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Arabidopsis	thaliana	(L.) Heynh.			Mouseear cress		Expected
620	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Arabis	fendleri	(S. Wats.) Greene	var.	fendleri	Fendler's rockcress		Known
621	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Arabis	fendleri				Fendler's rockeress		Expected
622	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Arabis	perennans	S. Wats.			Perennial rockcress		Known
623	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Brassica	rapa	L.			Field mustard		Known
624	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Brassica	tournefortii	Gouan			Asian mustard		Known
625	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Capsella	bursa-pastoris	(L.) Medik.			Shepherd's purse	(Gray) Goodric	Expected
626	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Chorispora	tenella	(Pallas) DC.			Crossflower		Expected
627	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Descurainia	incana	Bernh. ex Fisch. & C. A. Mey.) Dorn			Mountain tansymustard		Known
628	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Descurainia	pinnata	(Walt.) Britt.			Western tansymustard		Expected
629	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Descurainia	pinnata	(Walt) Britt.	subsp.	halictorum	Western tansymustard		Known
630	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Descurainia	sophia	(L.) Webb ex Prant L.			Herb sophia		Known
631	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Dimorphocarpa	wislizeni	(Engelm.) Rollins			Tansy spectaclepod		Known
632	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Diplotaxis	tenuifolia	(L.) DC.			Perennial wallrocket		Expected
633	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Draba	cuneifolia	T. & G.			Draba whitlow grass		Known
634	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Draba	cuneifolia	Nutt. ex Torr. & Gray	var.	cuneifolia	Wedgeleaf draba		Known

635	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Draba	standleyi	J. F. MacBr. & Payson			Standley's draba	DC.	Expected
636	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Dryopetalon	runcinatum	Gray			Rockmustard		Known
637	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Eruca	vesicaria				Rocketsalad		Known
638	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Eruca	vesicaria	(L.) Cav.	var.	sativa	Rocketsalad		Expected
639	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Erysimum	capitatum	(Dougl. ex Hook.) Greene			Sanddune wallflower		Known
640	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Halimolobos	diffusa	(Gray) O. F. Schulz			Spreading fissurewort		Known
641	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	alyssoides	Gray var. angustifolia (C L Hitchc)			Mountain pepperweed		Known
642	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	alyssoides	Gray	var.	eastwoodiae	Mountain pepperweed		Known
643	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	alyssoides	Gray var. angustifolia (C L Hitchc)	var.	angustifolium	Mountain pepperweed		Known
644	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	lasiocarpum	Nutt.			Bladder-pod		Known
645	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	lasiocarpum	Nutt.	var.	wrightii	Wright's pepperweed	(Benth.) B. L. T	Known
646	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	latifolium	L.			Broadleaved pepperweed		Expected
647	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	montanum	Nutt.	var.	angustifolium	Mountain pepperwort		Known
648	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	montanum	Nutt.			Pepperweed		Known
649	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	oblongum	Small			Veiny pepperweed		Expected
650	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	virginicum	L.			Lentejilla		Known
651	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lepidium	virginicum	L.	var.	medium	Medium pepperweed		Known
652	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lesquerella	fendleri	(Gray) S. Wats.			Fendler's bladderpod		Expected
653	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lesquerella	gordonii	(Gray) Wats.			Gordon's bladderpod		Known
654	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lesquerella	gordonii	(Gray) S. Wats.	var.	gordonii	Gordon's bladderpod		Known
655	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Lesquerella	purpurea	(Gray) S. Wats.			Rose bladderpod		Known
656	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Matthiola	longipetala	(Vent.) DC.			Night scented stock		Known
657	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Nerisyrenia	camporum	(Gray) Greene			Mesa greggia		Known
658	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Nerisyrenia	linearifolia	(S. Wats.) Greene			White Sands fanmustard		Known
659	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Pennellia	micrantha	(Gray) Nieuwl.			Mountain mock thelypody	(Gray) Gray	Known
660	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Nasturtium	officinale	(L.) Hayek			Watercress		Known
661	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Rorippa	palustris	(L.) Bess.			Bog yellowcress		Known
662	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Schoenocrambe	linearifolia	(Gray) Rollins			Slimleaf plainsmustard	Greene	Known
663	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Selenia	disecta	(T. & G.)			Texas selenia		Known
664	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Sibara	grisea	Rollins			Marble Canyon winged rockcress		Known
665	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Sinapis	arvensis	L.			Charlock mustard	Harvey & Gray	Not Applicable
666	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Sisymbrium	irio	L.			London rocket		Known
667	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Sisymbrium	orientale	L.			Indian hedgemustard		Known

668	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Streptanthus	carinatus	C. Wright ex Gray	subsp.	arizonicus	Lyerleaf jewelflower		Known
669	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Streptanthus	carinatus	C. Wright ex Gray	subsp.	carinatus	Lyerleaf jewelflower		Expected
670	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Streptanthus	carinatus	Wright ex Gray			Twistflower		Known
671	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Thelypodiopsis	purpusii	(Brandeg.) Rollins			Purpus tumblemustard		Known
672	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Thelypodiopsis	vaseyi	(S. Wats. ex B. L. Robins.) Rollins			Las Vegas tumblemustard		Known
673	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Thelypodium	wrightii	Gray			Wright's thelypody		Known
674	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Thelypodium	wrightii	Gray	var.	wrightii	Wright's thelypody		Known
675	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Thlaspi	montanum	L.			Alpine pennycress	(Woot. & Stan	Known
676	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae	Thlaspi	montanum	L.	var.	fendleri	Fendler's pennycress		Known
677	Magnoliophyta	Magnoliopsida	Capparales	Capparaceae	Koeberlinia	spinosa	Zucc.	var.	spinosa	Allthorn		Known
678	Magnoliophyta	Magnoliopsida	Capparales	Capparaceae	Koeberlinia	spinosa	Zucc.			Crown-of-thorns		Known
679	Magnoliophyta	Magnoliopsida	Capparales	Capparaceae	Polanisia	dodecandra	(L.) DC.			Red-whisker clammyweed		Not Applicable
680	Magnoliophyta	Magnoliopsida	Capparales	Capparaceae	Polanisia	dodecandra	(L.) DC.	var.	trachysperma	Sandyseed clammyweed		Known
681	Magnoliophyta	Magnoliopsida	Capparales	Capparaceae	Polanisia	uniglandulosa	(Cav.) DC.			Mexican clammyweed		Known
682	Magnoliophyta	Magnoliopsida	Caryophyllales	Aizoaceae	Trianthema	portulacastrum	L.			Desert horsepurslane		Known
683	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Alternanthera	caracasana	Kunth			Washer woman		Known
684	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	acanthochiton	(Torr.) Sauer			Green stripe		Known
685	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	bigelovii	Uline & Bray			Bigelow's amaranth		Known
686	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	blitoides	S. Wats.			Mat amaranth		Known
687	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	crassipes	Schlecht.			Spreading amaranth		Known
688	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	fimbriatus	(Torr.) Benth.			Fringed amaranth		Known
689	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	hybridus	L.			Slim amaranth		Known
690	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	palmeri	S. Wats.			Carelessweed		Known
691	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	retroflexus	L.			Redroot amaranth		Expected
692	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Amaranthus	wrightii	S. Wats.			Wright's amaranth		Known
693	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Froelichia	arizonica	Thornb. ex Standl.			Arizona snakecotton		Expected
694	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Froelichia	floridana				Florida snakecotton		Known
695	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Froelichia	floridana	(Nutt.) Moq.	var.	campestris	Plains snakecotton		Expected
696	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Froelichia	gracilis	(Hook.) Moq.			Slender snakecotton		Expected
697	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Gomphrena	caespitosa	Torr.			Tufted globe amaranth		Known
698	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Gomphrena	nitida	Rothrock			Pearly globe amaranth		Known
699	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Guilleminea	densa				Cottonflower		Known
700	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Guilleminea	densa	(Willd.) Moq.	var.	aggregata	Small matweed		Known

701	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Iresine	heterophylla	Standl.			Standley's bloodleaf		Expected
702	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Tidestromia	lanuginosa	(Nutt.) Standl.			Woolly tidestromia		Expected
703	Magnoliophyta	Magnoliopsida	Caryophyllales	Amaranthaceae	Tidestromia	suffruticosa	(Torr.) Standl.			Shrubby honeysweet		Known
704	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Asclepias	asperula	(Dcne.) Woods.	var.	capricornu	Antilopehorns		Known
705	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Rhus	microphylla	Engelm. ex Gray			Littleleaf sumac		Known
706	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Rhus	trilobata	Nutt.			Skunkbush sumac		Expected
707	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Rhus	trilobata	Engler	var.	pilosissima	Skunkbush sumac		Known
708	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Rhus	virens	Lindh. ex Gray	var.	choriophylla	Evergreen sumac		Known
709	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Rhus	virens	Lindh. ex Gray	var.	virens	Evergreen sumac	(Greene) Neso	Expected
710	Magnoliophyta	Magnoliopsida	Caryophyllales	Anacardiaceae	Rhus	virens	Lindh. ex Gray			Fragant sumac		Known
711	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Ancistrocactus	uncinatus	(Gal.) L. Benson			Chihuahuan fishhook cactus		Known
712	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Ancistrocactus	uncinatus	(Galeotti) L. Benson	var.	wrightii	Turk's head		Known
713	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Peniocereus	greggii	Engelm.	var.	greggii	Nightblooming cereus		Known
714	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	macromeris	(Engelm.) Lem.			Nipple beehive cactus		Known
715	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	macromeris	(Engelm.) Lem.	var.	macromeris	Nipple beehive cactus	Raf.	Expected
716	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	organensis	A. D. Zimmerman			Organ Mountains foxtail cactus		Known
717	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	robustispina	(O. Ktze.) L. Benson	ssp.	scheeri	Scheer's beehive cactus		Known
718	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	robustispina	(Muhlenpfordt) L. Benson	ssp.	uncinata	Scheer's beehive cactus		Expected
719	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Escobaria	sneedii				Sneed pincushion cactus		Expected
720	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Escobaria	sneedii	(Britt. & Rose) Berger	var.	sneedii	Sneed's pincushion cactus		Known
721	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	strobiliformis	(Poselger) Moran	var.	strobiliformis	Cob cactus		Known
722	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Coryphantha	strobiliformis	(Poselger) Orcutt.			White column foxtail cactus		Known
723	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Escobaria	vivipara	(Nutt.) Britt. & Rose			Spinystar		Expected
724	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Escobaria	vivipara	(Nutt.) Britt. & Rose	var.	radiosa	Spinystar		Known
725	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocactus	horizonthalonius	Lem.	var.	horizonthaloniu	Devilshead		Known
726	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocactus	horizonthalonius	Lem.			Turk's head		Known
727	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	viridiflorus	(Engelm.) Backeb.	var.	chloranthus	Hedgehog cactus	(Rydb.) Nesom	Known
728	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	enneacanthus				Pitaya		Known
729	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	fendleri	Engelm.			Fendler echinocereus		Known
730	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	fendleri	Engelmann	var.	kuenzleri	Kuenzler's Hedgehog Cactus		Known
731	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	fendleri	(Engelm.) F. Seitz.	var.	rectispinus	Pinkflower hedge hog cactus		Known
732	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	fendleri	(Engelm.) F. Seitz	var.	fendleri	Pinkflower hedgehog cactus		Known
734	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	dasyacanthus	(Scheidw.) Engelm.			Hedgehog cactus		Expected

735	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	pectinatus	(Scheidew.) Engelm.			Yellow pitya		Known
736	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	stramineus	(Engelm) F. Seitz.	var.	stramineus	Strawberry Hedgehog Cactus		Known
737	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	triglochidiatus	Engelm.			Claret-cup		Known
739	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	viridiflorus	Engelm.	var.	cylindricus	Nylon hedgehog cactus		Known
740	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Echinocereus	viridiflorus	Engelm.	var.	viridiflorus	Nylon hedgehog cactus	(A. Gray) Heise	Expected
741	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Epithelantha	micromeris	(Engelm.) A. Weber			Pingpong ball cactus		Known
742	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Ferocactus	wislizenii	(Engelm.) Britt. & Rose			Candy barrelcactus	Heiser	Known
743	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Mammillaria	grahamii	Engelm.			Graham's nipple cactus		Expected
744	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Mammillaria	grahamii	Engelm.	var.	grahamii	Graham's nipple cactus	(Dun.) Fern.	Not Applicable
745	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Mammillaria	heyderi				Little nipple cactus		Known
746	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Mammillaria	heyderi	Muehlenpfordt	var.	heyderi	Little nipple cactus		Known
747	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Mammillaria	heyderi	Muehlenpfordt	var.	meiacantha	Little nipple cactus	Semple	Expected
748	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Mammillaria	lasiacantha	Engelm.			Lacespine nipple cactus		Known
749	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Neolloydia	intertexta				White biznagita	(Woot. & Stan	Known
750	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Neolloydia	intertexta	(Engelm.) L. Benson	var.	dasyacantha	White fishhook cactus		Expected
751	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	polyacantha	Engelm.	var.	arenaria	El Paso pricklypear		Known
752	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	chlorotica	Engelm. & Bigelow			Dollarjoint pricklypear	(Greene) Harm	Expected
753	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	engelmannii	Salm Dyck.			Cactus apple		Expected
754	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	engelmannii	Salm-Dyck	var.	engelmannii	Engelman's prickly pear	(Hook) Harms	Not Applicable
755	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	engelmannii	Salm Dyck.	var.	discata	Pricklypear		Known
756	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	grahamii	Engelm.			Graham's pricklypear		Known
757	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Cylindropuntia	imbricata		var.	spinosior	(hybrid)	(Rydb.) I. M. Jo	Expected
758	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Cylindropuntia	imbricata	DC.			Tree cholla		Known
759	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Cylindropuntia	imbricata	(Haw.) DC.	var.	imbricata	Tree cholla	Gray	Known
760	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	kleiniae	DC.			Candle cholla		Known
761	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Cylindropuntia	leptocaulis	DC.			Christmas cactus		Known
762	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	macrocentra	Engelm.	var.	macrocentra	Purple pricklypear		Known
763	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	phaeacantha	Engelm.	var.	major	Mojave pricklypear		Known
764	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	phaeacantha	Engelm.			New Mexico pricklypear		Known
765	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	polyacantha	Haw.	var.	rufispina	Hairspine pricklypear	(Gray) Parker	Known
766	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	polyacantha	Haw.			Plains pricklypear		Known
767	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	spinosior				Walkingstick cactus		Known
768	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Opuntia	violaceae				Purple pricklypear		Known

769	Magnoliophyta	Magnoliopsida	Caryophyllales	Cactaceae	Sclerocactus	papyracanthus	(Engelm.) Britt. & Rose			Grama grass cactus		Expected
770	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Pseudostellaria	jamesiana	(Torr.)Heller			Tuber starwort		Known
771	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Arenaria	fendleri	Gray			Fendler's sandwort		Known
772	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Arenaria	lanuginosa				Spreading sandword		Known
773	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Cerastium	axillare	Correll			Trans-Pecos chickweed		Known
774	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Cerastium	glomeratum	Thuill			Sticky chickweed		Known
775	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Cerastium	nutans	Raf.			Nodding chickweed		Known
776	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Cerastium	nutans	Raf.	var.	nutans	Nodding chickweed		Expected
777	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Drymaria	glandulosa	Wats.			Fendler's drymary		Known
778	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Paronychia	jamesii	Torr. & Gray			James' nailwort	(Gray) B. L. Tu	Expected
779	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Silene	antirrhina	L.			Sleepy silene		Known
780	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Silene	laciniata	Cav.	var.	greggii	Cardinal catchfly		Known
781	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Silene	laciniata	Cav.			Mexican campion		Expected
782	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Silene	plankii	C. L. Hitchc. & Maguire			Plank campion	Turner & Harin	Not Applicable
783	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Silene	scouleri	Hook.			Scouler's campion		Known
784	Magnoliophyta	Magnoliopsida	Caryophyllales	Caryophyllaceae	Stellaria	cuspidata	Willd. ex Schlecht.			Mexican starwort		Known
785	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Allenrolfea	occidentalis	(S. Wats.) Kuntze			Iodinebush		Known
786	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	acanthocarpa				Tubercled saltbush		Known
787	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	acanthocarpa	(Torr.) S. Wats.	var.	acanthocarpa	Tubercled saltbush		Known
788	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	canescens	(Pursh) Nutt.			Fourwing saltbush		Known
789	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	canescens	(Pursh) Nutt.	var.	canescens	Fourwing saltbush		Known
790	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	elegans				Wheelscale saltbush		Known
791	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	elegans	(Moq.) D. Dietr.	var.	elegans	Wheelscale saltbush	(Gray) Rollins	Expected
792	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	heterosperma	Bunge			Twoscale saltbush		Known
793	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	saccaria	S. Wats.			Sack saltbush		Known
794	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	semibaccata	R. Br.			Australian saltbush		Known
795	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Atriplex	wrightii	S. Wats			Wright's saltbush		Known
796	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	atrovirens	Rydb.			Pinyon goosefoot		Expected
797	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	berlandieri	Moq.	var.	berlandieri	Berlandier's goosefoot		Known
798	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	berlandieri	Moq.			Pitseed goosefoot	Fern.	Expected
799	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	cycloides	A. Nels.			Sandhill goosefoot	Keil	Known
800	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	desiccatum	A. Nels.			Aridland goosefoot		Known
801	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	fremontii	S. Wats.			Fremont's goosefoot		Known

802	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	fremontii	S. Wats.	var.	fremontii	Fremont's goosefoot		Known
803	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	graveolens	Willd.			Ragleaf goosefoot		Known
804	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	incanum	(S. Wats.) Heller			Mealy goosefoot		Known
805	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	incanum	(S. Wats.) Heller	var.	elatum	Mealy goosefoot		Known
806	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	leptophyllum	(Moq.) Nutt. ex S. Wats.			Narrowleaf goosefoot		Known
807	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Chenopodium	neomexicanum	Standl.			New Mexico goosefoot		Expected
808	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Corispermum	americanum	(Nutt.) Nutt.			American bugseed		Expected
809	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Corispermum	nitidum	Schult.			Shiny bugseed		Known
810	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Cycloloma	atriplicifolium	(Spreng.) Coult.			Winged pigweed		Known
811	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Kochia	scoparia	(L.) Schrad.			Mexican fireweed		Expected
812	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Krascheninnikovia	lanata	(Pursh) A. D. J. Meeuse & Smit			Winterfat		Expected
813	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Monolepis	nuttalliana	(J. A. Schultes) Greene			Nuttall's povertyweed		Expected
814	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Salsola	kali	L.			Russian thistle	(A. Nels) B. Tu	Not Applicable
815	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Suaeda	calceoliformis	(Hook.) Moq.			Pursh seepweed		Known
816	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Suaeda	moquinii	(Torr.) Greene			Mojave seablite		Known
817	Magnoliophyta	Magnoliopsida	Caryophyllales	Chenopodiaceae	Suaeda	suffrutescens	S. Wats.			Desert seepweed		Expected
818	Magnoliophyta	Magnoliopsida	Caryophyllales	Molluginaceae	Mollugo	cerviana	(L.) Ser.			Threadstem carpetweed		Known
819	Magnoliophyta	Magnoliopsida	Caryophyllales	Molluginaceae	Mollugo	verticillata	L.			Green carpetweed		Known
820	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Abronia	angustifolia	Grewene			Purple sand verbena		Expected
821	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Abronia	fragrans	Nutt. ex Hook.			Snowball sand verbena		Known
822	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Allionia	choisyi	Standl.			Annual windmills		Expected
823	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Allionia	incarnata	L.	var.	incarnata	Trailing windmills		Known
824	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Allionia	incarnata	L.			Umbrella wort	(Gray) Heiser	Known
825	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Ammocodon	chenopodioides	(Gray) Standl.			Goosefoot moonpod	(Benth.)Benso	Not Applicable
826	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Anulocaulis	leiosolenus	(Torr.) Standl.			Southwestern ringstem		Known
827	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Anulocaulis	leiosolenus	(Torr.) Standl.	var.	leiosolenus	Southwestern ringstem		Not Applicable
828	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Boerhavia	coccinea	P. Mill.			Scarlet spiderling	(Heller) Cronq	Expected
829	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Boerhavia	gracillima	Heimerl.			Slimstalk spiderling	(DC.) B. L. Turr	Known
830	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Boerhavia	intermedia	M. E. Jones			Fivewing spiderling	Less.	Not Applicable
831	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Boerhavia	spicata	Choisy			Creeping spiderling		Known
832	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Boerhavia	wrightii	Gray			Largebract spiderling		Expected
833	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Cyphomeris	gypsophiloides	(Mart. & Gal.) Standl.			Red cyphomeris		Known
834	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	comata	(Small) Standl.			Hairy-tuft four o'clock		Expected

835	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	glabra	(S. Wats.) Standl.			Smooth four o'clock		Known
836	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	linearis	(Pursh) Heimerl			Narrowleaf four o'clock		Expected
837	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	longiflora	L.			Sweet four o'clock		Known
838	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	multiflora	(Torr.) Gray	var.	multiflora	Colorado four o'clock		Not Applicable
839	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	multiflora	(Torr.) Gray			Colorado four-o'clock		Expected
840	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	nyctaginea	(Michx.) MacM.			Heartleaf four o'clock		Expected
841	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	oblongifolia	(Gray) Heimerl.			White four o'clock		Known
842	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	oblongifolia	(Gray) Heimerl	var.	albida	White four o'clock		Known
843	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Mirabilis	oxybaphoides	(Gray) Gray			Smooth spreading four o'clock	Blake	Known
844	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Selinocarpus	diffusus	Gray			Spreading moonpod		Known
845	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Selinocarpus	lanceolatus	Woot.			Lanceleaf moonpod		Known
846	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Tripterocalyx	carneus	(Greene) L. Gal.			Sand verbena		Known
847	Magnoliophyta	Magnoliopsida	Caryophyllales	Nyctaginaceae	Tripterocalyx	carneus	9Greene) L. A. Gal.	var.	carneus	Winged sandpuffs		Known
848	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	halimoides	L.			Silkcotton purslane		Known
849	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	oleracea	L.			Little hogweed		Known
850	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	pilosa	L.			Kiss me quick		Known
851	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	retusa	Engelm.			Purslane		Known
852	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	suffrutescens	Engelm.			Shrubby purslane		Expected
853	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	umbraticola	Kunth			Wingpod purslane	Parker	Not Applicable
854	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Portulaca	umbraticola	Kunth	var.	umbraticola	Wingpod purslane	(Nutt.) Parker	Not Applicable
855	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Talinopsis	frutescens	Gray			Arroyo flameflower		Known
856	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Phemeranthus	aurantiacum	Engelm.			Orange flameflower		Known
857	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Phemeranthus	brevicaulis	S. Wats.			Dwarf flameflower		Known
858	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Phemeranthus	confertiflorus	Greene			New Mexico flameflower		Known
859	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Phemeranthus	longipes	Woot. & Standl.			Pink flameflower		Known
860	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Phemeranthus	paniculatum	(Jacq.) Geartn.			Jewels of Opar	(Gray) Strothe	Known
861	Magnoliophyta	Magnoliopsida	Caryophyllales	Portulacaceae	Phemeranthus	parviflorus	Nutt.			Sunbright	(DC.) Stother	Not Applicable
862	Magnoliophyta	Magnoliopsida	Cornales	Garryaceae	Garrya	ovata	Benth.			Eggleaf silktassel		Known
863	Magnoliophyta	Magnoliopsida	Cornales	Garryaceae	Garrya	ovata	Benth.	var.	goldmanii	Goldman's silktassel		Known
864	Magnoliophyta	Magnoliopsida	Cornales	Garryaceae	Garrya	wrightii	Torr.			Wright's silktassel		Known
865	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Lonicera	albiflora	Torr. & Gray			Western white honeysuckle	strother	Not Applicable
866	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Sambucus	cerulea	Raf.	var.	neomexicana	Blue elderberry		Known
867	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Sambucus	cerulea				Common elderberry		Known

868	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Symphoricarpos	guadalupensis	Correll			Duhamel		Known
869	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Symphoricarpos	longiflorus	Gray			Desert snowberry		Known
870	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Symphoricarpos	oreophilus	Gray			Mountain snowberry		Known
871	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Symphoricarpos	palmeri				Palmer's snowberry		Known
872	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Symphoricarpos	rotundifolius	Gray.			Roundleaf snowberry		Known
873	Magnoliophyta	Magnoliopsida	Dipsacales	Caprifoliaceae	Symphoricarpos	rotundifolius	Gray	var.	rotundifolius	Roundleaf snowberry		Known
874	Magnoliophyta	Magnoliopsida	Dipsacales	Valerianaceae	Valeriana	arizonica	Gray			Arizona valerian		Expected
875	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Acalypha	neomexicana	Muell.-Arg.			New Mexico copperleaf		Known
876	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Argythamnia	neomexicana	Muell.-Arg.			New Mexico silverbush	Butterwick	Known
877	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	albomarginata	(Torr. & Gray) Small			Whitemargin sandmat		Known
878	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	arizonica	(Engelm.) Arthur			Arizona sandmat	(P. Mill.) Torr.	Expected
879	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	chaeatocalyx				Bristlecup sandmat		Known
880	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	chaeatocalyx	(Boiss.) Woot. & Standl.	var.	chaetocalyx	Bristlecup sandmat		Known
881	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	dioica	(Kunth.) Millsp.			Royal sandmat		Known
882	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	fendleri	(Torr & Gray) Small	var.	chaetocalyx	Bristlecup sandmat		Known
883	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	geyeri				Geyer's sandmat		Known
884	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	geyeri	(Engelm.) Small	var.	wheeleriana	Geyer's sandmat		Expected
885	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	glyptosperma	(Engelm.) Small			Ribsewed sandmat		Expected
886	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	hyssopifolia	(L.) Small			Hysopleaf sandmat		Known
887	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	lata	(Engelm.) Small			Hoary sandmat		Known
888	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	maculata	(L.) Small			Spotted sandmat		Known
889	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	micromera	(Boiss. & Engelm.) Woot. & Standl.			Sonoran sandmat		Expected
890	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	parryi	(Engelm.) Rydh.			Parry's sandmat		Known
891	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	prostrata	(Ait.) Small			Prostrate sandmat		Expected
892	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	revoluta	(Engelm.) Small			Threadstem sandmat		Known
893	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	serpens	(Kunth) Small			Matted sandmat		Known
894	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	serphyllifolia	(Pers.) Small			Thymeleaf sandmat	M.E. Peck	Not Applicable
895	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	serrula	(Engelm.) Woot. & Standl.			Sawtooth sandmat		Known
896	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	setiloba	(Engelm. ex Torr.) Millsp. ex Parish			Yuma sandwort		Known
897	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	stictospora	(Engelm.) Small			Slimseed sandmat		Expected
898	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	theriaca	(L. C. Wheeler) Shinners			Terlingua sandmat		Known
899	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Chamaesyce	villifera	(Scheele) Small			Hairy sandmat		Known
900	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	dioicus	Cav.			Grassland croton		Known

901	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	fruticulosus	Engelm. ex Torr.			Bush croton		Known
902	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	lindheimerianus	Scheele			Tharp croton		Known
903	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	lindheimerianus	Scheele	var.	thaarpii	Tharp's croton	(P. Mill.) Thellu	Expected
904	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	pottsii	(Klotzsch) Muell.-Arg.	var.	pottsii	Leatherweed		Known
905	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	pottsii	(Kl.) Muell. Arg.			Leather-weed		Known
906	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	texensis	(Klotzsch) Muell-Arg.			Texas croton		Known
907	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Croton	texensis	(Klotzsch) Muell.-Arg.	var.	texensis	Texas croton	(Woot.) Rollins	Known
908	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	bifurcata	Engelm			Forked spurge		Not Applicable
909	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	brachycera	Engelm.			Horned spurge		Known
910	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	cyanthophora	Murr.			Fire on the mountain	(Gray) C. L. Hit	Known
911	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	dentata	Michr.			Toothed spurge		Expected
912	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	dentata	Michx.	var.	cuphosperma	Toothed spurge	C.L. Hitchc	Not Applicable
913	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	exstipulata	Engelm.	var.	exstipulata	Clark Mountain Spurge		Known
914	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	exstipulata	Engelm.			Squareseed spurge		Expected
915	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	exstipulata	Engelm.	var.	lata	Squareseed spurge		Known
916	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Euphorbia	marginata	Pursh.			Snow on the mountain	(Greene) C. L.	Known
917	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Phyllanthus	polygonoides	Nutt. ex Spreng.			Smartweed leaf-flower		Known
918	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Reverchonia	arenaria	Gray			Sand reverchonia		Known
919	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Tragia	amblyodonta	(Muell.-Arg.) Pax & K. Hoffmann			Dogtooth noseburn		Expected
920	Magnoliophyta	Magnoliopsida	Euphorbiales	Euphorbiaceae	Tragia	ramosa	Torr.			Branched noseburn		Known
921	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	anguistissima	(P. Mill.) Kuntze			Chisos prairie acacia		Expected
922	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	anguistissima	(P. Mill) Kuntze.	var.	texensis	Prairie wattle		Known
923	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	constricta	Gray			Whitethorn acacia		Expected
924	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	constricta	Benth.	var.	constricta	Whitethorn acacia		Known
925	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	greggii	Gray			Catclaw acacia		Expected
926	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	greggii	Gray	var.	greggii	Catclaw acacia		Expected
927	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Acacia	neovernicosa	Isely			Viscid acacia		Known
928	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Alhagi	maurorum	Medik.			Camelthorn		Known
929	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Amorpha	fruitcosa	L.			Desert false indigo		Expected
930	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	allochrous	Gray			Halfmoon locoweed		Expected
931	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	allochrous	Gray	var.	allochrous	Halfmoon milkvetch		Known
932	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	emoryanus				Emory's milkvetch		Expected
933	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	emoryanus	(Rydb.) Cory	var.	emoryanus	Emory's milkvetch	(S.Wats.) Kruc	Known

934	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	flexuosus	Dougl.			Flexile milkvetch		Known
935	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	gypsodes	Barneby.			Gypsum milkvetch		Known
936	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	humistratus				Groundcover milkvetch		Expected
937	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	humistratus	Gray	var.	sonorae	Groundcover milkvetch		Expected
938	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	mollissimus	Torr.			Crazy weed		Known
939	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	mollissimus	Torr.	var.	bigelovii	Woolly locoweed		Known
940	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	nuttallianus	DC. austrinus Small(Barneby)			Smallflowered milkvetch		Known
941	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	nuttallianus	DC.	var.	austrinus	Smallflowered milkvetch	(Gray) P. Holm	Expected
942	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	tephrodes				Ashen milkvetch		Known
943	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	tephrodes	Gray	var.	tephrodes	Ashen milkvetch		Known
944	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Astragalus	waterfalli	Barneby			Waterfall's milkvetch		Known
945	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Caesalpinia	gilliesii	(Hook.) Wallich ex D. Dietr.			Bird-of-paradise shrub	(T. & G.) Iltis	Known
946	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Pomaria	jamesii	(Torr. & Gray) Fisher			James' holdback		Known
947	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Chamaecrista	nictitans				Partridge pea		Known
948	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Chamaecrista	nictitans	(L.) Moench	var.	leptadenia	Partridge pea		Known
949	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Cologania	broussonettii	(Balb.) DC.			Mexican cologania		Known
950	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Crotalaria	pumila	Ortega			Low rattlebox		Known
951	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	brachystachya	Gray			Fort Bowie prairie clover		Known
952	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	candida	Michx. ex Willd.			White prairie clover		Expected
953	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	candida	Michx. ex Willd.	var.	oligophylla	White prairie clover		Known
954	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	formosa	Torr.			Featherplume		Known
955	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	frutescens	Gray.			Black prairie clover		Known
956	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	jamesii	(Torr.) Torr. & Gray			James' prairie clover		Known
957	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	lanata	Spreng.	var.	lanata	Woolly dalea		Known
958	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	lanata	Spreng.			Woolly prairie clover		Known
959	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	lanata	Spreng	var.	terminalis	Woolly prairie clover		Known
960	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	nana	Torr.			Dwarf dalea	(Small) Fern.	Expected
961	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	nana	Torr. ex Gray	var.	nana	Dwarf prairie clover		Known
962	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	neomexicana	(Gray) Cory	var.	neomexicana	Dwarf prairie clover		Known
963	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	neomexicana	(Gray) Cory			New Mexico dalea		Known
964	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	pogonathera	Gray	var.	pogonathera	Bearded prairie clover		Known
965	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	pogonathera	Gray			Brearded prairie clover	Uline & Gray	Known
966	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	polygonoides	Gray			Sixweeks prairie clover		Known

967	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Dalea	wrightii	Gray			Wright's prairie clover		Known
968	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Desmanthus	cooleyi	(Eat.) Trel.			Cooley's bundleflower		Known
969	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Desmanthus	glandulosus	(B. L. Turner) Luckow			Glandular bundleflower	(Woods.) Woo	Known
970	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Desmanthus	illinoensis	(Michx.) MacM. ex B. L. Robins. & Fern.			Prairie bundleflower		Known
971	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Desmodium	grahamii	Gray			Graham's ticktrefoil		Known
972	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Desmodium	neomexicanum	Gray			New Mexico ticktrefoil	Engler	Not Applicable
973	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Galactia	wrightii	Gray			Wright milkpea	(Woot. & Stan	Known
974	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Galactia	wrightii	Gray	var.	wrightii	Wright's milkpea		Known
975	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Glycyrrhiza	lepidota	Pursh			American licorice		Known
976	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Hoffmannseggia	drepanocarpa	Gray			Sicklepod rushpea		Known
977	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Hoffmannseggia	glauca	(Ortega) Eifert			Indian rushpea	(Engelm.) L. Be	Known
978	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Lotus	greenei	(Woot. & Standl.) Ottley			Greene's bird's-foot trefoil		Known
979	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Lotus	humistratus	Greene			Foothill deervetch		Known
980	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Lotus	plebeius	(Brand) Barneby			New Mexico bird's-foot trefoil		Expected
981	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Lupinus	concinnus	Agardh			Annual lupine		Known
982	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Lupinus	concinnus	J. G. Agradh	var.	concinnus	Annual lupine		Known
983	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Macroptilium	gibbosifolium	(Ortega) A. Delgado			Variableleaf bushbean	(Engelm.) L. Be	Expected
984	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Medicago	lupulina	L.			Black medik		Known
985	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Medicago	polymorpha	L.			Burclover		Known
986	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Medicago	sativa	L.			Alfalfa		Known
987	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Medicago	sativa	L.	var.	sativa	Alfalfa		Known
988	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Melilotus	officinalis	(L.)Lam			sweetclover		Known
989	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Melilotus	indicus	(L.) All.			Annual yellow sweetclover	(Engelm.) Back	Expected
991	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Mimosa	aculeaticarpa	Ortega			Catclaw mimosa		Known
992	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Mimosa	aculeaticarpa	Ortega	var.	biuncifera	Catclaw mimosa		Not Applicable
993	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Mimosa	borealis	Gray.			Fragant mimosa		Known
994	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Mimosa	quadrivalvis	L.			Fourvalve mimosa		Known
995	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Mimosa	rupertiana	B. L. Turner			Eastern sensitive plant	(Castetter, Pie	Potential
996	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Parkinsonia	aculeata	L.			Jerusalem thorn	(Peebles) L. Be	Not Applicable
997	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Peteria	scoparia	Gray			Rush peteria		Expected
998	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Phaseolus	acutifolius	Gray			Tepary bean	(Coult.) L. Ben	Not Applicable
999	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Phaseolus	acutifolius	Gray	var.	acutifolius	Tepary bean	(Engelm) N.P.	Not Applicable
1000	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Phaseolus	angustissimus	Gray			Slimleaf bean		Known

1001	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Phaseolus	filiformis	Benth.			Slimjim bean	(Engelm) L. Be	Not Applicable
1002	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Prosopis	glandulosa	Torr.			Honey mesquite		Known
1003	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Prosopis	glandulosa	Torr.	var.	torreyana	Western honey mesquite		Known
1004	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Prosopis	pubescens	Benth.			Screwbean mesquite	(Engelm.) Rum	Known
1005	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Psorothamnus	scoparius	(Gray) Rydb.			Broom dalea		Known
1006	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Rhynchosia	senna	Gillies ex Hook			Texas snoutbean		Known
1007	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Rhynchosia	senna	Gillies & Hook.	var.	texana	Texas snoutbean		Known
1008	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Robinia	neomexicana	(Gray)			New Mexico locust		Known
1009	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Robinia	neomexicana	Gray	var.	neomexicana	New Mexico locust		Known
1010	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Robinia	pseudoacacia	L.			Black locust		Known
1011	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Senna	bauhinioides	(Gray) Irwin & Barneby			Twinleaf senna		Expected
1012	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Senna	lindheimeriana	(Gray) Irwin & Barneby			Velvet leaf senna	(Engelm.) L. Be	Known
1013	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Senna	roemeriana	Irwin & Barneby.			Two-leaf wild sensitive plant		Known
1014	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Sophora	nuttalliana	B. L. Turner			Silky sophora		Known
1015	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Sophora	secundiflora	(Ortega) Lag. ex DC.			Mescal bean	(Engelm.) L. Be	Known
1016	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Spartium	junceum	L.			Spanish broom		Expected
1017	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Sphaerophysa	salsula	(Pallas) DC.			Alkali swainsonpea		Expected
1018	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Trifolium	repens	L.			White clover		Known
1019	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Vicia	americana	Muhl.			American vetch		Known
1020	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Vicia	ludoviciana	Nutt.			Louisiana vetch	L. Benson Wal	Not Applicable
1021	Magnoliophyta	Magnoliopsida	Fabales	Fabaceae	Vicia	ludoviciana	Nutt.	var.	ludoviciana	Louisiana vetch		Known
1022	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	arizonica	Sarg.			Arizona white oak		Expected
1023	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	gambelii	Nutt.			Gambel oak		Known
1024	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	gambelii	Nutt	var.	gambelii	Gambel oak		Known
1025	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	grisea	Liebm.			Gray oak		Known
1026	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	havardii	Rydb.			Shin oak		Known
1027	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	pungens	Liebm.			Pungent oak		Known
1028	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	pungens	Liebm.	var.	pungens	Pungent oak	Engelm.	Known
1029	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	rugosa	NŒe			Netleaf oak		Known
1030	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	toumeyi	Sarg.			Tomey oak	(Engelm. & Big	Known
1031	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	turbinella	Greene			Sonoran scrub oak		Known
1032	Magnoliophyta	Magnoliopsida	Fagales	Fagaceae	Quercus	xpauciloba	Torr.	pro.sp.	gambelii x turbi	Wavyleaf oak		Known
1033	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Amsonia	longiflora	Torr.			Slimpod		Known

1034	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Amsonia	longiflora	Torr.	var.	longiflora	Tubular bluestar		Known
1035	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Amsonia	tomentosa	Torr & Frem.			Woolly bluestar		Expected
1036	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Amsonia	tomentosa	Torr. & Frem.	var.	stenophylla	Woolly bluestar		Known
1037	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Apocynum	cannabinum	L.			Indianhemp		Known
1038	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Haplophyton	crooksii	(L. Benson) L. Benson			Cockroachplant		Known
1039	Magnoliophyta	Magnoliopsida	Gentianales	Apocynaceae	Mandevilla	brachysiphon	(Torr.) Gray			Huachuca Mountain rocktrumpet		Known
1040	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	arenaria	Torr.			Sand milkweed		Known
1041	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	asperula	(Dcne.) Woods			Milkweed		Expected
1042	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	brachystephana	Engelm. ex Torr.			Bract milkweed		Known
1043	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	latifolia	(Torr.) Raf.			Broadleaf milkweed		Known
1044	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	macrotis	Torr.			Longhood milkweed		Known
1045	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	oenotheroides	Cham. & Schlecht.			Zizotes milkweed	(Gray) C. L. Hit	Expected
1046	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Asclepias	subverticillata	(Gray) Vail			Horsetail milkweed		Known
1047	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Matelea	producta	(Torr.) Woods.			Texas milkvine		Known
1048	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Sarcostemma	crispum	Benth			Wavyleaf twinevine		Known
1049	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Sarcostemma	cynanchoides	Dcne.			Fringed twinevine		Known
1050	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Sarcostemma	cynanchoides	Dcne.	var.	cynanchoides	Fringed twinevine		Expected
1051	Magnoliophyta	Magnoliopsida	Gentianales	Asclepiadaceae	Sarcostemma	cynanchoides	Dcne.	var.	hartwegii	Hartweg's twinevine		Expected
1052	Magnoliophyta	Magnoliopsida	Gentianales	Gentianaceae	Centaurium	arizonicum	(Gray) Heller			Arizona centaury		Expected
1053	Magnoliophyta	Magnoliopsida	Gentianales	Gentianaceae	Centaurium	maryannum	B. L. Turner			Gypsum centaury		Known
1054	Magnoliophyta	Magnoliopsida	Gentianales	Gentianaceae	Centaurium	nudicaule	(Engelm.) B. L. Robins.			Santa Catalina Mountain centaury		Known
1055	Magnoliophyta	Magnoliopsida	Geraniales	Geraniaceae	Erodium	cicutarium	(l.) L'HΘr. Ex Ait.			Redstem stork's bill		Known
1056	Magnoliophyta	Magnoliopsida	Geraniales	Geraniaceae	Erodium	cicutarium	(L.) L'Her. ex Ait.	var.	cicutarium	Redstem stork's bill		Known
1057	Magnoliophyta	Magnoliopsida	Geraniales	Geraniaceae	Erodium	texanum	Gray			Texas stork's bill		Expected
1058	Magnoliophyta	Magnoliopsida	Geraniales	Geraniaceae	Geranium	caespitosum	James			Carolina geranium		Expected
1059	Magnoliophyta	Magnoliopsida	Geraniales	Geraniaceae	Geranium	caespitosum	James	var.	eremophilum	Purple cluster geranium		Expected
1060	Magnoliophyta	Magnoliopsida	Geraniales	Geraniaceae	Geranium	carolinianum	L.			Carolina geranium		Expected
1061	Magnoliophyta	Magnoliopsida	Geraniales	Oxalidaceae	Oxalis	alpina	(Rose) Rose ex R. Knuth			Alpine woodsorrel		Known
1062	Magnoliophyta	Magnoliopsida	Geraniales	Oxalidaceae	Oxalis	corniculata	L.			Creeping woodsorrel	Moq.	Not Applicable
1063	Magnoliophyta	Magnoliopsida	Geraniales	Oxalidaceae	Oxalis	drummondii	Gray			Drummond's woodsorrel		Known
1065	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	albida	(Kunth) I.M. Johnston.			New Mexico cryptantha		Expected
1066	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	angustifolia	(Torr.) Greene			Panamint cryptantha		Known
1067	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	barbigera	(Gray) Greene			Bearded cryptantha		Known

1068	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	cinerea	(Greene) Cronq.	var.	jamesii	Jame's catseye		Known
1069	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	cinerea	(Greene) Cronq.			James' cryptantha		Known
1070	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	cinerea	(Greene) Cronq.	var.	cinerea	James' cryptantha	Crawford	Known
1071	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	crassisepala	T. & G. Greene			Thicksepal cryptantha		Known
1072	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	crassisepala	(Torr. & Gray) Greene	var.	elachantha	Thicksepal cryptantha		Expected
1073	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	mexicana	(Brandegee) I. M. Johnst.			Mexican cryptantha		Expected
1074	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	micrantha	(Torr.) I. M. Johnst.			Redroot cryptantha		Known
1075	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	oblata	(M. E. Jones) Payson			Rough cryptantha		Known
1076	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	paysonii	(J. F. Macbr.) I. M. Johnst.			Payson's cryptantha		Known
1077	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	pterocarya	(Torr.) Greene			Wingnut cryptantha		Known
1078	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	pterocarya	(Torr.) Greene	var.	cycloptera	Wingnut cryptantha		Expected
1079	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	pterocarya	(Torr.) Greene	var.	pterocarya	Wingnut cryptantha		Known
1080	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Cryptantha	pusilla	(Torr. & Gray) Greene			Low cryptantha		Expected
1081	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Hackelia	besseyi	(Rydb.) J. L. Gentry			Bessey's stickseed		Expected
1082	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Hackelia	pinetorum	(Greene ex Gray) I. M. Johnson	var.	jonesii	Jones' stickseed		Expected
1083	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Hackelia	pinetorum	(Greene ex Gray) I. M. Johnston	var.	pinetorum	Livermore stickseed		Known
1084	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Hackelia	pinetorum	(Greene ex Gray) I. M. Johnst.			Stickseed		Expected
1085	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Heliotropium	convolvulaceum	(Nutt.) Gray			Phlox heliotrope		Known
1086	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Heliotropium	curassavicum	L.			Seaside heliotrope		Known
1087	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Heliotropium	greggii	Torr.			Fragrant heliotrope		Known
1088	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Lappula	occidentalis	(S. Watts) Greene.			Flat-spine sheepburr		Known
1089	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Lappula	occidentalis	(S. Wats.) Greene	var.	cupulata	Flatspine stickseed		Known
1090	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Lithospermum	incisum	Lehm.			Narrowleaf stoneseed		Known
1091	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Lithospermum	multiflorum	Torr. ex Gray			Manyflowered stoneseed		Expected
1092	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Lithospermum	parksii	I. M. Johnst.			Park's stoneseed		Expected
1093	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Pectocarya	heterocarpa	(I. M. Johnst.) I. M. Johnst.			Chuckwalla combseed		Known
1094	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Pectocarya	platycarpa	(Munz & Johnst.) Munz & Johnst.			Broadfruit combseed		Known
1095	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Tiquilia	canescens	(DC.) A. Richards.			Woody crinklemat		Known
1096	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Tiquilia	canescens	(DC.) A. Richards.	var.	canescens	Woody crinklemat		Known
1097	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Tiquilia	gossypina	(Woot. & Standl.) A. Richards.			Texas crinklemat		Expected
1098	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Tiquilia	greggii	(Torr. & Gray) A. Richards.			Plumed crinklemat		Known
1099	Magnoliophyta	Magnoliopsida	Lamiales	Boraginaceae	Tiquilia	hispidissima	(Torr. & Gray) A. Richards.			Hairy crinklemat		Known
1100	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Agastache	breviflora	(Gray) Epl.			Trans-Pecos giant hyssop		Known

1101	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Agastache	cana	(Hook.) Woot. & Standl.			Mosquito plant		Known
1102	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Agastache	micrantha	(Gray) Woot. & Standl.			White giant hyssop		Expected
1103	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Agastache	pallidiflora	(Briq.) Lint & Epl.			Bill Williams Mountain giant		Known
1104	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Agastache	pallidiflora	(A. Heller) Rydb.	ssp.	neomexicana	Bill Williams Mountain giant		Known
1105	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Agastache	pringlei	(Briq.) Lint & Epling	var.	verticillata	Pringle's giant hyssop		Expected
1106	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Dracocephalum	parviflorum	Nutt.			American dragonhead		Known
1107	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Hedeoma	drummondii	Benth.			Drummond's false pennyroyal	(Walt.) Heime	Known
1108	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Hedeoma	nana	(Torr.) Briq.	var.	nana	Dwarf false pennyroyal		Known
1109	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Hedeoma	nana	(Torr.) Briq.			Low false pennyroyal		Known
1110	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Hedeoma	oblongifolium				Oblongleaf false pennyroyal		Expected
1111	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Hedeoma	plicatum	Torr.			Veiny hedeoma		Known
1112	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Lamium	amplexicaule	L.			Henbit deadnettle		Expected
1113	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Marrubium	vulgare	L.			Horehound		Expected
1114	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Monarda	citriodora	Cerv. ex Lag.			Lemon beebalm		Known
1115	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Monarda	citriodora	Cerv. ex Lag.	var.	austromontana	Lemon beebalm		Known
1116	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Monarda	pectinata	Nutt.			Plains beebalm		Known
1117	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Monarda	punctata	L.			Spotted beebalm		Known
1118	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Monarda	punctata	L.	var.	punctata	Spotted beebalm		Known
1119	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Poliomintha	incana	(Torr.) Gray			Hoary rosemary-mint		Known
1120	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Salvia	henryi	Gray			Crimson sage		Known
1121	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Salvia	lycioides	Gray			Canyon sage		Known
1122	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Salvia	pinguifolia	(Fern.) Woot. & Standl.			Rock sage		Known
1123	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Salvia	reflexa	Hornem.			Lanceleaf sage		Known
1124	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Salvia	subincisa	Benth.			Sawtooth sage		Known
1125	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Salvia	summa	A. Nelson			Mountain sage		Expected
1126	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Stachys	coccinea	Ortega			Scarlet hedgenettle		Known
1127	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Teucrium	cubense				Small coastal germander		Expected
1128	Magnoliophyta	Magnoliopsida	Lamiales	Lamiaceae	Teucrium	laciniatum	Torr.			Cutleaf germander	(Woot. & Stan	Expected
1129	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Aloysia	wrightii	Heller ex Abrams			Wright's beebrush		Known
1130	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Glandularia	bipinnatifida	(Nutt.) Nutt.			Dakota mock vervain		Known
1131	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Glandularia	bipinnatifida	(Nutt) Nutt.	var.	ambrosiifolia	Davis Mountain mock vervain	(Woot.) Rehd.	Expected
1132	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Glandularia	plicata	(Nutt) Nutt.	var.	bipinnatifida	Mock Vervain		Known
1133	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Glandularia	pumila	(Rydb.) Umber			Pink mock vervain		Known

1134	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Glandularia	quandrangulata	(Eggert) Umber			Pale mock vervain		Expected
1135	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Glandularia	wrightii	(Gray) Umber			Davis Mountain mock vervain		Known
1136	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Phyla	nodiflora	(L.) Greene			Turkey tangle fogfruit		Expected
1137	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Tetraclea	coulteri	Gray			Coulter's wrinklefruit		Known
1138	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Tetraclea	coulteri	Gray.	var.	angustifolia	Coulter's wrinklefruit		Known
1139	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Verbena	bracteata	Lag. ex Rodr.			Bigbract verbena		Known
1140	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Verbena	macdougalii	Heller			MacDougal vervain		Known
1141	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Verbena	neomexicana	(Gray) Small			Hillside vervain		Known
1142	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Verbena	perennis	Woot.			Perennial verbena		Known
1143	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Verbena	plicata	Greene	var.	plicata	Fanleaf vervain		Known
1144	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Verbena	plicata	Greene.			Fan-leaf vervain		Known
1145	Magnoliophyta	Magnoliopsida	Lamiales	Verbenaceae	Vitex	agnus-castus	L.			Lilac chastetree		Known
1146	Magnoliophyta	Magnoliopsida	Linales	Linaceae	Linum	aristatum	Engelm.			Bristle flax		Expected
1147	Magnoliophyta	Magnoliopsida	Linales	Linaceae	Linum	lewisii	Pursh.			Blue flax	(Boiss) Shinner	Not Applicable
1148	Magnoliophyta	Magnoliopsida	Linales	Linaceae	Linum	lewisii	Pursh	var.	lewisii	Prairie flax		Expected
1149	Magnoliophyta	Magnoliopsida	Linales	Linaceae	Linum	puberulum	(Engelm.) Heller			Plains flax	(Warnock & M	Expected
1150	Magnoliophyta	Magnoliopsida	Linales	Linaceae	Linum	rupestre	(Gray) Engelm. ex Gray			Rock flax		Known
1151	Magnoliophyta	Magnoliopsida	Linales	Linaceae	Linum	vernale	Woot.			Chihuahuan flax		Known
1152	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Abutilon	malacum	S. Wats.			Yellow indian mallow		Known
1153	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Abutilon	parvulum	Gray			Dwarf indian mallow		Expected
1154	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Abutilon	wrightii	Gray			Wright's indian mallow		Known
1155	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Anoda	cristata	(L.) Schlecht.			Crested anoda		Known
1156	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Herissantia	crispa	(L.) Briz.			Bladdermallow		Expected
1157	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Hibiscus	denudatus	Benth.			Paleface		Known
1158	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Malva	neglecta	Wallr.			Common mallow		Known
1159	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Malva	parviflora	L.			Cheeseweed mallow		Known
1160	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Malvella	lepidota	(Gray) Fryxell			Scruffymallow		Known
1161	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Malvella	lepidota	(Gray) Fryxell.	var.	depauperata	Scurfymallow		Known
1162	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Malvella	leprosa	(Ortega) Krapov.			Alkali mallow		Known
1163	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Rhynchosida	physocalyx	(Gray) Fryxell			Buffpetal		Known
1164	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sida	abutifolia	P. Mill.			Common wireweed		Expected
1165	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	angustifolia	(Cav.) G. Don			Copper globemallow		Known
1166	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	angustifolia	(Cav.) G. Don.	var.	cuspidata	Copper globemallow		Known

1167	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	coccinea	(Pursh) Rydb.			Scarlet globemallow		Known
1168	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	coccinea	(Nutt.) Rydb.	var.	elata	Scarlet globemallow	M. C. Johnstor	Expected
1169	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	digitata	(Greene) Rydb.			Juniper globemallow		Known
1170	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	digitata	(Greene) Rydb.	var.	tenuipes	Juniper globemallow		Known
1171	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	fendleri	Gray			Fendler's globemallow		Known
1172	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	grossulariifolia				Globemallow		Expected
1173	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	hastulata	Gray			Globemallow		Expected
1174	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	incana	Torr. ex Gray			Gray globemallow		Expected
1175	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	leptophylla	(Gray) Rydb.			Scaly globemallow		Known
1176	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	polychroma	La Duke			Hot springs globemallow		Known
1177	Magnoliophyta	Magnoliopsida	Malvales	Malvaceae	Sphaeralcea	subhastata	Coult.			Wrinkled globemallow	(Engelm) Fern	Not Applicable
1178	Magnoliophyta	Magnoliopsida	Malvales	Sterculiaceae	Ayenia	filiformis	S. Wats.			Trans-Pecos ayenia		Not Applicable
1179	Magnoliophyta	Magnoliopsida	Malvales	Sterculiaceae	Ayenia	insulicola	Cristobal.			Dwarf ayenia		Known
1180	Magnoliophyta	Magnoliopsida	Malvales	Sterculiaceae	Ayenia	microphylla	Gray			Dense ayenia	Warnock &M.(	Not Applicable
1181	Magnoliophyta	Magnoliopsida	Myrtales	Lythraceae	Lythrum	californicum	Torr. & Gray			California loosestrife		Known
1182	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Calylophus	hartwegii	(Benth.) Raven			Hartweg's sundrops		Known
1183	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Calylophus	lavandulifolius	(Torr & Gray) Raven.	var.	lavandulifolius	Lavenderleaf sundrops		Known
1184	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Camissonia	chamaenerioides	(Gray) Raven			Longcapsule suncup		Expected
1185	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Epilobium	ciliatum	Raf.			Fringed willowherb		Known
1186	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Epilobium	ciliatum	Raf.	var.	watsonii	Fringed willowherb		Known
1187	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	coccinea	Nutt. ex Pursh			Scarlet bee blossom	(Torr & Gray) I	Not Applicable
1188	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	hexandra	Ort.			Harlequinbush		Known
1189	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	hexandra	Ortega	var.	gracilis	Harlequinbush		Known
1190	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	parviflora	Hook.			Lizard-tail		Known
1191	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	suffulta	Engelm ex Gray.			Kisses		Known
1192	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	suffulta	Engelm. ex Gray	var.	nealleyi	Nealley's kisses		Known
1193	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Gaura	villosa	Torr.			Woolly beeblossom		Expected
1194	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Ludwigia	peploides	(Kunth) Raven			Floating primrose-willow		Known
1195	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	albicaulis	Pursh			White evening-primrose		Known
1196	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	brachycarpa	Gray			Shortfruit evening-primrose		Expected
1197	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	elata	Kunth			Hooker's evening-primrose		Expected
1198	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	elata	Kunth	subsp.	hirsutissima	Hooker's evening-primrose		Expected
1199	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	engelmannii	(Small) Munz.			Engelman evening-primrose		Expected

1200	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	hookeri	T. & G.			Hooker evening-primrose		Known
1201	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	hookeri	T. & G.	subsp.	hirsutissima	Hooker's evening-primrose		Known
1202	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	neomexicana	(Small) Munz			New Mexico evening-primrose	(Gray) M. E. Jo	Expected
1203	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	organensis	Munz			Organ Mountain evening-primrose		Known
1204	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	pallida	Lindl.			Mountain evening-primrose	(Gray) Barneby	Expected
1205	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	pallida	Lindl.	subsp.	runcinata	Pale evening-primrose		Known
1206	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	primiveris	Gray	subsp.	primiveris	Desert evening primrose	(Small) Barneb	Known
1207	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	primiveris	Gray			Large yellow desert primrose		Known
1208	Magnoliophyta	Magnoliopsida	Myrtales	Onagraceae	Oenothera	speciosa	Nutt.			Pinkladies		Known
1209	Magnoliophyta	Magnoliopsida	Myrtales	Punicaceae	Punica	granatum	L.			Pomegranate		Known
1210	Magnoliophyta	Magnoliopsida	Papaverales	Fumariaceae	Corydalis	aurea	Willd.			Scrambled eggs		Known
1211	Magnoliophyta	Magnoliopsida	Papaverales	Papaveraceae	Argemone	chisosensis	G.B. Ownbery.			Chisos mountain pricklypoppy		Known
1212	Magnoliophyta	Magnoliopsida	Papaverales	Papaveraceae	Argemone	pleiacantha	Greene	var.	pinnatisecta	Scramento Prickly Poppy		Known
1213	Magnoliophyta	Magnoliopsida	Papaverales	Papaveraceae	Argemone	polyanthemos	(Fedde) G. B. Ownbey			Crested pricklypoppy	(Greenm.) Gar	Known
1214	Magnoliophyta	Magnoliopsida	Papaverales	Papaveraceae	Argemone	squarrosa	Greene.			Hedgehog pricklypoppy		Expected
1215	Magnoliophyta	Magnoliopsida	Papaverales	Papaveraceae	Eschscholtzia	californica	Cham.			Mexican gold poppy		Expected
1216	Magnoliophyta	Magnoliopsida	Papaverales	Papaveraceae	Eschscholzia	californica	Cham.	var.	mexicana	California poppy		Expected
1217	Magnoliophyta	Magnoliopsida	Piperales	Saururaceae	Anemopsis	californica	(Nutt.) Hook. & Arn.			Yerba mansa		Known
1218	Magnoliophyta	Magnoliopsida	Plantaginales	Plantaginaceae	Plantago	hookeriana	Fisch. & C. A. May			California plantain	(Torr.)(Shinne	Expected
1219	Magnoliophyta	Magnoliopsida	Plantaginales	Plantaginaceae	Plantago	major	L.			Common plantain		Known
1220	Magnoliophyta	Magnoliopsida	Plantaginales	Plantaginaceae	Plantago	patagonica	Jacq.			Woolly plantain		Known
1221	Magnoliophyta	Magnoliopsida	Plantaginales	Plantaginaceae	Plantago	rhodosperma	Dcne.			Wright's plantain		Known
1222	Magnoliophyta	Magnoliopsida	Plantaginales	Plantaginaceae	Plantago	virginica	L.			Virginia plantain	Spreng.	Not Applicable
1223	Magnoliophyta	Magnoliopsida	Plumbaginales	Plumbaginaceae	Limonium	limbatum	Small			Trans-Pecos sealavender		Known
1224	Magnoliophyta	Magnoliopsida	Polygalales	Krameriaceae	Krameria	grayi	Rose & Painter			White ratany	(M. E. Jones) B	Expected
1225	Magnoliophyta	Magnoliopsida	Polygalales	Krameriaceae	Krameria	lanceolata	Torr.			Trailing krameria		Known
1226	Magnoliophyta	Magnoliopsida	Polygalales	Krameriaceae	Krameria	parvifolia	Benth	var.	glandulosa	Littleleaf ratany		Known
1227	Magnoliophyta	Magnoliopsida	Polygalales	Krameriaceae	Krameria	parvifolia	(Benth.)			Ranger ratany		Expected
1228	Magnoliophyta	Magnoliopsida	Polygalales	Krameriaceae	Krameria	ramosissima	(Gray) S. Wats.			Manystem ratany		Known
1229	Magnoliophyta	Magnoliopsida	Polygalales	Malpighiaceae	Janusia	gracilis	Gray			Slender janusia		Known
1230	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Eriogonum	abertianum	Torr.	var.	abertianum	Abert's buckwheat		Known
1231	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	alba	Nutt.			White milkwort		Known
1232	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	barbeyana	Chod.			Blue milkwort		Known

1233	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	lindheimeri	Gray			Shrubby milkwort		Expected
1234	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	lindheimeri	Gray	var.	parvifolia	Shrubby milkwort		Known
1235	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	macradenia	Gray			Glandleaf milkwort		Expected
1236	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	obscura	Benth.			Veiledseed milkwort		Known
1237	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	reducta	Blake			Blue milkwort		Known
1238	Magnoliophyta	Magnoliopsida	Polygonales	Polygalaceae	Polygala	scoparioides	Chod.			Broom milkwort		Known
1239	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	abertianum	Torr.	var.	cyclosepalum	Abert's buckwheat		Known
1240	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	abertianum	Torr.			Wild buckwheat		Expected
1241	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	alatum	Torr.			Winged buckwheat		Known
1242	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	annuum	Nutt.			Annual buckwheat		Known
1243	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	havardii	S. Wats.			Harvard's buckwheat		Known
1244	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	hieraciifolium	Benth.			Hawkweed wild buckwheet		Known
1245	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	jamesii	Benth.			Antelope sage		Known
1246	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	jamesii	Benth.	var.	jamesii	James' buckwheat		Known
1247	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	polycladon	Benth.			Sorrel buckwheat		Known
1248	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	rotundifolium	Benth.			Roundleaf wild buckwheat		Known
1249	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	trichopes	Torr.	var.	trichopes	Little desert trumpet		Known
1250	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	trichopes	Torr.			Wild buckwheat		Known
1251	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	wrightii	Torr.			Bastardsage		Known
1252	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Eriogonum	wrightii	Torr. ex Benth.	var.	wrightii	Bastardsage		Known
1253	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Polygonum	amphibium	L.			Water knotweed		Known
1254	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Polygonum	argyrocoleon	Steud. ex Kunze.			Silver-sheath knotweed		Known
1255	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Polygonum	aviculare	L.			Prostrate knotweed		Known
1256	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Polygonum	lapathifolium	L.			Curlytop knotweed		Known
1257	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Polygonum	pensylvanicum	L.			Pensylvania smartweed	(Benth.) Barne	Known
1258	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Polygonum	persicaria	L.			Spotted ladysthumb		Expected
1259	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Rumex	crispus	L.			Curly dock		Known
1260	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Rumex	crispus	L.	var.	crispus	Curly dock		Expected
1261	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Rumex	hymenosepalus	Torr.			Canaigre dock		Known
1262	Magnoliophyta	Magnoliopsida	Polygonales	Polygonaceae	Rumex	violascens	Reich. F.			Violet dock		Known
1263	Magnoliophyta	Magnoliopsida	Primulales	Primulaceae	Androsace	occidentalis	Pursh			Western rockjasmine		Known
1264	Magnoliophyta	Magnoliopsida	Primulales	Primulaceae	Anagallis	minima	L.			Chaffweed		Known
1265	Magnoliophyta	Magnoliopsida	Primulales	Primulaceae	Samolus	ebracteatus	Kunth			Limewater brookweed		Known

1266	Magnoliophyta	Magnoliopsida	Primulales	Primulaceae	Samolus	ebracteatus	Kunth	var.	cuneatus	Limewater brookweed		Known
1267	Magnoliophyta	Magnoliopsida	Rafflesiales	Rafflesiaceae	Pilostyles	thurberi	Gray			Thurber's stemsucker		Known
1268	Magnoliophyta	Magnoliopsida	Ranunculales	Berberidaceae	Berberis	haematocarpa	Woot.			Red barberry	(L. Benson) M.	Known
1269	Magnoliophyta	Magnoliopsida	Ranunculales	Berberidaceae	Berberis	trifoliolata	Moric.			Algerita		Expected
1270	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Anemone	tuberosa	Rydb.			Desert windflower		Known
1271	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Anemone	tuberosa	Rydb.	var.	tuberosa	Tuber anemone		Known
1272	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Aquilegia	chrysantha	Gray			Golden columbine	(Torr. & Gray)	Known
1273	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Aquilegia	chrysantha	Gray	var.	chrysantha	Golden columbine		Known
1274	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Clematis	drummondii	Torr. & Gray			Drummond's clematis		Expected
1275	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Clematis	ligusticifolia	Nutt.			Western white clematis		Known
1276	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Clematis	ligusticifolia	Nutt.	var.	ligusticifolia	Western white clematis		Known
1277	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Delphinium	wootonii	Rydb.			Organ Mountain larkspur		Known
1278	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Myosurus	cupulatus	S. Wats.			Arizona mousetail		Known
1279	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Myosurus	minimus	L.			Tiny mousetail		Expected
1280	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Thalictrum	fendleri	Engelm ex Gray			Fendler's meadow-rue		Expected
1281	Magnoliophyta	Magnoliopsida	Ranunculales	Ranunculaceae	Thalictrum	fendleri	Engelm. ex Gray	var.	wrightii	Wright's meadow-rue		Known
1282	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Ceanothus	greggii	Gray			Desert ceanothus		Expected
1283	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Ceanothus	greggii	Gray	var.	greggii	Desert ceanothus		Expected
1284	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Condalia	ericoides	(Gray) M. C. Johnston			Javelin bush		Known
1285	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Condalia	warnockii	M. C. Johnst.			Condalia		Known
1286	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Condalia	warnockii	M. C. Johnston	var.	warnockii	Warnock's snakewood		Known
1287	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Ziziphus	obtusifolia	(T. & G.) Gray			Lotebush		Known
1288	Magnoliophyta	Magnoliopsida	Rhamnales	Rhamnaceae	Ziziphus	obtusifolia	(Hook. ex Torr. & Gray) Gray	var.	obtusifolia	Lotebush		Known
1289	Magnoliophyta	Magnoliopsida	Rhamnales	Vitaceae	Parthenocissus	vitacea	(Knerr) A. S. Hitchc.			Woodbine		Known
1290	Magnoliophyta	Magnoliopsida	Rhamnales	Vitaceae	Vitis	arizonica	Engelm.			Canyon grape		Known
1291	Magnoliophyta	Magnoliopsida	Rosales	Crassulaceae	Sedum	cockerellii	Britt.			Cockerell's stonecrop		Known
1292	Magnoliophyta	Magnoliopsida	Rosales	Crassulaceae	Sedum	wrightii	Gray			Wright's stonecrop		Known
1293	Magnoliophyta	Magnoliopsida	Rosales	Crassulaceae	Sedum	wrightii	Gray	var.	priscum	Wright's stonecrop		Not Applicable
1294	Magnoliophyta	Magnoliopsida	Rosales	Crossosomataceae	Apacheria	chiricahuensis	C. T. Mason			Apachebush		Known
1295	Magnoliophyta	Magnoliopsida	Rosales	Crossosomataceae	Glossopetalon	spinescens	Gray			Spiny greasebush		Known
1296	Magnoliophyta	Magnoliopsida	Rosales	Crossosomataceae	Glossopetalon	spinescens	Gray	var.	spinescens	Spiny greasebush		Known
1297	Magnoliophyta	Magnoliopsida	Rosales	Grossulariaceae	Ribes	leptanthum	Gray			Trumpet gooseberry		Known
1298	Magnoliophyta	Magnoliopsida	Rosales	Grossulariaceae	Ribes	montigenum	McClatchie			Gooseberry currant		Known

1299	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Fendlera	rupicola	Gray			Cliff fendlerbush		Expected
1300	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Fendlera	rupicola	Gray	var.	rupicola	Cliff fendlerbush		Known
1301	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Fendlerella	utahensis	(S. Wats.) Heller			Utah fendlerbush	Kearney & Pee	Expected
1302	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Fendlerella	utahensis	(S. Wats.) Heller	var.	cymosa	Utah fendlerbush		Known
1303	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Jamesia	americana	Torr. & Gray			Fivepetal cliffbush		Known
1304	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Jamesia	americana	Torr. & Gray	var.	americana	Fivepetal cliffbush		Known
1305	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Philadelphus	argenteus	Rydb.			Silver mock orange		Expected
1306	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Philadelphus	mearnsii	W. H. Evans ex Koehne			Mearns' mock orange		Known
1307	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Philadelphus	microphyllus	A. Gray			Littleleaf mock orange		Known
1308	Magnoliophyta	Magnoliopsida	Rosales	Hydrangeaceae	Philadelphus	microphyllus	Gray	var.	argenteus	Silver mock orange		Expected
1310	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Cercocarpus	breviflorus	Gray	var.	breviflorus	Hairy mountain mahogany		Known
1311	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Cercocarpus	montanus	Raf.	var.	paucidentatus	Hairy mountain mahogany		Known
1312	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Cercocarpus	montanus	Raf.			Mountain mahogany		Known
1313	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Fallugia	paradoxa	(D. Don) Endl. ex Torr.			Apache plume		Known
1314	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Holodiscus	dumosus	(Nutt. ex Hook.) Heller			Rockspirea		Known
1315	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Petrophytum	caespitosum	Rydb.			Rock-spiraea		Expected
1316	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Potentilla	hippiana	Lehm.			Woolly cinquefoil	(Vail) Shinners	Known
1317	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Potentilla	pennsylvanica	L.			Pennsylvania cinguefoil		Known
1318	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Potentilla	thurberi	Gray			Scarlet cinquefoil		Expected
1319	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Prunus	serotina	Ehrh.			Black cherry		Expected
1320	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Rosa	stellata	Woot.			Desert rose		Known
1321	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Rosa	woodsii	Lindl.	var.	woodsii	Woods' rose		Known
1322	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Rosa	woodsii	Lindl.			Wood's rose		Known
1323	Magnoliophyta	Magnoliopsida	Rosales	Rosaceae	Rubus	neomexicanus	Gray			New Mexico raspberry		Known
1324	Magnoliophyta	Magnoliopsida	Rosales	Saxifragaceae	Heuchera	parvifolia	Nutt. ex Torr. & Gray			Littleleaf alumroot	(Woot. & Stan	Known
1325	Magnoliophyta	Magnoliopsida	Rosales	Saxifragaceae	Heuchera	rubescens	Torr.	var.	versicolor	Pink alumroot		Known
1326	Magnoliophyta	Magnoliopsida	Rosales	Saxifragaceae	Heuchera	rubescens	Torr.			Red alumroot		Known
1327	Magnoliophyta	Magnoliopsida	Rosales	Saxifragaceae	Heuchera	versicolor	(Greene) Kearn. & Peeb.	var.	leptomeria	Pink Alumroot		Expected
1328	Magnoliophyta	Magnoliopsida	Rosales	Saxifragaceae	Saxifraga	eriophora	S. Wats.			Redfuzz saxifrage		Expected
1329	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Galium	aparine	L.			Stickywilly		Expected
1330	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Galium	microphyllum	Gray			Bracted bedstraw		Known
1331	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Galium	proliferum	Gray			Limestone bedstraw		Known
1332	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Galium	wrightii	Gray			Wright's bedstraw		Known

1333	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Houstonia	humifusa	Gray			Mat bluets	Cronq.	Not Applicable
1334	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Houstonia	rubra	(Cav.) Gray			Red bluet		Known
1335	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Houstonia	acerosa	(Gray) Gray ex Bentham & Hooke.			Needleleaf bluet		Expected
1336	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Houstonia	acerosa	(Gray) Gray ex Benth.	var.	bigelovii	Needleleaf bluet		Known
1337	Magnoliophyta	Magnoliopsida	Rubiales	Rubiaceae	Houstonia	intricata	Gray, non Bertol.			Cluster bluet	I. M. Johnst.	Known
1338	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Populus	angustifolia	James			Narrowleaf cottonwood		Known
1339	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Populus	deltoides	Bart. ex. Marsh			Plains cottonwood		Known
1340	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Populus	deltoides	Bartr. ex Marsh.	subsp.	wislizenii	Rio Grande cottonwood		Known
1341	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Populus	tremuloides	Michx.			Quaking aspen		Expected
1342	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Salix	amygdaloides	Anderss.			Peachleaf willow		Known
1343	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Salix	exigua	Nutt.			Narrowleaf willow	(Greene) J. F. M	Expected
1344	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Salix	gooddingii	Ball			Goodding's willow		Expected
1345	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Salix	lasiolepis	Benth.	var.	lasiolepis	Arroyo willow		Known
1346	Magnoliophyta	Magnoliopsida	Salicales	Salicaceae	Salix	lasiolepis	Benth.			Narrowleaf arroyo willow		Expected
1347	Magnoliophyta	Magnoliopsida	Santalales	Santalaceae	Comandra	umbellata	(L.) Nutt.			Bastard toadflax	Gentry	Expected
1348	Magnoliophyta	Magnoliopsida	Santalales	Santalaceae	Comandra	umbellata	(L.) Nutt.	var.	pallida	Pale bastard toadflax		Expected
1349	Magnoliophyta	Magnoliopsida	Sapindales	Aceraceae	Acer	grandidentatum				Bigtooth maple		Known
1350	Magnoliophyta	Magnoliopsida	Sapindales	Aceraceae	Acer	grandidentatum	Nutt.	var.	sinuosum	Canyon maple		Known
1351	Magnoliophyta	Magnoliopsida	Sapindales	Aceraceae	Acer	negundo				Boxelder		Known
1352	Magnoliophyta	Magnoliopsida	Sapindales	Rutaceae	Choisya	dumosa	(Torr.) Gray			Mexican orange		Known
1353	Magnoliophyta	Magnoliopsida	Sapindales	Rutaceae	Ptelea	trifoliata	L.			Common hoptree		Known
1354	Magnoliophyta	Magnoliopsida	Sapindales	Rutaceae	Thamnosma	texana	(Gray) Torr.			Rue of the mountains	(Gray) Higgins	Known
1355	Magnoliophyta	Magnoliopsida	Sapindales	Sapindaceae	Koelreuteria	paniculata	Laxm.			Golden rain-tree		Known
1356	Magnoliophyta	Magnoliopsida	Sapindales	Sapindaceae	Sapindus	saponaria	L.			Soap-berry		Known
1357	Magnoliophyta	Magnoliopsida	Sapindales	Sapindaceae	Sapindus	saponaria	L.	var.	drummondii	Western soapberry		Expected
1358	Magnoliophyta	Magnoliopsida	Sapindales	Sapindaceae	Ungnadia	speciosa	Endl.			Mexican buckeye		Known
1359	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Kallstroemia	californica	(S. Wats.) Vail			California caltrop		Known
1360	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Kallstroemia	grandiflora	Gray			Orange caltrop		Known
1361	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Kallstroemia	hirsutissima	Vail ex Small			Hairy caltrop		Known
1362	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Kallstroemia	parviflora	J. B. S. Norton			Warty caltrop		Known
1363	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Larrea	tridentata	(DC.) Cov.			Creosote bush		Known
1364	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Larrea	tridentata	(Sesse & Moc. ex DC.) Coville	var.	tridentata	Creosote bush		Known
1365	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Peganum	harmala	L.			African Rue		Known

1366	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Tribulus	terrestris	L.			Puncturevine		Known
1367	Magnoliophyta	Magnoliopsida	Sapindales	Zygophyllaceae	Zygophyllum	fabago	L.			Syrian beancaper		Known
1368	Magnoliophyta	Magnoliopsida	Scrophulariales	Acanthaceae	Carlowrightia	linearifolia	(Torr.) Gray			Heath wrightwort		Known
1369	Magnoliophyta	Magnoliopsida	Scrophulariales	Acanthaceae	Carlowrightia	serpyllifolia	Gray			Trans-Pecos wrightwort		Not Applicable
1370	Magnoliophyta	Magnoliopsida	Scrophulariales	Acanthaceae	Dyschoriste	decumbens	(Gray) Kuntze			Spreading snakeherb	(Woot. & Stan	Expected
1371	Magnoliophyta	Magnoliopsida	Scrophulariales	Acanthaceae	Ruellia	parryi	Gray			Parry's wild petunia		Expected
1372	Magnoliophyta	Magnoliopsida	Scrophulariales	Acanthaceae	Stenandrium	barbatum	Torr. & Gray			Shaggy stenandrium		Known
1373	Magnoliophyta	Magnoliopsida	Scrophulariales	Bignoniaceae	Chilopsis	linearis	(Cav.) Sweet			Desert willow		Expected
1374	Magnoliophyta	Magnoliopsida	Scrophulariales	Bignoniaceae	Chilopsis	linearis	(Cav.) Sweet	var.	linearis	Desert willow		Known
1375	Magnoliophyta	Magnoliopsida	Scrophulariales	Bignoniaceae	Tecoma	stans	(L.) Juss.			Esperanza		Known
1376	Magnoliophyta	Magnoliopsida	Scrophulariales	Bignoniaceae	Tecoma	stans	(L.) Juss. ex Kunth	var.	angustatum	Yellow trumpetbush		Known
1377	Magnoliophyta	Magnoliopsida	Scrophulariales	Oleaceae	Forestiera	pubescens	Nutt.			Stretchberry		Known
1378	Magnoliophyta	Magnoliopsida	Scrophulariales	Oleaceae	Forestiera	pubescens	Nutt.	var.	pubescens	Stretchberry		Known
1379	Magnoliophyta	Magnoliopsida	Scrophulariales	Oleaceae	Fraxinus	cuspidata	Torr.			Fragrant ash		Known
1380	Magnoliophyta	Magnoliopsida	Scrophulariales	Oleaceae	Fraxinus	velutina	Torr.			Velvet ash	(Epling) Scora	Expected
1381	Magnoliophyta	Magnoliopsida	Scrophulariales	Oleaceae	Menodora	longiflora	Gray			Showy menodora		Known
1382	Magnoliophyta	Magnoliopsida	Scrophulariales	Oleaceae	Menodora	scabra	Gray			Rough menodora		Known
1383	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Conopholis	alpina	Liebm.			Alpine squawroot		Expected
1384	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Conopholis	alpina	Liebm.	var.	mexicana	American squawroot		Known
1385	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Orobanche	cooperi	(Gray) Heller.			Desert broomrape		Known
1386	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Orobanche	cooperi	(Gray) Heller	subsp.	cooperi	Desert broomrape		Known
1387	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Orobanche	fasciculata	Nutt.			Clustered broomrape		Known
1388	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Orobanche	ludoviciana	Nutt.			Louisiana broomrape		Known
1389	Magnoliophyta	Magnoliopsida	Scrophulariales	Orobanchaceae	Orobanche	ludoviciana	Nutt.	subsp.	multiflora	Manyflower broomrape		Expected
1390	Magnoliophyta	Magnoliopsida	Scrophulariales	Pedaliaceae	Proboscidea	altheaifolia	(Benth.) Dcne.			Desert unicorn-plant		Known
1391	Magnoliophyta	Magnoliopsida	Scrophulariales	Pedaliaceae	Proboscidea	parviflora	(Woot.) Woot. & Standl.			Devil's claw		Known
1392	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Bacopa	rotundifolia	(Michx.) Wettst.			Disk waterhyssop		Known
1393	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Castilleja	integra	Gray			Wholeleaf Indian paintbrush		Known
1394	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Castilleja	lanata	Gray			Sierra woolly Indian paintbrush		Known
1395	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Castilleja	latebracteata	Penn.			Broadbract Indian paintbrush		Known
1396	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Castilleja	organorum	Standl.			Organ Mountain Indian paintbrush	Rydb ex Small	Not Applicable
1397	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Castilleja	sessiliflora	Pursh			Downy paintedcup	Rydb ex Small	Not Applicable
1398	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Cordylanthus	wrightii	Gray			Wright's bird's beak		Known

1399	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Cordylanthus	wrightii	Gray	var.	wrightii	Wright's bird's beak		Expected
1400	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Leucophyllum	minus	Gray			Big Bend barometerbush		Known
1401	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Maurandella	antirrhiniflora	(Humb. & Bonpl. ex Willd.) Rothm.			Blue snapdragon vine		Known
1402	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Epixiphium	wislizenii	Engelm. ex Gray			Balloonsepal maurandya		Known
1403	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Mimulus	glabratus	Kunth			Roundleaf monkeyflower	(Woot & Stand	Not Applicable
1404	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Mimulus	guttatus	DC.			Seep monkeyflower		Known
1405	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Mimulus	rubellus	Gray			Little redstem monkeyflower		Known
1406	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	alamosensis	Pennell & Nisbet			Alamo beardtongue		Known
1407	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	ambiguus	Torr.			Gilia beardtongue		Known
1408	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	barbatus	(Cav.) Roth			Beardlip penstemon		Expected
1409	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	barbatus	(Cv.) roth	subsp.	torreyi	Torrey's penstemon		Known
1410	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	fendleri	Torr. & Gray			Fendler's penstemon		Known
1411	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	jamesii	Benth.			James' beard tongue		Known
1412	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	linarioides	Gray			Toadflak penstemon		Known
1413	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	linarioides	Gray	subsp.	linarioides	Toadflax beardtongue		Expected
1414	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	palmeri	Gray			Palmer's penstemon		Known
1415	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	palmeri	Gray	subsp.	palmeri	Scented beardtongue		Known
1416	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	pseudospectabilis	M. E. Jones	subsp.	connatifolius	Desert beardtongue		Known
1417	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Penstemon	pseudospectabilis	M.E. Jones			Desert penstemon		Known
1418	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Scrophularia	laevis	Woot. & Standl.			Organ Mountain figwort		Known
1419	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Verbascum	thapsus	L.			Flannel mullein		Known
1420	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Veronica	americana	(Raf.) Schwein			American brookline		Known
1421	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Veronica	anagallis-aquatica	L.			Water speedwell		Known
1422	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Veronica	peregrina	L.	var.	xalapensis	Hairy purslane speedwell		Known
1423	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Veronica	peregrina	L.			Neckweed		Expected
1424	Magnoliophyta	Magnoliopsida	Scrophulariales	Scrophulariaceae	Veronica	persica	Poir.			Birdeye speedwell		Known
1425	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Convolvulus	arvensis	L.			Mallow bindweed		Known
1426	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Convolvulus	equitans	Benth.			Texas bindweed	(Gray) I. Clem	Not Applicable
1427	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Cressa	truxillensis	Kunth			Spreading alkaliweed		Known
1428	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Dichondra	argentea	Humb. & Bonpl. ex Willd.			Silver ponysfoot		Known
1429	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Dichondra	brachypoda	Woot. & Standl.			New Mexico ponysfoot		Known
1430	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Evolvulus	alsinoides				Slender dwarf morning-glory		Known
1431	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Evolvulus	alsinoides	(L.) L.	var.	angustifolius	Slender dwarf morning-glory	Gray	Not Applicable

1432	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Evolvulus	arizonicus	Gray			Wild dwarf morning-glory		Known
1433	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Evolvulus	nuttallianus	J. A. Schultes			Shaggy dwarf morning-glory	(E. G. Baker) K	Known
1434	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Evolvulus	sericeus				Silver dwarf morning-glory		Known
1435	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Evolvulus	sericeus	Sw.	var.	sericeus	Silver dwarf morning-glory	(Woot. & Stan	Known
1436	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	barbatisepala	Gray			Canyon morning-glory		Known
1437	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	cardiophylla	Gray			Heartleaf morning-glory		Known
1438	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	costellata	Torr.			Crestrib morning-glory		Known
1439	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	cristulata	Hallier F.			Trans-Pecos morning-glory		Known
1440	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	hederacea	Jacq.			Ivyleaf morning-glory		Known
1441	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	lindheimeri	Gray			Lindheimer's mornng-glory		Known
1442	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	pubescens				Silky morning-glory		Known
1443	Magnoliophyta	Magnoliopsida	Solanales	Convolvulaceae	Ipomoea	purpurea	(L.) Roth			Tall morning-glory		Known
1444	Magnoliophyta	Magnoliopsida	Solanales	Cuscutaceae	Cuscuta	applanata	Engelm.			Gila River dodder		Known
1445	Magnoliophyta	Magnoliopsida	Solanales	Cuscutaceae	Cuscuta	decipiens	Yuncker			Trans-Pecos dodder		Known
1446	Magnoliophyta	Magnoliopsida	Solanales	Cuscutaceae	Cuscuta	indecora	Choisy			Bigseed alfalfa dodder		Known
1447	Magnoliophyta	Magnoliopsida	Solanales	Cuscutaceae	Cuscuta	umbellata	Kunth			Flatglobe dodder		Known
1448	Magnoliophyta	Magnoliopsida	Solanales	Fouquieriaceae	Fouquieria	splendens	Engelm.			Ocotillo	(Torr & Gray) S	Not Applicable
1449	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Eucrypta	micrantha	(Torr.) Heller			Dainty desert hideseed		Known
1450	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Nama	carnosum	(Woot.) C. L. Hitchc.			Sand fiddleleaf		Known
1451	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Nama	dichotomum	(Ruiz & Pavon) Choisy			Wishbone fiddleleaf	(Barbey) Hoch	Expected
1452	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Nama	hispidum	Gray			Bristly nama		Known
1453	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Nama	xylopodum	(Woot. & Standl.) C. L. Hitchc.			Yellowseed fiddleleaf		Known
1454	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	coerulea	Greene			Skyblue phacelia	(Woot. & Stan	Expected
1455	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	congesta	Hook.			Caterpillars		Known
1456	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	integrifolia	Torr.			Crenate leaf phacelia		Known
1457	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	integrifolia	Torr.	var.	integrifolia	Gypsum phacelia	(Coulter) Rave	Expected
1458	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	intermedia	Woot.			Clefleaf wildheliotrope		Expected
1459	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	popei	Torr. & Gray			Pope's phacelia		Expected
1460	Magnoliophyta	Magnoliopsida	Solanales	Hydrophyllaceae	Phacelia	rupestris	Greene			Rock phacelia		Known
1461	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Eriastrum	diffusum	(Gray) Mason			Miniature woollystar		Known
1462	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Gilia	flavocincta	A. Nels.	var.	australis	Lesser yellowthroat gilia		Known
1463	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Gilia	flavocincta	A. Nels.			Yellow-throat gilia	(Gray ex S. Wa	Expected
1464	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Gilia	mexicana	A. & V. Grant			El Paso gilia		Known

1465	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Gilia	acerosa	Benth.			Bluebowls		Expected
1466	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Giliastrum	rigidula	Benth. var. acerosa (Gray)Wherry			Gilia	(Gray) Munz	Not Applicable
1467	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	aggregata	(Pursh) V.Grant			Scarlet gilia		Known
1468	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	aggregata	(Pursh) V. Grant	var.	aggregata	Scarlet gilia		Known
1469	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	longiflora	(Torr.) V. Grant	var.	longiflora	Flaxflowered ipomopsis		Known
1470	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	longiflora	(Torr.) V. Grant			Trumpet flower	(Engelm.) Mun	Expected
1471	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	multiflora	(Nutt.) V. Grant			Manyflowered ipomopsis		Known
1472	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	polycladon	(Torr.) V. Grant			Sprawling ipomopsis		Known
1473	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	pumila	(Nutt.) V. Grant			Dwarf ipomopsis		Expected
1474	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Ipomopsis	wrightii	(Gray) Gould			Leafy skyrocket		Known
1475	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Linanthus	bigelovii	(Gray) Greene			Bigelow's linanthus		Known
1476	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Phlox	longifolia	Nutt.			Longleaf phlox		Known
1477	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Phlox	nana	Nutt.			Santa Fe phlox	G.B. Ownbey	Known
1478	Magnoliophyta	Magnoliopsida	Solanales	Polemoniaceae	Phlox	triovulata	Thurb. ex Torr.			Threeseed phlox		Known
1479	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Chamaesaracha	conoides	(Moric. ex Dunal) Britt.			Gray five eyes		Known
1480	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Chamaesaracha	coronopus	(Dunal) Gray			Greenleaf five eyes		Known
1481	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Chamaesaracha	sordida	(Dunal) Gray			Hairy five eyes	(Greene) C. Cl	Known
1482	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Datura	quercifolia	Kunth			Chinese thorn-apple		Expected
1483	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Datura	wrightii	Regel			Sacred thorn-apple		Expected
1484	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Lycium	berlandieri	Dunal			Berlandier wolfberry		Known
1485	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Lycium	pallidum	Miers	var.	pallidum	Pale desert-thorn		Known
1486	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Lycium	pallidum	Piers			Pale wolfberry		Expected
1487	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Lycium	torreyi	Gray			Squawthorn		Expected
1488	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Nicotiana	glauca	Graham			Tree tobacco		Expected
1489	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Nicotiana	trigonophylla	Dunal			Desert tobacco		Expected
1490	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	acutifolia	(Miers) Sandw.			Sharpleaf groundcherry		Known
1491	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	cinerascens	(Dunal) A. S. Hitchc.			Smallflower groundcherry	(Rose & Painte	Not Applicable
1492	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	hederaefolia	Gray			Groundcherry		Known
1493	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	hederaefolia	Gray	var.	hederaefolia	Ivyleaf groundcherry		Expected
1494	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	hederifolia	Gray.	var.	cordifolia	Fendler's groundcherry		Known
1495	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	solanaceus	(Schlecht.) Axelius			Neted globecherry		Known
1496	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	subulata	Rydb.			Chihuahuan groundcherry		Known
1497	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Physalis	subulata	Rydb.	var.	neomexicana	New Mexico groundcherry		Known

1498	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Quincula	lobata	(Torr.) Raf.			Purple groundcherry		Known
1499	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	americanum	P. Mill.			American black nightshade	Wheelock	Known
1500	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	citrullifolium	A. Br.			Melon-leaf nightshade		Known
1501	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	elaeagnifolium	Cav.			Silverleaf nightshade		Known
1502	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	fendleri	Gray ex Torr.			Fendler's horsenettle		Known
1503	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	heterodoxum	Dunal			Melonleaf nightshade		Known
1504	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	jamesii	Torr.			Wild potato	(Greene) Fosb	Expected
1505	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	rostratum	Dunal			Buffalobur nightshade		Known
1506	Magnoliophyta	Magnoliopsida	Solanales	Solanaceae	Solanum	triflorum	Nutt.			Cutleaf nightshade		Expected
1507	Magnoliophyta	Magnoliopsida	Urticales	Moraceae	Morus	alba	L.			White mulberry		Known
1508	Magnoliophyta	Magnoliopsida	Urticales	Moraceae	Morus	microphylla	Buckl.			Texas mulberry		Known
1509	Magnoliophyta	Magnoliopsida	Urticales	Ulmaceae	Celtis	laevigata	Wild.			Hetleaf hackberry		Known
1510	Magnoliophyta	Magnoliopsida	Urticales	Ulmaceae	Celtis	laevigata	Willd.	var.	reticulata	Netleaf hackberry		Known
1511	Magnoliophyta	Magnoliopsida	Urticales	Ulmaceae	Celtis	pallida	Torr.			Spiny hackberry		Known
1512	Magnoliophyta	Magnoliopsida	Urticales	Ulmaceae	Celtis	tenuifolia	Nutt.	var.	smallii	Dwarf hackberry		Known
1513	Magnoliophyta	Magnoliopsida	Urticales	Ulmaceae	Ulmus	pumila	L.			Siberian elm		Known
1514	Magnoliophyta	Magnoliopsida	Urticales	Urticaceae	Parietaria	pensylvanica	Muhl. ex Willd.	var.	obtusa	Pennsylvania pellitory		Expected
1515	Magnoliophyta	Magnoliopsida	Urticales	Urticaceae	Parietaria	pensylvanica	Muhl. ex Willd.			Pennsylvania pellitory		Known
1516	Magnoliophyta	Magnoliopsida	Urticales	Urticaceae	Urtica	gracilenta	Greene			Mountain nettle		Known
1517	Magnoliophyta	Magnoliopsida	Violales	Cucurbitaceae	Apodanthera	undulata	Gray			Melon loco		Known
1518	Magnoliophyta	Magnoliopsida	Violales	Cucurbitaceae	Cucurbita	digitata	Gray			Fingerleaf gourd		Expected
1519	Magnoliophyta	Magnoliopsida	Violales	Cucurbitaceae	Cucurbita	foetidissima	Kunth			Buffalo gourd		Known
1520	Magnoliophyta	Magnoliopsida	Violales	Cucurbitaceae	Ibervillea	tenuisecta	(Gray) Small			Slimlobe globeberry		Expected
1521	Magnoliophyta	Magnoliopsida	Violales	Cucurbitaceae	Sicyos	ampelophyllus	Woot. & Standl.			Streamside burr cucumber		Known
1522	Magnoliophyta	Magnoliopsida	Violales	Cucurbitaceae	Sicyos	glaber	Woot.			Smooth burr cucumber		Expected
1523	Magnoliophyta	Magnoliopsida	Violales	Frankeniaceae	Frankenia	jamesii	Torr. ex Gray			James' seaheath		Expected
1524	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Cevallia	sinuata	Lag.			Stinging serpent		Known
1525	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Mentzelia	albicaulis	(Dougl. ex Hook.) Douglas ex Torr. &			Whitestem blazingstar		Expected
1526	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Mentzelia	asperula	Woot. & Standl.			Organ Mountain blazingstar		Known
1527	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Mentzelia	montana	(A. Davids.) A. Davids.			Variegated-bract blazingstar		Expected
1528	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Mentzelia	multiflora	(Nutt.) Gray			Adonis blazingstar		Known
1529	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Mentzelia	oligosperma	Nutt. ex Sims			Chickenthief		Expected
1530	Magnoliophyta	Magnoliopsida	Violales	Loasaceae	Mentzelia	pumila	(Nutt.) Gray			Stick-leaf		Expected

1531	Magnoliophyta	Magnoliopsida	Violales	Tamaricaceae	Tamarix	ramosissima	Ledeb.			Saltcedar	(Small) R. Knut	Expected
1532	Magnoliophyta	Magnoliopsida	Violales	Violaceae	Hybanthus	verticillatus	(Ortega) Baill.	var.	verticillatus	Babyslippers		Known
1533	Magnoliophyta	Magnoliopsida	Violales	Violaceae	Hybanthus	verticillatus	(Ort.) Baill.			Green violet		Known
1534	Magnoliophyta	Magnoliopsida	Violales	Viscaceae	Arceuthobium	vaginatum	(Willd.) J. Presl			Pineland dwarf mistletoe		Known
1535	Magnoliophyta	Magnoliopsida	Violales	Viscaceae	Arceuthobium	vaginatum	(Willd.) J. Presl.	var.	cryptopodum	Pineland dwarf mistletoe		Known
1536	Magnoliophyta	Magnoliopsida	Violales	Viscaceae	Phoradendron	hawksworthii	(Wiens) Wiens			Hawksworth's mistletoe		Known
1537	Magnoliophyta	Magnoliopsida	Violales	Viscaceae	Phoradendron	tomentosum				Christmas mistletoe		Known
1538	Magnoliophyta	Magnoliopsida	Violales	Viscaceae	Phoradendron	villosum	(Nutt.) Nutt.			Oak mistletoe		Expected
1539	Magnoliophyta	Magnoliopsida	Violales	Viscaceae	Phoradendron	villosum	(Nutt.) Nutt.	var.	coryae	Oak mistletoe		Known

Section X: Magnoliophyta-Liliopsida (Monocots)

ID	Division	Class	Order	Family	Genus	Species	Species_Author	Prefix_	SubSpecies	Common Name	bSpecies_Auth	Presence
1540	Magnoliophyta	Liliopsida	Arales	Lemnaceae	Lemna	minor	L.			Common duckweed		Expected
1541	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Commelina	dianthifolia	DeLile			Birdbill dayflower		Known
1542	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Commelina	erecta	L.			Whitemouth dayflower	(Gray) Trel.	Expected
1543	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Commelina	erecta	L.	var.	angustifolia	Whitemouth dayflower		Known
1544	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Tradescantia	occidentalis	(Britt.) Smyth			Prairie spiderwort		Expected
1545	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Tradescantia	occidentalis	(Britt.) Smyth.	var.	scopulorum	Prairie spiderwort		Known
1546	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Tradescantia	wrightii	Rose & Bush			Wright spiderwort		Known
1547	Magnoliophyta	Liliopsida	Commelinales	Commelinaceae	Tradescantia	wrightii	Rose & Bush	var.	wrightii	Wright's spiderwort		Known
1548	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Carex	emoryi	Dewey			Emory's sedge		Known
1549	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Carex	frankii	Kunth			Frank's sedge		Known
1550	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Carex	microptera	MacKenzie			Smallwing sedge		Known
1551	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Carex	occidentalis	Bailey			Western sedge		Known
1552	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Carex	wootonii	MacKenzie			Wooton's sedge		Known
1553	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	croceus	Vahl			Baldwin's flatsedge		Known
1554	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	erythrorhizos	Muhl.			Redroot flatsedge	Clausen	Known
1555	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	esculentus	L.			Chuffa flatsedge		Expected
1556	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	fendlerianus	Boeckl.			Fendler's flatsedge		Known
1557	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	odoratus	L.			Fragrant flatsedge		Known
1558	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	retroflexus	Buckl.			Oneflower flatsedge		Known
1559	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	rotundus	L.			Nutgrass		Known

1560	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Cyperus	squarrosus	L.			Bearded flatsedge		Known
1561	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Eleocharis	geniculata	(L.) Roemer & J. A. Schultes			Canada spikesedge		Not Applicable
1562	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Eleocharis	palustris	(L.) Roemer & J. A. Schultes			Common spikerush		Known
1563	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Eleocharis	rostellata	(Torr.) Torr.			Beaked spikerush	(Greene ex W	Known
1564	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Schoenoplectus	acutus	(Muhl. ex Bigelow) A. & D. Love			Hardstem bullrush		Expected
1565	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Schoenoplectus	americanus	(Pers.) Volk. ex Schinz & R. Keller			Chairmaker's bullrush		Expected
1566	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Schoenoplectus	californicus	(C. A. Mey.) Palla			California bullrush		Known
1567	Magnoliophyta	Liliopsida	Cyperales	Cyperaceae	Schoenoplectus	maritimus	(L.) Lye			Cosmopolitan bullrush		Expected
1568	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Agrostis	exarata	Trinl			Spike bentgrass		Known
1569	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Agrostis	hyemalis	(Walt.) B. S. P.			Winter bentgrass	(Rydb.) C. L. H	Known
1570	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Andropogon	gerardii	Vitman			Big bluestem		Expected
1571	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Andropogon	gerardii	Vitman	var.	gerardii	Big bluestem		Known
1572	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	adscensionis	L.			Sixweeks three-awn	(S. Wats) F.L.	Not Applicable
1573	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	divaricata	Humb. & Bonpl. ex Willd.			Poverty three-awn		Known
1574	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	fendleriana	Steud.			Fendler's three-awn		Known
1575	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	glauca	(Nees) Walp.			Red three-awn		Known
1576	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	havardii	Vasey			Havard three-awn		Known
1577	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	longiseta	Steud.			Three-awn		Expected
1578	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	orcuttiana	Vasey			Single three-awn		Known
1579	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	pansa	Woot. & Standl.			Wooton's three-awn		Expected
1580	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	purpurea	Nutt.	var.	nealleyi	Blue threeawn		Known
1581	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	purpurea	Nutt.	var.	longiseta	Fendler threeawn		Known
1582	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	purpurea	Nutt.	var.	fendleriana	Fendler's threeawn		Known
1583	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	purpurea	Nutt.	var.	purpurea	Purple threeawn		Known
1584	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	purpurea	Nutt.			Purple three-awn		Known
1585	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	purpurea	Nutt.	var.	wrightii	Wright threeawn		Known
1586	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	schiedeana	Trin. & Rupr.	var.	orcuttiana	Orcutt's threeawn	(Greene) M. G	Expected
1587	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	ternipes	Cav.			Spidergrass		Known
1588	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	ternipes	Cav.	var.	gentilis	Spidergrass		Not Applicable
1589	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	ternipes	(Henr.) Trent	var.	hamulosa	Spidergrass		Known
1590	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	ternipes	Cav.	var.	ternipes	Spidergrass		Known
1591	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Aristida	wrightii	Nash			Wright three-awn		Known
1592	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Arundo	donax	L.			Giant reed		Known

1593	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Avena	fatua	L.			Wild oat		Known
1594	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Blepharoneuron	tricholepis	(Torr.) Nash			Pine dropseed		Expected
1595	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bothriochloa	barbinodis	(Lag.) Herter.			Cane bluestem		Known
1596	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bothriochloa	barbinodis	(Lag.) Herter.	var.	barbinodis	Cane bluestem		Known
1597	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bothriochloa	laguroides	(DC.) Herter			Silver beardgrass	(Green) W.H. I	Not Applicable
1598	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bothriochloa	laguroides	(DC.) Herter.	var.	torreyana	Silver beardgrass		Known
1599	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bothriochloa	springfieldii	(Gould) Parodi			Springfield's beardgrass		Known
1600	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	aristidoides	(Kunth) Griseb.			Needle grama		Known
1601	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	aristidoides	(Kunth) Griseb.	var.	aristidoides	Needle grama	(S. Wats.) Ecke	Known
1602	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	barbata	Lag.			Sixweeks grama		Known
1603	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	breviseta	Vasey			Gypsum grama		Expected
1604	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	curtipendula	(Michx.) Torr.			Sideoats grama		Expected
1605	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	eriopoda	(Torr.) Torr.			Black grama		Known
1606	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	gracilis	(Willd. ex Kunth) Lag. ex Griffiths			Blue grama		Known
1607	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	hirsuta	Lag.			Hairy grama		Known
1608	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	hirsuta	Lag.	var.	hirsuta	Hairy grama		Expected
1609	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	parryi	(Four.) Griffiths			Parry's grama	(A. DC.) Piehl	Expected
1610	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	trifida	Thurb.			Red grama		Known
1611	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bouteloua	warnockii	Gould & Kapadia			Warnock's grama	(Rehd.) Little	Expected
1612	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Urochloa	arizonica	(Scribn. & Merr.) S. T. Blake			Panic grass		Known
1613	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Brachiaria	fasciculata	(Sw.) Parodi			Browntop signalgrass		Known
1614	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	anomalus	Rupr. ex Fourn.			Nodding brome		Known
1615	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	carinatus	Hook. & Arn.			California brome		Known
1616	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	catharticus	Vahl			Rescuegrass		Known
1617	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	ciliatus	L.			Fringed brome		Known
1618	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	ciliatus	L.	var.	richardsonii	Fringed brome	(Hook. & Arn.)	Known
1619	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	frondosus	(Shear) A. S. Hitchc.			Weeping brome		Known
1620	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	arvensis	Thunb. ex Mrr.			Japanese brome		Known
1621	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	lanatipes	(Shear) Rydb.			Woolly brome		Known
1622	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	rubens	L.			Red brome		Known
1623	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Bromus	tectorum	L.			Cheatgrass		Known
1624	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Cenchrus	incertus	M.A. Curtis			Common sandbur		Known
1625	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Cenchrus	longispinus	(Hack.) Fern.			Mat sandbur		Known

1626	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Cenchrus	spinifex	Cav.			Coastal sandbur		Known
1627	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Trichloris	crinita	Lag.			False Rhodes grass		Known
1628	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Chloris	cucullata	Bisch.			Hooded windmill grass		Expected
1629	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Chloris	submutica	Kunth			Mexican windmill grass		Known
1630	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Chloris	verticillata	Nutt.			Tumble windmill grass		Expected
1631	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Chloris	virgata	Sw.			Feather fingergrass		Expected
1632	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Cynodon	dactylon	(L.) Pers.			Bermudagrass		Known
1633	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Dactylis	glomerata	L.			Orchard grass		Known
1634	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Dasyochloa	pulchella	(Kunth) Willd. ex Rydb.			Low woollygrass		Known
1635	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Dichanthelium	acuminatum	(Sw.) Gould & C. A. Clark			Tapered rosette grass		Known
1636	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Dichanthelium	acuminatum	(Sw.) Gould and C. A. Clark	var.	acuminatum	Tapered rosette grass		Known
1637	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Digitaria	bicornis	(Lam.) Roemer & J .A. Schultes ex Loud.			Asian crabgrass	Rehder	Known
1638	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Digitaria	californica	(Benth.) Henr.			Arizona cottontop		Expected
1639	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Digitaria	cognata	(J. A. Schultes) Pilger			Carolina crabgrass		Expected
1640	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Digitaria	cognata	(J. A. Schultes) Pilger	var.	pubiflora	Carolina crabgrass		Known
1641	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Digitaria	sanguinalis	(L.) Scop.			Hairy crabgrass		Known
1642	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Distichlis	spicata	(L.) Greene			Inland saltgrass		Expected
1643	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Echinochloa	colona	(L.) Link			Jungle rice		Known
1644	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Echinochloa	crus-galli	(L.) Beauv.			Barnyardgrass		Known
1645	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Elymus	arizonicus	(Scribn. & J. G. Sm.) Gould			Arizona wheatgrass	(L.) Wallr. F.	Expected
1646	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Elymus	canadensis	L.			Canada wildrye		Known
1647	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Elymus	canadensis	L.	var.	canadensis	Wildrye		Known
1648	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Elymus	elymoides	(RAF.) Swezey	var.	brevifolius	Squirreltail		Known
1649	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Elymus	longifolius	(J. G. Sm.) Gould			Squirreltail		Known
1650	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Enneapogon	desvauxii	Desv. ex Beauv.			Nineawn pappusgrass	(Nutt.) Collins	Known
1651	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	barrelieri	(Schrad. ex J. A. Schultes) J. A.			Bahia lovegrass		Known
1652	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	cilianensis	(All.) Vign. ex Janchen			Stinkgrass		Known
1653	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	curvula	(Schrad.) Nees			Weeping lovegrass		Expected
1654	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	erosa	Scribn.			Chihuahuan lovegrass		Known
1655	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	intermedia	A. S. Hitchc.			Plains lovegrass		Known
1656	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	lehmanniana	Nees			Lehmann lovegrass		Known
1657	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	mexicana	(Hornem.) Link			Mexican lovegrass		Known
1658	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	pectinacea	(Michx.)Nees			Lovegrass		Known

1659	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	pectinacea	(Michx.)Nees	var.	miserrima	Lovegrass		Known
1660	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	pectinacea	(Michx.) Nees ex Steud.	var.	pectinacea	Tufted lovegrass		Expected
1661	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eragrostis	pilosa	(L.) Beauv.			Indian lovegrass		Expected
1662	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eriochloa	acuminata	(Presl.) Kunth.			Cupgrass		Known
1663	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eriochloa	acuminata	(J. Presl.) Kunth	var.	acuminata	Tapertip cupgrass		Known
1664	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eriochloa	acuminata	(Presl.) Kunth	var.	minor	Tapertip cupgrass		Known
1665	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Eriochloa	contracta	A. S. Hitchcock			Prairie cupgrass		Known
1666	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Erioneuron	nealleyi	Kunth in H.B.K var. nealleyi Vasey			Large-flowered euphorbia		Known
1667	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Erioneuron	avenaceum	(Kunth) Tateoka			Shortleaf woollygrass		Known
1668	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Erioneuron	pilosum	(Buckl.) Nash			Hairy woollygrass		Known
1669	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Heteropogon	contortus	(L.) Beauv. ex Roemer & J. A. Schultes			Tanglehead		Known
1670	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Hordeum	jubatum	L.			Foxtail barley	(Benth.) Keck	Expected
1671	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Hordeum	jubatum	L.	subsp.	jubataum	Foxtail barley		Known
1672	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Hordeum	murinum	L.	subsp.	leporinum	Leporinum barley		Known
1673	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Hordeum	murinum	L.			Mouse barley		Known
1674	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Hordeum	pusillum	Nutt.			Little barley		Expected
1675	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Koeleria	macrantha	(Ledeb.) J. A. Schultes			Prairie junegrass		Expected
1676	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Leptochloa	dubia	(Kunth) Nees			Green sprangletop		Expected
1677	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Leptochloa	fascicularis	(Lam.) Gray			Breaded sprangletop	(A. Nels.) Keck	Known
1678	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Leptochloa	fusca	(L.) Kunth	ssp.	fascicularis	Bearded sprangletop		Known
1679	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Lolium	perenne	L.			Perennial ruegrass		Known
1680	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Lycurus	phleoides	Kunth			Common wolftail		Known
1681	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Lycurus	setosus	(Nutt.)C. Reeder			Common wolftail		Known
1682	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Melica	porteri	Scribn.			Porter's melicgrass		Expected
1683	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Melica	porteri	Scribn.	var.	porteri	Porter's melicgrass	(Kunth) Penne	Expected
1684	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	arenacea	(Buckl.) A. S. Hitchc.			Ear muhly		Expected
1685	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	arenicola	Buckl.			Sand muhly		Known
1686	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	asperifolia	(Nees & Meyen ex Trin.) Parodi			Scratchgrass		Known
1687	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	brevis	C. O. Goodding			Short muhly		Known
1688	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	dubia	Fourn. ex Hemsl.			Pine muhly		Expected
1689	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	emersleyi	Vasey			Bullgrass		Known
1690	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	fragilis	Swallen			Delicate muhly		Known
1691	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	glauca	(Nees) B. D. Jackson			Desert muhly		Known

1692	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	longiligula	A. S. Hitchc.			Longtonque muhly	Torr.	Known
1693	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	metcalfei	M.E. Jones			Metcalfe muhly		Known
1694	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	minutissima	(Steud.) Swallen			Annual muhly		Known
1695	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	montana	(Nutt.) A. S. Hitchc.			Mountain muhly		Known
1696	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	pauciflora	Buckl.			New Mexico muhly		Known
1697	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	polycaulis	Scribn.			Cliff muhly		Known
1698	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	porteri	Scribn. ex Beal			Bush muhly		Known
1699	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	pungens	Thurb.			Sandhill muhly		Known
1700	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	repens	(J. Presl.) A. S. Hitchc.			Creeping muhly		Known
1701	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	rigens	(Benth.) A. S. Hitchc.			Deergrass		Known
1702	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	rigida	(Kunth) Trin.			Purple muhly		Known
1703	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	setifolia	Vasey			Curlyleaf muhly		Known
1704	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	sinuosa	Swallen			Marshland muhly		Known
1705	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	tenuifolia	(Kunth) Trin.			Slim flower muhly		Expected
1706	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	torreyi	(Kunth) A. S. Hitchc. ex Bush			Ring muhly		Expected
1707	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Muhlenbergia	wrightii	Vasey			Spike muhly		Expected
1708	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Munroa	squarrosa	(Nutt.) Torr.			False buffalograss		Expected
1709	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Achnatherum	hymenoides	(Roem.&Schult.) Ricker ex Piper			Indian ricegrass		Known
1710	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	bulbosum	Kunth			Bulb panicgrass		Known
1711	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	capillare	L.			Witchgrass		Expected
1712	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	dichotomiflorum	Michx.			Fall panicgrass		Known
1713	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	hallii	Vasey	var.	hallii	Hall's panicgrass		Known
1714	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	hallii	Vasey			Panic grass		Expected
1715	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	hians	Ell.			Gaping grass		Known
1716	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	hirticaule	J. Presl.	var.	hirticaule	Mexican panicgrass		Known
1717	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	hirticaule	J. Presl.			Panic grass		Known
1718	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	miliaceum	L.			Broomcorn millet		Known
1719	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Panicum	obtusum	Kunth			Vine mesquite		Known
1720	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Paspalum	distichum	L.			Knotgrass		Known
1721	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Pennisetum	ciliare	(L.) Link			Buffelgrass		Known
1722	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Pennisetum	setaceum	(Forsk.) Chiov.			Crimson fountaingrass		Known
1723	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Phalaris	canariensis	L.			Canary grass	(A. & V. Grant)	Known
1724	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Phalaris	caroliniana	Walt.			Carolina canarygrass		Known

1725	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Phleum	pratense	L.			Timothy		Expected
1726	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Phragmites	australis	(Csv.) Trin. ex Steud.			Common reed	(Gray) Wherry	Expected
1727	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Piptochaetium	fimbriatum	(Kunth) A. S. Hitchc.			Pinyon ricegrass		Known
1728	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Pleuraphis	jamesii	Torr.			James' galleta		Known
1729	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Pleuraphis	mutica	Buckl.			Tobosagrass		Known
1730	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Poa	annua	L.			Annual bluegrass		Known
1731	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Poa	bigelovii	Vasey & Scribn.			Bigelow's bluegrass		Known
1732	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Poa	bulbosa	L.			Bulbous bluegrass		Expected
1733	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Poa	fendleriana	(Steud.) Vasey			Muttongrass		Known
1734	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Poa	fendleriana	(Steud.) Vasey	var.	fendleriana	Muttongrass		Known
1735	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Polypogon	monspeliensis	(L.) DesF.			Annual rabbitfoot grass		Expected
1736	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Polypogon	viridis	(Gouan) Breistr.			Beardless rabbitsfoot grass		Known
1737	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Schizachyrium	sanguineum	(Retz.) Alston			Crimson bluestem		Known
1738	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Schizachyrium	scoparium	(Michx.) Nash			Little bluestem		Known
1739	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Schizachyrium	scoparium	(Michx.) Nash	var.	scoparium	Little bluestem		Known
1740	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Schizachyrium	scorparium	(Michx.) Nash	var.	neomexicanum	Little bluestem		Known
1741	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Scleropogon	brevifolius	Phil.			Burrograss		Known
1742	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	adhaerens	(Forsk.) Chiov.			Burr bristlegrass		Known
1743	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	grisebachi	Fourn.			Grisebach's bristlegrass		Known
1744	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	leucopila	(Scribn. & Merr.)			Streambed bristlegrass		Known
1745	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	parviflora	(Poir.) Kerguelen			Marsh bristlegrass		Known
1746	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	pumila	(Poir.)Roemer and J. A. Schultes			Yellow bristlegrass		Expected
1747	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	pumila	(Poir.) Roemer & J. A. Schultes	var.	pallidifusca	Yellow bristlegrass		Known
1748	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	verticillata	(L.) Beauv.			Hooked bristlegrass		Expected
1749	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	viridis	(L.) Beauv.			Green bristlegrass		Expected
1750	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Setaria	viridis	(L.) Beauv.	var.	viridis	Green bristlegrass		Known
1751	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sorghum	bicolor	(L.) Moench.			Sorghum		Expected
1752	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sorghum	halepense	(L.) Pers.			Johnsongrass		Known
1753	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sphenopholis	obtusata	(Michx.) Scribn.			Prairie wedgescale		Known
1754	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	airoides	(Torr.) Torr.			Alkali sacaton		Known
1755	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	contractus	A. S. Hitchc.			Spike dropseed	(Gray) Waterfa	Not Applicable
1756	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	cryptandrus	(Torr.) Gray			Sand dropseed		Known
1757	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	flexuosus	(Thurb. ex Vasey) Rydb.			Mesa dropseed		Expected

1758	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	giganteus	Nash			Giant dropseed	(Rydb.) Water	Expected
1759	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	texanus	Vasey			Wireleaf dropseed		Known
1760	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Sporobolus	wrightii	Munro ex Scribn.			Big sacaton		Known
1761	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Achnatherum	curvifolia	Swallen			Guadalupe needlegrass		Known
1762	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Achnatherum	eminens	Cav.			Southwestern needlegrass		Known
1763	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Hesperostipa	neomexicana	(Thurb.) Scribn.			New Mexico feathergrass		Expected
1764	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Tragus	berteronianus	J. A. Schultes			Spiked burr grass		Expected
1765	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Tridens	albescens	(Vasey) Woot. & Standl.			White tridens		Expected
1766	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Tridens	muticus	(Torr.) Nash	var.	muticus	Slim tridens		Known
1767	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Tridens	muticus	(Torr.) Nash			Slim tridens		Known
1768	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Trisetum	interruptum	Buckl.			Prairie false oat		Known
1769	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Triticum	aestivum	L.			Common wheat		Known
1770	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Vulpia	microstachys	(Nutt.) Munro	var.	microstachys	Desert fescue		Known
1771	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Vulpia	microstachys	(Nutt.) Munro			Small fescue	(Torr.) L. Bens	Known
1772	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Vulpia	octoflora	(Walt.) Rydb.			Sixweeks fescue		Known
1773	Magnoliophyta	Liliopsida	Cyperales	Poaceae	Vulpia	octoflora	(Walt.) Rydb.	var.	octoflora	Sixweeks fescue	(Beadle) Sarg.	Not Applicable
1774	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	arcticus	Willd.	ssp.	littoralis	Baltic rush		Known
1775	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	bufonius	L.			Toad rush	(Small)Shinner	Not Applicable
1776	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	bufonius	L.	var.	bufonius	Toad rush		Known
1777	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	interior	Wieg.			Inland rush		Known
1778	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	mexicanus	Willd. ex J. A. & J. H. Schultes			Mexican rush		Known
1779	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	saximontanus	A. Nels.			Rocky Mountain rush		Expected
1780	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	tenuis	Willd.			Poverty rush		Known
1781	Magnoliophyta	Liliopsida	Juncales	Juncaceae	Juncus	torreyi	Coville			Torrey's rush		Known
1782	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Agave	gracilipes	Trel.			Slimfoot century plant		Known
1783	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Agave	lechuguilla	Torr.			Lechuguilla		Known
1784	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Agave	neomexicana	Woot. & Standl.			New Mexico agave		Expected
1785	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Dasylirion	heteracanthum	I. M. Johnston			Trans-Pecos sotol		Known
1786	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Dasylirion	wheeleri	S. Wats.			Common sotol		Known
1787	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Nolina	micrantha	I.M. Johnst.			Sacahuista		Known
1788	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Nolina	microcarpa	S. Wats.			Smallseed sacahuista		Expected
1789	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Nolina	texana	S. Wats.			Texas sacahuista		Known
1790	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Yucca	baccata	(Engelm.) Trel.			Banana yucca		Known

1791	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Yucca	baccata	Torr.	var.	baccata	Banana yucca		Known
1792	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Yucca	elata	(Engelm.) Engelm.	var.	elata	Soaptree yucca		Expected
1793	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Yucca	elata	Engelm.			Soap-tree yucca		Known
1794	Magnoliophyta	Liliopsida	Liliales	Agavaceae	Yucca	torreyi	Shafer			Torrey's yucca		Known
1795	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Allium	cernuum	Roth	var.	neomexicanum	New Mexico nodding onion		Known
1796	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Allium	cernuum	Roth			Nodding onion	(Engelm.) Haw	Known
1797	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Allium	geyeri	S. Wats			Geyer onion		Known
1798	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Allium	geyeri	S. Wats.	var.	geyeri	Geyer's onion		Known
1799	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Allium	kunthii	G. Don			Kunth's onion		Known
1800	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Allium	macropetalum	Rydb.			Largeflower onion	(Trel.) Weins	Not Applicable
1801	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Cooperia	drummondii	Herbert			Evening rainlily		Known
1802	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Maianthemum	racemosum	(L.) Link			Feathery false lily of the valley		Known
1803	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Maianthemum	racemosum	(L.) Link	var.	amplexicaule	Feathery false lily-of-the-Valley	(Trel.) Weins	Not Applicable
1804	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Maianthemum	stellatum	(L.) Link			Starry false lily of the valley		Known
1805	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Schoenocaulon	texanum	Scheele			Texas feathershank		Known
1806	Magnoliophyta	Liliopsida	Liliales	Liliaceae	Zephyranthes	longifolia	Hemsl.			Copper zephyrlily		Known
1807	Magnoliophyta	Liliopsida	Najadales	Potamogetonaceae	Potamogeton	foliosus	Raf.			Leafy pondweed		Known
1808	Magnoliophyta	Liliopsida	Najadales	Potamogetonaceae	Potamogeton	foliosus	Raf.	var.	foliosus	Leafy pondweed		Known
1809	Magnoliophyta	Liliopsida	Najadales	Potamogetonaceae	Potamogeton	illinoensis	Morong			Illinois pondweed		Known
1810	Magnoliophyta	Liliopsida	Orchidales	Orchidaceae	Epipactis	gigantea	Dougl. ex Hook.			Stream orchid	(Beissn.) Franc	Expected
1811	Magnoliophyta	Liliopsida	Orchidales	Orchidaceae	Hexalectris	spicata	(Walt.) Barnh.			Crested coral-root		Known
1812	Magnoliophyta	Liliopsida	Typhales	Typhaceae	Typha	angustifolia	L.			Narrowleaf cattail		Known
1813	Magnoliophyta	Liliopsida	Typhales	Typhaceae	Typha	domingensis	Pers.			Southern cattail		Known
1814	Magnoliophyta	Liliopsida	Typhales	Typhaceae	Typha	latifolia	L.			Broadleaf cattail		Known

B. Baseline List of Vertebrates

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
1	Chordata	Amphibia	Anura	Bufonidae	Bufo	cognatus		Great Plains Toad	Known
2	Chordata	Amphibia	Anura	Bufonidae	Bufo	debilis		Green Toad	Known
3	Chordata	Amphibia	Anura	Bufonidae	Bufo	punctatus		Red-spotted Toad	Known
4	Chordata	Amphibia	Anura	Bufonidae	Bufo	woodhousii		Woodhouse's Toad	Known
5	Chordata	Amphibia	Anura	Hylidae	Hyla	arenicolor		Canyon Treefrog	Expected
6	Chordata	Amphibia	Anura	Pelobatidae	Scaphiopus	couchii		Couch's Spadefoot	Known
7	Chordata	Amphibia	Anura	Pelobatidae	Spea	multiplicata		New Mexico Spadefoot	Known
8	Chordata	Amphibia	Anura	Pelobatidae	Spea	bombifrons		Plains Spadefoot	Known
9	Chordata	Amphibia	Anura	Ranidae	Rana	catesbeiana		Bullfrog	Expected
10	Chordata	Amphibia	Caudata	Ambystomatidae	Ambystoma	tigrinum		Tiger Salamander	Known
11	Chordata	Reptilia	Squamata	Colubridae	Arizona	elegans		Glossy Snake	Known
12	Chordata	Reptilia	Squamata	Colubridae	Bogertophis	subocularis		Trans-Pecos Rat Snake	Expected
13	Chordata	Reptilia	Squamata	Colubridae	Coluber	constrictor		Racer	Expected
14	Chordata	Reptilia	Squamata	Colubridae	Diadophis	punctatus		Ringneck Snake	Known
15	Chordata	Reptilia	Squamata	Colubridae	Elaphe	guttata		Corn Snake	Expected
16	Chordata	Reptilia	Squamata	Colubridae	Gyalopion	canum		Western Hooknose Snake	Known
17	Chordata	Reptilia	Squamata	Colubridae	Heterodon	nasicus		Western Hognose Snake	Expected
18	Chordata	Reptilia	Squamata	Colubridae	Hypsiglena	torquata		Night Snake	Known
19	Chordata	Reptilia	Squamata	Colubridae	Lampropeltis	getula		Common Kingsnake	Known
20	Chordata	Reptilia	Squamata	Colubridae	Lampropeltis	triangulum		Milk Snake	Expected
21	Chordata	Reptilia	Squamata	Colubridae	Lampropeltis	alterna		Gray-banded Kingsnake	Expected
22	Chordata	Reptilia	Squamata	Colubridae	Masticophis	flagellum		Western Coachwhip	Known
23	Chordata	Reptilia	Squamata	Colubridae	Masticophis	taeniatus		Striped Whipsnake	Known
24	Chordata	Reptilia	Squamata	Colubridae	Pituophis	melanoleucus		Bullsnake	Known
25	Chordata	Reptilia	Squamata	Colubridae	Rhinocheilus	lecontei		Longnose Snake	Known
26	Chordata	Reptilia	Squamata	Colubridae	Salvadora	deserticola		Big Bend Patchnose Snake	Expected
27	Chordata	Reptilia	Squamata	Colubridae	Salvadora	grahamiae		Mountain Patchnose Snake	Known
28	Chordata	Reptilia	Squamata	Colubridae	Sonora	semiannulata		Ground Snake	Known
29	Chordata	Reptilia	Squamata	Colubridae	Tantilla	nigriceps		Plains Black-headed Snake	Known
30	Chordata	Reptilia	Squamata	Colubridae	Tantilla	hobartsmithi		Southwestern Black-headed Snake	Expected
31	Chordata	Reptilia	Squamata	Colubridae	Thamnophis	elegans		Western Terrestrial Garter Snake	Expected
32	Chordata	Reptilia	Squamata	Colubridae	Thamnophis	marcianus		Checkered Garter Snake	Expected
33	Chordata	Reptilia	Squamata	Colubridae	Thamnophis	sirtalis		Common Garter Snake	Expected
34	Chordata	Reptilia	Squamata	Colubridae	Thamnophis	cyrtopsis		Blackneck Garter Snake	Expected
35	Chordata	Reptilia	Squamata	Colubridae	Trimorphodon	biscutatus		Texas Lyre Snake	Known
36	Chordata	Reptilia	Squamata	Crotaphytidae	Crotaphytus	collaris		Collared Lizard	Known
37	Chordata	Reptilia	Squamata	Crotaphytidae	Gambelia	wislizenii		Leopard Lizard	Known
38	Chordata	Reptilia	Squamata	Gekkonidae	Coleonyx	brevis		Western Banded Gecko	Known
39	Chordata	Reptilia	Squamata	Gekkonidae	Hemidactylus	turcicus		Mediterranean Gecko	Known
40	Chordata	Reptilia	Squamata	Leptotyphlopidae	Leptotyphlops	dulcis		Texas Blind Snake	Known
41	Chordata	Reptilia	Squamata	Leptotyphlopidae	Leptotyphlops	humilis		Western Blind Snake	Expected
42	Chordata	Reptilia	Squamata	Phrynosomatidae	Cophosaurus	texanus		Greater Earless Lizard	Known
43	Chordata	Reptilia	Squamata	Phrynosomatidae	Holbrookia	maculata		Lesser Earless Lizard	Known
44	Chordata	Reptilia	Squamata	Phrynosomatidae	Phrynosoma	cornutum		Texas Horned Lizard	Known
45	Chordata	Reptilia	Squamata	Phrynosomatidae	Phrynosoma	hernandesi		Short-horned Lizard	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
46	Chordata	Reptilia	Squamata	Phrynosomatidae	Phrynosoma	douglasii	hernandesi	Mountain Short-horned Lizard	Expected
47	Chordata	Reptilia	Squamata	Phrynosomatidae	Phrynosoma	modestum		Roundtail Horned Lizard	Known
48	Chordata	Reptilia	Squamata	Phrynosomatidae	Sceloporus	cowlesi		Prairie Lizard	Known
49	Chordata	Reptilia	Squamata	Phrynosomatidae	Sceloporus	magister		Desert Spiny Lizard	Known
50	Chordata	Reptilia	Squamata	Phrynosomatidae	Sceloporus	poinsetti		Crevice Spiny Lizard	Expected
51	Chordata	Reptilia	Squamata	Phrynosomatidae	Urosaurus	ornatus		Tree Lizard	Known
52	Chordata	Reptilia	Squamata	Phrynosomatidae	Uta	stansburiana		Side-blotched Lizard	Known
53	Chordata	Reptilia	Squamata	Scincidae	Plestiodon	obsoletus		Great Plains Skink	Known
54	Chordata	Reptilia	Squamata	Teiidae	Aspidoscelis	exsanguis		Chihuahuan Spotted Whiptail	Known
55	Chordata	Reptilia	Squamata	Teiidae	Aspidoscelis	inornatus		Little Striped Whiptail	Known
56	Chordata	Reptilia	Squamata	Teiidae	Aspidoscelis	neomexicanus		New Mexico Whiptail	Known
57	Chordata	Reptilia	Squamata	Teiidae	Aspidoscelis	tesselata		Checkered Whiptail	Known
58	Chordata	Reptilia	Squamata	Teiidae	Aspidoscelis	tigris		Western Whiptail	Known
59	Chordata	Reptilia	Squamata	Teiidae	Aspidoscelis	uniparens		Desert Grassland Whiptail	Known
60	Chordata	Reptilia	Squamata	Viperidae	Crotalus	atrox		Western Diamondback Rattlesnake	Known
61	Chordata	Reptilia	Squamata	Viperidae	Crotalus	lepidus	lepidus	Mottled Rock Rattlesnake	Expected
62	Chordata	Reptilia	Squamata	Viperidae	Crotalus	lepidus	klauberi	Banded Rock Rattlesnake	Known
63	Chordata	Reptilia	Squamata	Viperidae	Crotalus	lepidus		Rock Rattlesnake	Known
64	Chordata	Reptilia	Squamata	Viperidae	Crotalus	molossus		Blacktail Rattlesnake	Known
65	Chordata	Reptilia	Squamata	Viperidae	Crotalus	scutulatus		Mojave Rattlesnake	Known
66	Chordata	Reptilia	Squamata	Viperidae	Crotalus	viridis		Western Rattlesnake	Known
67	Chordata	Reptilia	Squamata	Viperidae	Sistrurus	catenatus		Massasauga	Expected
68	Chordata	Reptilia	Testudines	Emydidae	Chrysemys	picta		Painted Turtle	Expected
69	Chordata	Reptilia	Testudines	Emydidae	Terrapene	ornata		Ornate Box Turtle	Known
70	Chordata	Reptilia	Testudines	Kinosternidae	Kinosternon	flavescens		Yellow Mud Turtle	Expected
71	Chordata	Aves	Anseriformes	Anatidae	Aix	sponsa		Wood Duck	Known
72	Chordata	Aves	Anseriformes	Anatidae	Anas	americana-nest		American Widgeon Nest	Known
73	Chordata	Aves	Anseriformes	Anatidae	Anas	acuta		Northern Pintail	Known
74	Chordata	Aves	Anseriformes	Anatidae	Anas	americana		American Wigeon	Known
75	Chordata	Aves	Anseriformes	Anatidae	Anas	clypeata		Northern Shoveler	Known
76	Chordata	Aves	Anseriformes	Anatidae	Anas	crecca		Green-winged Teal	Known
77	Chordata	Aves	Anseriformes	Anatidae	Anas	cyanoptera		Cinnamon Teal	Known
78	Chordata	Aves	Anseriformes	Anatidae	Anas	discors		Blue-winged Teal	Known
79	Chordata	Aves	Anseriformes	Anatidae	Anas	penelope		Eurasian Wigeon	Known
80	Chordata	Aves	Anseriformes	Anatidae	Anas	platyrhynchos		Mallard	Known
81	Chordata	Aves	Anseriformes	Anatidae	Anas	strepera		Gadwall	Known
82	Chordata	Aves	Anseriformes	Anatidae	Anser	albifrons		Greater White-fronted Goose	Known
83	Chordata	Aves	Anseriformes	Anatidae	Aythya	affinis		Lesser Scaup	Known
84	Chordata	Aves	Anseriformes	Anatidae	Aythya	americana		Redhead	Known
85	Chordata	Aves	Anseriformes	Anatidae	Aythya	collaris		Ring-necked Duck	Known
86	Chordata	Aves	Anseriformes	Anatidae	Aythya	marila		Greater Scaup	Known
87	Chordata	Aves	Anseriformes	Anatidae	Aythya	valisineria		Canvasback	Known
88	Chordata	Aves	Anseriformes	Anatidae	Branta	canadensis		Canada Goose	Known
89	Chordata	Aves	Anseriformes	Anatidae	Bucephala	albeola		Bufflehead	Known
90	Chordata	Aves	Anseriformes	Anatidae	Bucephala	clangula		Common Goldeneye	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
91	Chordata	Aves	Anseriformes	Anatidae	Chen	caerulescens		Snow Goose	Known
92	Chordata	Aves	Anseriformes	Anatidae	Chen	rossii		Ross's Goose	Known
93	Chordata	Aves	Anseriformes	Anatidae	Lophodytes	cucullatus		Hooded Merganser	Known
94	Chordata	Aves	Anseriformes	Anatidae	Melanitta	fusca		White-winged Scoter	Known
95	Chordata	Aves	Anseriformes	Anatidae	Melanitta	perspicillata		Surf Scoter	Known
96	Chordata	Aves	Anseriformes	Anatidae	Mergus	merganser		Common Merganser	Known
97	Chordata	Aves	Anseriformes	Anatidae	Mergus	serrator		Red-breasted Merganser	Known
98	Chordata	Aves	Anseriformes	Anatidae	Nomonyx	dominicus		Masked Duck	Known
99	Chordata	Aves	Anseriformes	Anatidae	Oxyura	jamaicensis		Ruddy Duck	Known
100	Chordata	Aves	Apodiformes	Apodidae	Aeronautes	saxatalis		White-throated Swift	Known
101	Chordata	Aves	Apodiformes	Apodidae	Cypseloides	niger		Black Swift	Known
102	Chordata	Aves	Apodiformes	Trochilidae	Archilochus	alexandri		Black-chinned Hummingbird	Known
103	Chordata	Aves	Apodiformes	Trochilidae	Calypte	costae		Costa's Hummingbird	Not Applicable
104	Chordata	Aves	Apodiformes	Trochilidae	Selasphorus	platycercus		Broad-tailed Hummingbird	Known
105	Chordata	Aves	Apodiformes	Trochilidae	Selasphorus	rufus		Rufous Hummingbird	Known
106	Chordata	Aves	Apodiformes	Trochilidae	Stellula	calliope		Calliope Hummingbird	Known
107	Chordata	Aves	Caprimulgiformes	Caprimulgidae	Caprimulgus	vociferus		Whip-poor-will	Known
108	Chordata	Aves	Caprimulgiformes	Caprimulgidae	Chordeiles	acutipennis		Lesser Nighthawk	Known
109	Chordata	Aves	Caprimulgiformes	Caprimulgidae	Chordeiles	minor		Common Nighthawk	Known
110	Chordata	Aves	Caprimulgiformes	Caprimulgidae	Phalaenoptilus	nuttallii		Common Poorwill	Known
111	Chordata	Aves	Charadriiformes	Charadriidae	Charadrius	montanus		Mountain Plover	Known
112	Chordata	Aves	Charadriiformes	Charadriidae	Charadrius	alexandrinus		Snowy Plover	Known
113	Chordata	Aves	Charadriiformes	Charadriidae	Charadrius	melodus		Piping Plover	Known
114	Chordata	Aves	Charadriiformes	Charadriidae	Charadrius	semipalmatus		Semipalmated Plover	Known
115	Chordata	Aves	Charadriiformes	Charadriidae	Charadrius	vociferus		Killdeer	Known
116	Chordata	Aves	Charadriiformes	Charadriidae	Pluvialis	dominica		American Golden-plover	Known
117	Chordata	Aves	Charadriiformes	Charadriidae	Pluvialis	squatarola		Black-bellied Plover	Known
118	Chordata	Aves	Charadriiformes	Laridae	Chlidonias	niger		Black Tern	Known
119	Chordata	Aves	Charadriiformes	Laridae	Larus	argentatus		Herring Gull	Known
120	Chordata	Aves	Charadriiformes	Laridae	Larus	atricilla		Laughing Gull	Known
121	Chordata	Aves	Charadriiformes	Laridae	Larus	californicus		California Gull	Known
122	Chordata	Aves	Charadriiformes	Laridae	Larus	delawarensis		Ring-billed Gull	Known
123	Chordata	Aves	Charadriiformes	Laridae	Larus	occidentalis		Western Gull	Known
124	Chordata	Aves	Charadriiformes	Laridae	Larus	philadelphia		Bonaparte's Gull	Known
125	Chordata	Aves	Charadriiformes	Laridae	Larus	pipixcan		Franklin's Gull	Known
126	Chordata	Aves	Charadriiformes	Laridae	Sterna	caspia		Caspian Tern	Known
127	Chordata	Aves	Charadriiformes	Laridae	Sterna	forsteri		Forster's Tern	Known
128	Chordata	Aves	Charadriiformes	Laridae	Sterna	hirundo		Common Tern	Known
129	Chordata	Aves	Charadriiformes	Laridae	Xema	sabini		Sabine's Gull	Known
130	Chordata	Aves	Charadriiformes	Recurvirostridae	Himantopus	mexicanus		Black-necked Stilt	Known
131	Chordata	Aves	Charadriiformes	Recurvirostridae	Recurvirostra	americana		American Avocet	Known
132	Chordata	Aves	Charadriiformes	Scolopacidae	Actitis	macularia		Spotted Sandpiper	Known
133	Chordata	Aves	Charadriiformes	Scolopacidae	Arenaria	interpres		Ruddy Turnstone	Known
134	Chordata	Aves	Charadriiformes	Scolopacidae	Bartramia	longicauda		Upland Sandpiper	Known
135	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	melanotos		Pectoral Sandpiper	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
136	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	sp.		Unidentified Peep	Known
137	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	alba		Sanderling	Known
138	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	alpina		Dunlin	Known
139	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	bairdii		Baird's Sandpiper	Known
140	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	canutus		Red Knot	Known
141	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	fuscicollis		White-rumped Sandpiper	Known
142	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	himantopus		Stilt Sandpiper	Known
143	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	mauri		Western Sandpiper	Known
144	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	minutilla		Least Sandpiper	Known
145	Chordata	Aves	Charadriiformes	Scolopacidae	Calidris	pusilla		Semipalmated Sandpiper	Known
146	Chordata	Aves	Charadriiformes	Scolopacidae	Gallinago	gallinago		Common Snipe	Known
147	Chordata	Aves	Charadriiformes	Scolopacidae	Limnodromus	griseus		Short-billed Dowitcher	Known
148	Chordata	Aves	Charadriiformes	Scolopacidae	Limnodromus	scolopaceus		Long-billed Dowitcher	Known
149	Chordata	Aves	Charadriiformes	Scolopacidae	Limosa	fedoa		Marbled Godwit	Known
150	Chordata	Aves	Charadriiformes	Scolopacidae	Numenius	americanus		Long-billed Curlew	Not Applicable
151	Chordata	Aves	Charadriiformes	Scolopacidae	Numenius	phaeopus		Whimbrel	Known
152	Chordata	Aves	Charadriiformes	Scolopacidae	Phalaropus	fulicarius		Red Phalarope	Known
153	Chordata	Aves	Charadriiformes	Scolopacidae	Phalaropus	lobatus		Red-necked Phalarope	Known
154	Chordata	Aves	Charadriiformes	Scolopacidae	Phalaropus	tricolor		Wilson's Phalarope	Known
155	Chordata	Aves	Charadriiformes	Scolopacidae	Philomachus	pugnax		Ruff	Known
156	Chordata	Aves	Charadriiformes	Scolopacidae	Tringa	semipalmata		Willet	Known
157	Chordata	Aves	Charadriiformes	Scolopacidae	Tringa	solitaria		Solitary Sandpiper	Known
158	Chordata	Aves	Charadriiformes	Scolopacidae	Tringa	flavipes		Lesser Yellowlegs	Known
159	Chordata	Aves	Charadriiformes	Scolopacidae	Tringa	melanoleuca		Greater Yellowlegs	Known
160	Chordata	Aves	Charadriiformes	Stercorariidae	Stercorarius	longicaudus		Long-tailed Jaeger	Known
161	Chordata	Aves	Ciconiiformes	Ardeidae	Ardea	alba		Great Egret	Known
162	Chordata	Aves	Ciconiiformes	Ardeidae	Ardea	herodias		Great Blue Heron	Known
163	Chordata	Aves	Ciconiiformes	Ardeidae	Bubulcus	ibis		Cattle Egret	Known
164	Chordata	Aves	Ciconiiformes	Ardeidae	Butorides	virescens		Green Heron	Known
165	Chordata	Aves	Ciconiiformes	Ardeidae	Egretta	caerulea		Little Blue Heron	Known
166	Chordata	Aves	Ciconiiformes	Ardeidae	Egretta	rufescens		Reddish Egret	Known
167	Chordata	Aves	Ciconiiformes	Ardeidae	Egretta	thula		Snowy Egret	Known
168	Chordata	Aves	Ciconiiformes	Ardeidae	Ixobrychus	exilis		Least Bittern	Known
169	Chordata	Aves	Ciconiiformes	Ardeidae	Nyctanassa	violacea		Yellow-crowned Night-heron	Known
170	Chordata	Aves	Ciconiiformes	Ardeidae	Nycticorax	nycticorax		Black-crowned Night-heron	Known
171	Chordata	Aves	Ciconiiformes	Threskiornithidae	Plegadis	chihi		White-faced Ibis	Known
172	Chordata	Aves	Ciconiiformes	Threskiornithidae	Plegadis	falcinellus		Glossy Ibis	Known
173	Chordata	Aves	Columbiformes	Columbidae	Columba	livia		Rock Pigeon	Known
174	Chordata	Aves	Columbiformes	Columbidae	Columbina	inca		Inca Dove	Known
175	Chordata	Aves	Columbiformes	Columbidae	Patagioenas	fasciata		Band-tailed Pigeon	Known
176	Chordata	Aves	Columbiformes	Columbidae	Streptopelia	decaocto		Eurasian Collared-dove	Known
177	Chordata	Aves	Columbiformes	Columbidae	Zenaida	asiatica		White-winged Dove	Known
178	Chordata	Aves	Columbiformes	Columbidae	Zenaida	macroura		Mourning Dove	Known
179	Chordata	Aves	Coraciiformes	Alcedinidae	Ceryle	alcyon		Belted Kingfisher	Known
180	Chordata	Aves	Cuculiformes	Cuculidae	Coccyzus	americanus		Yellow-billed Cuckoo	Known

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ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
181	Chordata	Aves	Cuculiformes	Cuculidae	Crotophaga	sulcirostris		Groove-billed Ani	Known
182	Chordata	Aves	Cuculiformes	Cuculidae	Geococcyx	californianus		Greater Roadrunner	Known
183	Chordata	Aves	Falconiformes	Accipitridae	Accipiter	cooperii		Cooper's Hawk	Known
184	Chordata	Aves	Falconiformes	Accipitridae	Accipiter	gentilis		Northern Goshawk	Known
185	Chordata	Aves	Falconiformes	Accipitridae	Accipiter	striatus		Sharp-shinned Hawk	Known
186	Chordata	Aves	Falconiformes	Accipitridae	Aquila	chrysaetos		Golden Eagle	Known
187	Chordata	Aves	Falconiformes	Accipitridae	Buteo	albonotatus		Zone-tailed Hawk	Known
188	Chordata	Aves	Falconiformes	Accipitridae	Buteo	lagopus		Rough-legged Hawk	Known
189	Chordata	Aves	Falconiformes	Accipitridae	Buteo	nitida		Gray Hawk	Known
190	Chordata	Aves	Falconiformes	Accipitridae	Buteo	jamaicensis		Red-tailed Hawk	Known
191	Chordata	Aves	Falconiformes	Accipitridae	Buteo	regalis		Ferruginous Hawk	Known
192	Chordata	Aves	Falconiformes	Accipitridae	Buteo	swainsoni		Swainson's Hawk	Known
193	Chordata	Aves	Falconiformes	Accipitridae	Buteogallus	anthracinus		Common Black-hawk	Known
194	Chordata	Aves	Falconiformes	Accipitridae	Circus	cyaneus		Northern Harrier	Known
195	Chordata	Aves	Falconiformes	Accipitridae	Elanoides	forficatus	forficatus	Swallow-tailed Kite	Not Applicable
196	Chordata	Aves	Falconiformes	Accipitridae	Elanus	leucurus		White-tailed Kite	Known
197	Chordata	Aves	Falconiformes	Accipitridae	Haliaeetus	leucocephalus		Bald Eagle	Known
198	Chordata	Aves	Falconiformes	Accipitridae	Ictinia	mississippiensis		Mississippi Kite	Known
199	Chordata	Aves	Falconiformes	Accipitridae	Pandion	haliaetus		Osprey	Known
200	Chordata	Aves	Falconiformes	Accipitridae	Parabuteo	unicinctus		Harris's Hawk	Known
201	Chordata	Aves	Falconiformes	Cathartidae	Cathartes	aura		Turkey Vulture	Known
202	Chordata	Aves	Falconiformes	Falconidae	Falco	femoralis	septentrionalis	Northern Aplomado Falcon	Known
203	Chordata	Aves	Falconiformes	Falconidae	Falco	hybrid		Peregrine Prairie Falcon	Known
204	Chordata	Aves	Falconiformes	Falconidae	Falco	columbarius		Merlin	Known
205	Chordata	Aves	Falconiformes	Falconidae	Falco	mexicanus		Prairie Falcon	Known
206	Chordata	Aves	Falconiformes	Falconidae	Falco	peregrinus		Peregrine Falcon	Known
207	Chordata	Aves	Falconiformes	Falconidae	Falco	sparverius		American Kestrel	Known
208	Chordata	Aves	Galliformes	Meleagrididae	Meleagris	gallopavo		Wild Turkey	Known
209	Chordata	Aves	Galliformes	Odontophoridae	Callipepla	gambelii		Gambel's Quail	Known
210	Chordata	Aves	Galliformes	Odontophoridae	Callipepla	squamata		Scaled Quail	Known
211	Chordata	Aves	Galliformes	Odontophoridae	Cyrtonyx	montezumae		Montezuma Quail	Known
212	Chordata	Aves	Gaviiformes	Gaviidae	Gavia	immer		Common Loon	Known
213	Chordata	Aves	Gruiformes	Gruidae	Grus	canadensis		Sandhill Crane	Known
214	Chordata	Aves	Gruiformes	Rallidae	Fulica	americana		American Coot	Known
215	Chordata	Aves	Gruiformes	Rallidae	Gallinula	chloropus		Common Moorhen	Known
216	Chordata	Aves	Gruiformes	Rallidae	Porzana	carolina		Sora	Known
217	Chordata	Aves	Gruiformes	Rallidae	Rallus	limicola		Virginia Rail	Known
218	Chordata	Aves	Passeriformes	Aegithalidae	Psaltriparus	minimus		Bushtit	Known
219	Chordata	Aves	Passeriformes	Alaudidae	Alauda	alpestris		Horned Lark	Known
220	Chordata	Aves	Passeriformes	Bombycillidae	Bombycilla	cedrorum		Cedar Waxwing	Known
221	Chordata	Aves	Passeriformes	Cardinalidae	Cardinalis	sinuatus		Pyrrhuloxia	Known
222	Chordata	Aves	Passeriformes	Cardinalidae	Passerina	caerulea		Blue Grosbeak	Known
223	Chordata	Aves	Passeriformes	Cardinalidae	Passerina	ciris		Painted Bunting	Known
224	Chordata	Aves	Passeriformes	Cardinalidae	Passerina	amoena		Lazuli Bunting	Known
225	Chordata	Aves	Passeriformes	Cardinalidae	Passerina	cyanea		Indigo Bunting	Known

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ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
226	Chordata	Aves	Passeriformes	Cardinalidae	Passerina	versicolor		Varied Bunting	Known
227	Chordata	Aves	Passeriformes	Cardinalidae	Pheucticus	ludovicianus		Rose-breasted Grosbeak	Known
228	Chordata	Aves	Passeriformes	Cardinalidae	Pheucticus	melanocephalus		Black-headed Grosbeak	Known
229	Chordata	Aves	Passeriformes	Cardinalidae	Spiza	americana		Dickcissel	Known
230	Chordata	Aves	Passeriformes	Certhiidae	Certhia	americana		Brown Creeper	Known
231	Chordata	Aves	Passeriformes	Cinelidae	Cinclus	mexicanus		American Dipper	Known
232	Chordata	Aves	Passeriformes	Corvidae	Aphelocoma	californica		Western Scrub-jay	Known
233	Chordata	Aves	Passeriformes	Corvidae	Corvus	brachyrhynchos		American Crow	Known
234	Chordata	Aves	Passeriformes	Corvidae	Corvus	corax		Common Raven	Known
235	Chordata	Aves	Passeriformes	Corvidae	Corvus	cryptoleucus		Chihuahuan Raven	Known
236	Chordata	Aves	Passeriformes	Corvidae	Cyanocitta	stelleri		Steller's Jay	Known
237	Chordata	Aves	Passeriformes	Corvidae	Gymnorhinus	cyanocephalus		Pinyon Jay	Known
238	Chordata	Aves	Passeriformes	Emberizidae	Aimophila	cassinii		Cassin's Sparrow	Known
239	Chordata	Aves	Passeriformes	Emberizidae	Aimophila	ruficeps		Rufous-crowned Sparrow	Known
240	Chordata	Aves	Passeriformes	Emberizidae	Ammodramus	leconteii		Le Conte's Sparrow	Known
241	Chordata	Aves	Passeriformes	Emberizidae	Ammodramus	bairdii		Baird's Sparrow	Known
242	Chordata	Aves	Passeriformes	Emberizidae	Ammodramus	savannarum		Grasshopper Sparrow	Known
243	Chordata	Aves	Passeriformes	Emberizidae	Amphispiza	belli		Sage Sparrow	Known
244	Chordata	Aves	Passeriformes	Emberizidae	Amphispiza	bilineata		Black-throated Sparrow	Known
245	Chordata	Aves	Passeriformes	Emberizidae	Calamospiza	melanocorys		Lark Bunting	Known
246	Chordata	Aves	Passeriformes	Emberizidae	Calcarius	pictus		Smith's Longspur	Known
247	Chordata	Aves	Passeriformes	Emberizidae	Calcarius	lapponicus		Lapland Longspur	Known
248	Chordata	Aves	Passeriformes	Emberizidae	Calcarius	mccownii		McCown's Longspur	Known
249	Chordata	Aves	Passeriformes	Emberizidae	Calcarius	ornatus		Chestnut-collared Longspur	Known
250	Chordata	Aves	Passeriformes	Emberizidae	Chondestes	grammacus		Lark Sparrow	Known
251	Chordata	Aves	Passeriformes	Emberizidae	Junco	hyemalis		Dark-eyed Junco	Known
252	Chordata	Aves	Passeriformes	Emberizidae	Melospiza	georgiana		Swamp Sparrow	Known
253	Chordata	Aves	Passeriformes	Emberizidae	Melospiza	lincolnii		Lincoln's Sparrow	Known
254	Chordata	Aves	Passeriformes	Emberizidae	Melospiza	melodia		Song Sparrow	Known
255	Chordata	Aves	Passeriformes	Emberizidae	Passerculus	sandwichensis		Savannah Sparrow	Known
256	Chordata	Aves	Passeriformes	Emberizidae	Passerella	iliaca		Fox Sparrow	Known
257	Chordata	Aves	Passeriformes	Emberizidae	Pipilo	chlorurus		Green-tailed Towhee	Known
258	Chordata	Aves	Passeriformes	Emberizidae	Pipilo	erythrophthalmus		Eastern Towhee	Known
259	Chordata	Aves	Passeriformes	Emberizidae	Pipilo	fuscus		Canyon Towhee	Known
260	Chordata	Aves	Passeriformes	Emberizidae	Pipilo	maculatus		Spotted Towhee	Known
261	Chordata	Aves	Passeriformes	Emberizidae	Pooecetes	gramineus		Vesper Sparrow	Known
262	Chordata	Aves	Passeriformes	Emberizidae	Spizella	atrogularis		Black-chinned Sparrow	Known
263	Chordata	Aves	Passeriformes	Emberizidae	Spizella	breweri		Brewer's Sparrow	Known
264	Chordata	Aves	Passeriformes	Emberizidae	Spizella	pallida		Clay-colored Sparrow	Known
265	Chordata	Aves	Passeriformes	Emberizidae	Spizella	passerina		Chipping Sparrow	Known
266	Chordata	Aves	Passeriformes	Emberizidae	Zonotrichia	albicollis		White-throated Sparrow	Known
267	Chordata	Aves	Passeriformes	Emberizidae	Zonotrichia	leucophrys	gambelii	Gambel's White-crowned Sparrow	Known
268	Chordata	Aves	Passeriformes	Emberizidae	Zonotrichia	leucophrys		White-crowned Sparrow	Known
269	Chordata	Aves	Passeriformes	Emberizidae	Zonotrichia	querula		Harris's Sparrow	Known
270	Chordata	Aves	Passeriformes	Fringillidae	Carduelis	lawrencei		Lawrence's Goldfinch	Known

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ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
271	Chordata	Aves	Passeriformes	Fringillidae	Carduelis	pinus		Pine Siskin	Known
272	Chordata	Aves	Passeriformes	Fringillidae	Carduelis	psaltria		Lesser Goldfinch	Known
273	Chordata	Aves	Passeriformes	Fringillidae	Carduelis	tristis		American Goldfinch	Known
274	Chordata	Aves	Passeriformes	Fringillidae	Carpodacus	cassinii		Cassin's Finch	Known
275	Chordata	Aves	Passeriformes	Fringillidae	Carpodacus	mexicanus		House Finch	Known
276	Chordata	Aves	Passeriformes	Fringillidae	Carpodacus	purpureus		Purple Finch	Known
277	Chordata	Aves	Passeriformes	Fringillidae	Coccothraustes	vespertinus		Evening Grosbeak	Known
278	Chordata	Aves	Passeriformes	Fringillidae	Loxia	curvirostra		Red Crossbill	Known
279	Chordata	Aves	Passeriformes	Hirundinidae	Hirundo	rustica		Barn Swallow	Known
280	Chordata	Aves	Passeriformes	Hirundinidae	Petrochelidon	fulva		Cave Swallow	Known
281	Chordata	Aves	Passeriformes	Hirundinidae	Petrochelidon	pyrrhonota		Cliff Swallow	Known
282	Chordata	Aves	Passeriformes	Hirundinidae	Progne	subis		Purple Martin	Known
283	Chordata	Aves	Passeriformes	Hirundinidae	Riparia	riparia		Bank Swallow	Known
284	Chordata	Aves	Passeriformes	Hirundinidae	Stelgidopteryx	serripennis		Northern Rough-winged Swallow	Known
285	Chordata	Aves	Passeriformes	Hirundinidae	Tachycineta	bicolor		Tree Swallow	Known
286	Chordata	Aves	Passeriformes	Hirundinidae	Tachycineta	thalassina		Violet-green Swallow	Known
287	Chordata	Aves	Passeriformes	Icteridae	Agelaius	phoeniceus		Red-winged Blackbird	Known
288	Chordata	Aves	Passeriformes	Icteridae	Dolichonyx	oryzivorus		Bobolink	Known
289	Chordata	Aves	Passeriformes	Icteridae	Euphagus	carolinus		Rusty Blackbird	Known
290	Chordata	Aves	Passeriformes	Icteridae	Euphagus	cyanocephalus		Brewer's Blackbird	Known
291	Chordata	Aves	Passeriformes	Icteridae	Icterus	cucullatus		Hooded Oriole	Known
292	Chordata	Aves	Passeriformes	Icteridae	Icterus	spurius		Orchard Oriole	Known
293	Chordata	Aves	Passeriformes	Icteridae	Icterus	bullockii		Bullock's Oriole	Known
294	Chordata	Aves	Passeriformes	Icteridae	Icterus	galbula		Baltimore Oriole	Known
295	Chordata	Aves	Passeriformes	Icteridae	Icterus	parisorum		Scott's Oriole	Known
296	Chordata	Aves	Passeriformes	Icteridae	Molothrus	aeneus		Bronzed Cowbird	Known
297	Chordata	Aves	Passeriformes	Icteridae	Molothrus	ater		Brown-headed Cowbird	Known
298	Chordata	Aves	Passeriformes	Icteridae	Quiscalus	mexicanus		Great-tailed Grackle	Known
299	Chordata	Aves	Passeriformes	Icteridae	Sturnella	magna		Eastern Meadowlark	Known
300	Chordata	Aves	Passeriformes	Icteridae	Sturnella	neglecta		Western Meadowlark	Known
301	Chordata	Aves	Passeriformes	Icteridae	Xanthocephalus	xanthocephalus		Yellow-headed Blackbird	Known
302	Chordata	Aves	Passeriformes	Laniidae	Lanius	excubitor		Northern Shrike	Known
303	Chordata	Aves	Passeriformes	Laniidae	Lanius	ludovicianus		Loggerhead Shrike	Known
304	Chordata	Aves	Passeriformes	Mimidae	Mimus	polyglottos		Northern Mockingbird	Known
305	Chordata	Aves	Passeriformes	Mimidae	Oreoscoptes	montanus		Sage Thrasher	Known
306	Chordata	Aves	Passeriformes	Mimidae	Toxostoma	crissale		Crissal Thrasher	Known
307	Chordata	Aves	Passeriformes	Mimidae	Toxostoma	curvirostre		Curve-billed Thrasher	Known
308	Chordata	Aves	Passeriformes	Mimidae	Toxostoma	rufum		Brown Thrasher	Known
309	Chordata	Aves	Passeriformes	Motacillidae	Anthus	rubescens		American Pipit	Known
310	Chordata	Aves	Passeriformes	Motacillidae	Anthus	spragueii		Sprague's Pipit	Known
311	Chordata	Aves	Passeriformes	Paridae	Baeolophus	ridgwayi		Juniper Titmouse	Known
312	Chordata	Aves	Passeriformes	Paridae	Poecile	gambeli		Mountain Chickadee	Known
313	Chordata	Aves	Passeriformes	Parulidae	Cardellina	rubrifrons		Red-faced Warbler	Known
314	Chordata	Aves	Passeriformes	Parulidae	Dendroica	coronata		Yellow-rumped Warbler	Known
315	Chordata	Aves	Passeriformes	Parulidae	Dendroica	fusca		Blackburnian Warbler	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
316	Chordata	Aves	Passeriformes	Parulidae	Dendroica	graciae		Grace's Warbler	Known
317	Chordata	Aves	Passeriformes	Parulidae	Dendroica	nigrescens		Black-throated Gray Warbler	Known
318	Chordata	Aves	Passeriformes	Parulidae	Dendroica	occidentalis		Hermit Warbler	Known
319	Chordata	Aves	Passeriformes	Parulidae	Dendroica	palmarum		Palm Warbler	Known
320	Chordata	Aves	Passeriformes	Parulidae	Dendroica	pensylvanica		Chestnut-sided Warbler	Known
321	Chordata	Aves	Passeriformes	Parulidae	Dendroica	petechia		Yellow Warbler	Known
322	Chordata	Aves	Passeriformes	Parulidae	Dendroica	striata		Blackpoll Warbler	Known
323	Chordata	Aves	Passeriformes	Parulidae	Dendroica	townsendi		Townsend's Warbler	Known
324	Chordata	Aves	Passeriformes	Parulidae	Dendroica	virens		Black-throated Green Warbler	Known
325	Chordata	Aves	Passeriformes	Parulidae	Geothlypis	trichas		Common Yellowthroat	Known
326	Chordata	Aves	Passeriformes	Parulidae	Icteria	virens		Yellow-breasted Chat	Known
327	Chordata	Aves	Passeriformes	Parulidae	Mniotilta	varia		Black-and-White Warbler	Known
328	Chordata	Aves	Passeriformes	Parulidae	Myioborus	pictus		Painted Redstart	Known
329	Chordata	Aves	Passeriformes	Parulidae	Oporornis	tolmiei		MacGillivray's Warbler	Known
330	Chordata	Aves	Passeriformes	Parulidae	Parula	americana		Northern Parula	Known
331	Chordata	Aves	Passeriformes	Parulidae	Protonotaria	citrea		Prothonotary Warbler	Known
332	Chordata	Aves	Passeriformes	Parulidae	Seiurus	noveboracensis		Northern Waterthrush	Known
333	Chordata	Aves	Passeriformes	Parulidae	Setophaga	ruticilla		American Redstart	Known
334	Chordata	Aves	Passeriformes	Parulidae	Vermivora	luciae		Lucy's Warbler	Known
335	Chordata	Aves	Passeriformes	Parulidae	Vermivora	celata		Orange-crowned Warbler	Known
336	Chordata	Aves	Passeriformes	Parulidae	Vermivora	chrysoptera		Golden-winged Warbler	Known
337	Chordata	Aves	Passeriformes	Parulidae	Vermivora	peregrina		Tennessee Warbler	Known
338	Chordata	Aves	Passeriformes	Parulidae	Vermivora	ruficapilla		Nashville Warbler	Known
339	Chordata	Aves	Passeriformes	Parulidae	Vermivora	virginiae		Virginia's Warbler	Known
340	Chordata	Aves	Passeriformes	Parulidae	Wilsonia	citrina		Hooded Warbler	Known
341	Chordata	Aves	Passeriformes	Parulidae	Wilsonia	pusilla		Wilson's Warbler	Known
342	Chordata	Aves	Passeriformes	Passeridae	Passer	domesticus		House Sparrow	Known
343	Chordata	Aves	Passeriformes	Ptilogonatidae	Phainopepla	nitens		Phainopepla	Known
344	Chordata	Aves	Passeriformes	Regulidae	Regulus	calendula		Ruby-crowned Kinglet	Known
345	Chordata	Aves	Passeriformes	Regulidae	Regulus	satrapa		Golden-crowned Kinglet	Known
346	Chordata	Aves	Passeriformes	Remizidae	Auriparus	flaviceps		Verdin	Known
347	Chordata	Aves	Passeriformes	Sittidae	Sitta	canadensis		Red-breasted Nuthatch	Known
348	Chordata	Aves	Passeriformes	Sittidae	Sitta	carolinensis		White-breasted Nuthatch	Known
349	Chordata	Aves	Passeriformes	Sittidae	Sitta	pygmaea		Pygmy Nuthatch	Known
350	Chordata	Aves	Passeriformes	Sturnidae	Sturnus	vulgaris		European Starling	Known
351	Chordata	Aves	Passeriformes	Sylviidae	Polioptila	caerulea		Blue-gray Gnatcatcher	Known
352	Chordata	Aves	Passeriformes	Sylviidae	Polioptila	melanura		Black-tailed Gnatcatcher	Known
353	Chordata	Aves	Passeriformes	Thraupidae	Piranga	flava		Hepatic Tanager	Known
354	Chordata	Aves	Passeriformes	Thraupidae	Piranga	ludoviciana		Western Tanager	Known
355	Chordata	Aves	Passeriformes	Thraupidae	Piranga	rubra		Summer Tanager	Known
356	Chordata	Aves	Passeriformes	Troglodytidae	Campylorhynchus	brunneicapillus		Cactus Wren	Known
357	Chordata	Aves	Passeriformes	Troglodytidae	Catherpes	mexicanus		Canyon Wren	Known
358	Chordata	Aves	Passeriformes	Troglodytidae	Cistothorus	palustris		Marsh Wren	Known
359	Chordata	Aves	Passeriformes	Troglodytidae	Salpinctes	obsoletus		Rock Wren	Known
360	Chordata	Aves	Passeriformes	Troglodytidae	Thryomanes	bewickii		Bewick's Wren	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
361	Chordata	Aves	Passeriformes	Troglodytidae	Troglodytes	aedon		House Wren	Known
362	Chordata	Aves	Passeriformes	Turdidae	Catharus	guttatus		Hermit Thrush	Known
363	Chordata	Aves	Passeriformes	Turdidae	Catharus	ustulatus		Swainson's Thrush	Known
364	Chordata	Aves	Passeriformes	Turdidae	Myadestes	townsendi		Townsend's Solitaire	Known
365	Chordata	Aves	Passeriformes	Turdidae	Sialia	currucoides		Mountain Bluebird	Known
366	Chordata	Aves	Passeriformes	Turdidae	Sialia	mexicana		Western Bluebird	Known
367	Chordata	Aves	Passeriformes	Turdidae	Sialia	sialis		Eastern Bluebird	Known
368	Chordata	Aves	Passeriformes	Turdidae	Turdus	migratorius		American Robin	Known
369	Chordata	Aves	Passeriformes	Tyrannidae	Contopus	cooperi		Olive-sided Flycatcher	Known
370	Chordata	Aves	Passeriformes	Tyrannidae	Contopus	sordidulus		Western Wood-Pewee	Known
371	Chordata	Aves	Passeriformes	Tyrannidae	Empidonax	hammondii		Hammond's Flycatcher	Known
372	Chordata	Aves	Passeriformes	Tyrannidae	Empidonax	minimus		Least Flycatcher	Known
373	Chordata	Aves	Passeriformes	Tyrannidae	Empidonax	oberholseri		Dusky Flycatcher	Known
374	Chordata	Aves	Passeriformes	Tyrannidae	Empidonax	occidentalis		Cordilleran Flycatcher	Known
375	Chordata	Aves	Passeriformes	Tyrannidae	Empidonax	traillii		Willow Flycatcher	Known
376	Chordata	Aves	Passeriformes	Tyrannidae	Empidonax	wrightii		Gray Flycatcher	Known
377	Chordata	Aves	Passeriformes	Tyrannidae	Myiarchus	cinerascens		Ash-throated Flycatcher	Known
378	Chordata	Aves	Passeriformes	Tyrannidae	Sayornis	nigricans		Black Phoebe	Known
379	Chordata	Aves	Passeriformes	Tyrannidae	Sayornis	phoebe		Eastern Phoebe	Known
380	Chordata	Aves	Passeriformes	Tyrannidae	Sayornis	saya		Say's Phoebe	Known
381	Chordata	Aves	Passeriformes	Tyrannidae	Tyrannus	tyrannus		Eastern Kingbird	Known
382	Chordata	Aves	Passeriformes	Tyrannidae	Tyrannus	verticalis		Western Kingbird	Known
383	Chordata	Aves	Passeriformes	Tyrannidae	Tyrannus	vociferans		Cassin's Kingbird	Known
384	Chordata	Aves	Passeriformes	Vireonidae	Vireo	huttoni		Hutton's Vireo	Known
385	Chordata	Aves	Passeriformes	Vireonidae	Vireo	plumbeus		Plumbeous Vireo	Known
386	Chordata	Aves	Passeriformes	Vireonidae	Vireo	bellii		Bell's Vireo	Known
387	Chordata	Aves	Passeriformes	Vireonidae	Vireo	cassinii		Cassin's Vireo	Known
388	Chordata	Aves	Passeriformes	Vireonidae	Vireo	gilvus		Warbling Vireo	Known
389	Chordata	Aves	Passeriformes	Vireonidae	Vireo	olivaceus		Red-eyed Vireo	Known
390	Chordata	Aves	Passeriformes	Vireonidae	Vireo	philadelphicus		Philadelphia Vireo	Known
391	Chordata	Aves	Passeriformes	Vireonidae	Vireo	vicinior		Gray Vireo	Known
392	Chordata	Aves	Pelecaniformes	Pelecanidae	Pelecanus	erythrorhynchos		American White Pelican	Known
393	Chordata	Aves	Pelecaniformes	Phalacrocoracidae	Phalacrocorax	auritus		Double-crested Cormorant	Known
394	Chordata	Aves	Pelecaniformes	Phalacrocoracidae	Phalacrocorax	brasilianus		Neotropic Cormorant	Known
395	Chordata	Aves	Piciformes	Picidae	Colaptes	auratus		Northern Flicker	Known
396	Chordata	Aves	Piciformes	Picidae	Melanerpes	erythrocephalus	caurinus	Red-headed Woodpecker	Known
397	Chordata	Aves	Piciformes	Picidae	Melanerpes	lewis		Lewis's Woodpecker	Known
398	Chordata	Aves	Piciformes	Picidae	Melanerpes	formicivorus		Acorn Woodpecker	Known
399	Chordata	Aves	Piciformes	Picidae	Picoides	pubescens		Downy Woodpecker	Known
400	Chordata	Aves	Piciformes	Picidae	Picoides	scalaris		Ladder-backed Woodpecker	Known
401	Chordata	Aves	Piciformes	Picidae	Picoides	villosus		Hairy Woodpecker	Known
402	Chordata	Aves	Piciformes	Picidae	Sphyrapicus	nuchalis		Red-naped Sapsucker	Known
403	Chordata	Aves	Piciformes	Picidae	Sphyrapicus	thyroideus		Williamson's Sapsucker	Known
404	Chordata	Aves	Piciformes	Picidae	Sphyrapicus	varius		Yellow-bellied Sapsucker	Known
405	Chordata	Aves	Podicipediformes	Podicipedidae	Aechmophorus	clarkii		Clark's Grebe	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
406	Chordata	Aves	Podicipediformes	Podicipedidae	Aechmophorus	occidentalis		Western Grebe	Known
407	Chordata	Aves	Podicipediformes	Podicipedidae	Podiceps	auritus		Horned Grebe	Known
408	Chordata	Aves	Podicipediformes	Podicipedidae	Podiceps	nigricollis		Eared Grebe	Known
409	Chordata	Aves	Podicipediformes	Podicipedidae	Podilymbus	podiceps		Pied-billed Grebe	Known
410	Chordata	Aves	Psittaciformes	Psittacidae	Ara	militaris		Military Macaw	Not Applicable
411	Chordata	Aves	Strigiformes	Strigidae	Asio	otus		Long-eared Owl	Known
412	Chordata	Aves	Strigiformes	Strigidae	Asio	flammeus		Short-eared Owl	Known
413	Chordata	Aves	Strigiformes	Strigidae	Athene	cunicularia		Burrowing Owl	Known
414	Chordata	Aves	Strigiformes	Strigidae	Bubo	virginianus		Great Horned Owl	Known
415	Chordata	Aves	Strigiformes	Strigidae	Glaucidium	gnoma		Northern Pygmy-Owl	Known
416	Chordata	Aves	Strigiformes	Strigidae	Megascops	kennicottii		Western Screech-Owl	Known
417	Chordata	Aves	Strigiformes	Strigidae	Strix	occidentalis	lucida	Mexican Spotted Owl	Known
418	Chordata	Aves	Strigiformes	Strigidae	Strix	occidentalis		Spotted Owl	Known
419	Chordata	Aves	Strigiformes	Tytonidae	Tyto	alba		Barn Owl	Known
420	Chordata	Aves	Trogoniformes	Trogonidae	Trogon	elegans		Elegant Trogon	Known
421	Chordata	Mammalia	Artiodactyla	Antilocapridae	Antilocapra	americana		Pronghorn	Known
422	Chordata	Mammalia	Artiodactyla	Bovidae	Ammotragus	lervia		Barbary Sheep	Known
423	Chordata	Mammalia	Artiodactyla	Bovidae	Capra	hircus		Persian Ibex	Known
424	Chordata	Mammalia	Artiodactyla	Bovidae	Oryx	gazella		Oryx	Known
425	Chordata	Mammalia	Artiodactyla	Bovidae	Ovis	canadensis	mexicana	Desert Bighorn Sheep	Expected
426	Chordata	Mammalia	Artiodactyla	Cervidae	Odocoileus	hemionus		Mule Deer	Known
427	Chordata	Mammalia	Artiodactyla	Tayassuidae	Pecari	tajacu		Collared Peccary	Known
428	Chordata	Mammalia	Carnivora	Canidae	Canis	latrans		Coyote	Known
429	Chordata	Mammalia	Carnivora	Canidae	Urocyon	cinereoargenteus		Common Gray Fox	Known
430	Chordata	Mammalia	Carnivora	Canidae	Vulpes	macrotis		Kit Fox	Known
431	Chordata	Mammalia	Carnivora	Canidae	Vulpes	vulpes		Red Fox	Expected
432	Chordata	Mammalia	Carnivora	Felidae	Lynx	rufus		Bobcat	Known
433	Chordata	Mammalia	Carnivora	Felidae	Puma	concolor		Mountain Lion	Known
434	Chordata	Mammalia	Carnivora	Mephitidae	Conepatus	leuconotus		American Hog-nosed Skunk	Known
435	Chordata	Mammalia	Carnivora	Mephitidae	Mephitis	mephitis		Striped Skunk	Known
436	Chordata	Mammalia	Carnivora	Mephitidae	Spilogale	gracilis		Western Spotted Skunk	Known
437	Chordata	Mammalia	Carnivora	Mustelidae	Mustela	frenata		Long-tailed Weasel	Known
438	Chordata	Mammalia	Carnivora	Mustelidae	Taxidea	taxus		American Badger	Known
439	Chordata	Mammalia	Carnivora	Procyonidae	Bassariscus	astutus		Ringtail	Known
440	Chordata	Mammalia	Carnivora	Procyonidae	Procyon	lotor		Common Raccoon	Expected
441	Chordata	Mammalia	Carnivora	Ursidae	Ursus	americanus		Black Bear	Known
442	Chordata	Mammalia	Chiroptera	Molossidae	Nyctinomops	femorosaccus		Pocketed Free-tailed Bat	Expected
443	Chordata	Mammalia	Chiroptera	Molossidae	Nyctinomops	macrotis		Big Free-tailed Bat	Expected
444	Chordata	Mammalia	Chiroptera	Molossidae	Tadarida	brasiliensis		Brazilian Free-tailed Bat	Known
445	Chordata	Mammalia	Chiroptera	Vespertilionidae	Antrozous	pallidus		Pallid Bat	Known
446	Chordata	Mammalia	Chiroptera	Vespertilionidae	Eptesicus	fuscus		Big Brown Bat	Known
447	Chordata	Mammalia	Chiroptera	Vespertilionidae	Euderma	maculatum		Spotted Bat	Expected
448	Chordata	Mammalia	Chiroptera	Vespertilionidae	Lasionycteris	noctivagans		Silver-haired Bat	Known
449	Chordata	Mammalia	Chiroptera	Vespertilionidae	Lasiurus	blossevillii		Western Red Bat	Known
450	Chordata	Mammalia	Chiroptera	Vespertilionidae	Lasiurus	cinereus		Hoary Bat	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
451	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	californicus		California Myotis	Known
452	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	ciliolabrum		Western Small-footed Myotis	Known
453	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	leibii		Eastern Small-footed Myotis	Expected
454	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	lucifugus		Little Brown Myotis	Expected
455	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	occultus		Arizona Myotis	Known
456	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	thysanodes		Fringed Myotis	Known
457	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	velifer		Cave Myotis	Expected
458	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	volans		Long-legged Myotis	Expected
459	Chordata	Mammalia	Chiroptera	Vespertilionidae	Myotis	yumanensis		Yuma Myotis	Expected
460	Chordata	Mammalia	Chiroptera	Vespertilionidae	Pipistrellus	hesperus		Western Pipistrelle	Known
461	Chordata	Mammalia	Chiroptera	Vespertilionidae	Plecotus	townsendii		Townsend's Big-eared Bat	Expected
462	Chordata	Mammalia	Didelphimorphia	Didelphidae	Didelphis	virginiana		Virginia Opossum	Expected
463	Chordata	Mammalia	Insectivora	Soricidae	Notiosorex	crawfordi		Desert Shrew	Known
464	Chordata	Mammalia	Lagomorpha	Leporidae	Lepus	californicus		Black-tailed Jackrabbit	Known
465	Chordata	Mammalia	Lagomorpha	Leporidae	Sylvilagus	audubonii		Desert Cottontail	Known
466	Chordata	Mammalia	Lagomorpha	Leporidae	Sylvilagus	floridanus		Eastern Cottontail	Expected
467	Chordata	Mammalia	Rodentia	Erethizontidae	Erethizon	dorsatum		Common Porcupine	Known
468	Chordata	Mammalia	Rodentia	Geomyidae	Cratogeomys	castanops		Yellow-faced Pocket Gopher	Known
469	Chordata	Mammalia	Rodentia	Geomyidae	Geomys	arenarius	arenarius	Desert Pocket Gopher	Potential
470	Chordata	Mammalia	Rodentia	Geomyidae	Geomys	arenarius		Desert Pocket Gopher	Potential
471	Chordata	Mammalia	Rodentia	Geomyidae	Geomys	arenarius	brevirostris	White Sands Desert Pocket Gopher	Potential
472	Chordata	Mammalia	Rodentia	Geomyidae	Geomys	bursarius		Plains Pocket Gopher	Expected
473	Chordata	Mammalia	Rodentia	Geomyidae	Thomomys	bottae		Botta's Pocket Gopher	Known
474	Chordata	Mammalia	Rodentia	Heteromyidae	Chaetodipus	eremicus		Chihuahuan Desert Pocket Mouse	Known
475	Chordata	Mammalia	Rodentia	Heteromyidae	Chaetodipus	hispidus		Hispid Pocket Mouse	Known
476	Chordata	Mammalia	Rodentia	Heteromyidae	Chaetodipus	intermedius		Rock Pocket Mouse	Known
477	Chordata	Mammalia	Rodentia	Heteromyidae	Dipodomys	merriami		Merriam's Kangaroo Rat	Known
478	Chordata	Mammalia	Rodentia	Heteromyidae	Dipodomys	ordii		Ord's Kangaroo Rat	Known
479	Chordata	Mammalia	Rodentia	Heteromyidae	Dipodomys	spectabilis		Banner-tailed Kangaroo Rat	Known
480	Chordata	Mammalia	Rodentia	Heteromyidae	Perognathus	flavescens		Plains Pocket Mouse	Known
481	Chordata	Mammalia	Rodentia	Heteromyidae	Perognathus	flavus		Silky Pocket Mouse	Known
482	Chordata	Mammalia	Rodentia	Muridae	Microtus	mexicanus		Mexican Vole	Known
483	Chordata	Mammalia	Rodentia	Muridae	Mus	musculus		House Mouse	Known
484	Chordata	Mammalia	Rodentia	Muridae	Neotoma	albigula		White-throated Woodrat	Known
485	Chordata	Mammalia	Rodentia	Muridae	Neotoma	micropus		Southern Plains Woodrat	Known
486	Chordata	Mammalia	Rodentia	Muridae	Onychomys	leucogaster		Northern Grasshopper Mouse	Known
487	Chordata	Mammalia	Rodentia	Muridae	Onychomys	arenicola		Mearn's Grasshopper Mouse	Known
488	Chordata	Mammalia	Rodentia	Muridae	Peromyscus	boylii		Brush Mouse	Known
489	Chordata	Mammalia	Rodentia	Muridae	Peromyscus	eremicus		Cactus Mouse	Known
490	Chordata	Mammalia	Rodentia	Muridae	Peromyscus	leucopus		White-footed Mouse	Known
491	Chordata	Mammalia	Rodentia	Muridae	Peromyscus	maniculatus		Deer Mouse	Known
492	Chordata	Mammalia	Rodentia	Muridae	Peromyscus	nasutus		Northern Rock Mouse	Expected
493	Chordata	Mammalia	Rodentia	Muridae	Reithrodontomys	megalotis		Western Harvest Mouse	Known
494	Chordata	Mammalia	Rodentia	Muridae	Reithrodontomys	montanus		Plains Harvest Mouse	Known
495	Chordata	Mammalia	Rodentia	Muridae	Sigmodon	hispidus		Hispid Cotton Rat	Known

Vertebrate Species List

ID	Phylum	Class	Order	Family	Genus	Species	SubSpecies	Common Name	Presence
496	Chordata	Mammalia	Rodentia	Sciuridae	Ammospermophilus	interpres		Texas Antelope Squirrel	Known
497	Chordata	Mammalia	Rodentia	Sciuridae	Cynomys	ludovicianus		Black-tailed Prairie Dog	Known
498	Chordata	Mammalia	Rodentia	Sciuridae	Neotamias	canipes		Gray-footed Chipmunk	Known
499	Chordata	Mammalia	Rodentia	Sciuridae	Neotamias	cinereicollis		Gray-collared Chipmunk	Known
500	Chordata	Mammalia	Rodentia	Sciuridae	Neotamias	minimus		Least Chipmunk	Expected
501	Chordata	Mammalia	Rodentia	Sciuridae	Neotamias	quadrivittatus	australis	Organ Mountain Colorado Chipmunk	Known
502	Chordata	Mammalia	Rodentia	Sciuridae	Spermophilus	mexicanus		Mexican Ground Squirrel	Expected
503	Chordata	Mammalia	Rodentia	Sciuridae	Spermophilus	spilosoma		Spotted Ground Squirrel	Known
504	Chordata	Mammalia	Rodentia	Sciuridae	Spermophilus	tridecemlineatus		Thirteen-lined Ground Squirrel	Expected
505	Chordata	Mammalia	Rodentia	Sciuridae	Spermophilus	variegatus		Rock Squirrel	Known

C. Baseline List of Invertebrates

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Invertebrate Species List

ID	Phylum	Class	Order_	Family	Genus	Species	Species_Author	SubSpecies	Common_Name	Presence
1	Annelida	Clitellata	Arhynchobdellida	Erpobdellidae	Erpobdella	punctata	(Leidy)		Leech	Expected
2	Arthropoda	Arachnida	Acari	Acaridae	Acarus	siro	Linnaeus		Grain mite	Expected
3	Arthropoda	Arachnida	Acari	Acaridae	Caloglyphus	spp	(Zach.)		Mite	Expected
4	Arthropoda	Arachnida	Acari	Acaridae	Rhizoglyphus	callae	Oudemans		Bulb mite	Expected
5	Arthropoda	Arachnida	Acari	Acaridae	Rhizoglyphus	echinopus	(F. and R.)		Bulb mite	Expected
6	Arthropoda	Arachnida	Acari	Acaridae	Tyrophagus	putrescentae	(Schrank)		Mold mite	Expected
7	Arthropoda	Arachnida	Acari	Argasidae	Argas	persicus	(Oken)		Fowl tick	Expected
8	Arthropoda	Arachnida	Acari	Dermanyssidae	Ornithonyssus	bacoti	(Hirst)		Tropical rat mite	Expected
9	Arthropoda	Arachnida	Acari	Dermanyssidae	Ornithonyssus	sylvarium	(Canestrini and Fanzago)		Northern fowl mite	Expected
10	Arthropoda	Arachnida	Acari	Eriophyidae	Aceria	neocynodonis	Keifer		Eriophyid Mite	Expected
11	Arthropoda	Arachnida	Acari	Eriophyidae	Aculops	lycopersici	(Massee)		Tomato russet mite	Expected
12	Arthropoda	Arachnida	Acari	Eriophyidae	Eriophyes	fraxinivorus	Nalepa		Eriophyid Mite	Expected
13	Arthropoda	Arachnida	Acari	Eriophyidae	Eriophyes	ulmi	Garman		Eriophyid Mite	Expected
14	Arthropoda	Arachnida	Acari	Ixodidae	Dermacentor	albipictus	(Packard)		Winter tick	Expected
15	Arthropoda	Arachnida	Acari	Ixodidae	Rhipicephalus	sanguineus	(Latreille)		Brown dog tick	Expected
16	Arthropoda	Arachnida	Acari	Tarsonemidae	Tarsonemis	fusarii			Thread-footed mite	Expected
17	Arthropoda	Arachnida	Acari	Tenuipalpidae	Brevipalpus	cardinalis	(Banks)		Flat Mite	Expected
18	Arthropoda	Arachnida	Acari	Tenuipalpidae	Brevipalpus	lewisi	McGregor		Citrus flat mite	Expected
19	Arthropoda	Arachnida	Acari	Tenuipalpidae	Pentamerismus	erythreus	(Ewing)		Flat Mite	Expected
20	Arthropoda	Arachnida	Acari	Tetranychidae	Eotetranychus	weldoni	(Ewing)		Spider Mite	Expected
21	Arthropoda	Arachnida	Acari	Tetranychidae	Oligonychus	coniferarum	(McGregor)		Conifer spider mite	Expected
22	Arthropoda	Arachnida	Acari	Tetranychidae	Oligonychus	gramineus	(McGregor)		Spider Mite	Expected
23	Arthropoda	Arachnida	Acari	Tetranychidae	Oligonychus	milleri	(McGregor)		Spider Mite	Expected
24	Arthropoda	Arachnida	Acari	Tetranychidae	Oligonychus	pratensis	(Banks)		Banks grass mite	Expected
25	Arthropoda	Arachnida	Acari	Tetranychidae	Oligonychus	stickneyi	(McGregor)		Spider Mite	Expected
26	Arthropoda	Arachnida	Acari	Tetranychidae	Oligonychus	unuguis	(Jacobi)		Spider Mite	Expected
27	Arthropoda	Arachnida	Acari	Tetranychidae	Petrobia	latens	(Muller)		Brown wheat mite	Expected
28	Arthropoda	Arachnida	Acari	Tetranychidae	Tetranychus	canadensis	McGregor		Fourspotted spider mite	Expected
29	Arthropoda	Arachnida	Acari	Tetranychidae	Tetranychus	cinnabarinus	(Boisduval)		Spider Mite	Expected
30	Arthropoda	Arachnida	Acari	Tetranychidae	Tetranychus	desertorum	Banks		Spider Mite	Expected
31	Arthropoda	Arachnida	Acari	Tetranychidae	Tetranychus	mcdanieli	McGregor		Spider Mite	Expected
32	Arthropoda	Arachnida	Acari	Tetranychidae	Tetranychus	telarius	(Linnaeus)		Spider Mite	Expected
33	Arthropoda	Arachnida	Acari	Tetranychidae	Tetranychus	turkestani	Vgaror and Nikolski		Spider Mite	Expected
34	Arthropoda	Arachnida	Acari	Trombiculidae	Trombicula	alfreddugesi	(Oudemans)		Common chigger mite	Expected
35	Arthropoda	Arachnida	Acari	Trombidiidae	Trombidium	magnificum	LeConte		Red velvet mite	Expected
36	Arthropoda	Arachnida	Acari	Tydeidae	Pronematus	ubiquitus	(McGregor)		Tyeid Mite	Expected
37	Arthropoda	Arachnida	Araneae	Agelenidae	Agelenopsis	aperta	(Gertsch)		grass spider	Expected
38	Arthropoda	Arachnida	Araneae	Agelenidae	Hololena	hola	(Chamberlin and Gertsch)		Funnel Weavers	Expected
39	Arthropoda	Arachnida	Araneae	Anyphaenidae	Anyphaena	judicata (nr.)	O.P.-Cambridge		Ghost Spiders	Expected
40	Arthropoda	Arachnida	Araneae	Anyphaenidae	Hibana	incursa	(Chamberlin)		Ghost Spiders	Expected
41	Arthropoda	Arachnida	Araneae	Araneidae	Argiope	aurantia	Lucas		Yellow garden argiope	Expected
42	Arthropoda	Arachnida	Araneae	Araneidae	Argiope	trifasciata	(Forskal)		Banded argiope	Expected
43	Arthropoda	Arachnida	Araneae	Araneidae	Metapeira	arizonica	Chamberlin and Ivie		Orb Weavers	Expected
44	Arthropoda	Arachnida	Araneae	Araneidae	Metapeira	comanche	Levi		Orb Weavers	Expected
45	Arthropoda	Arachnida	Araneae	Araneidae	Neoscona	crucifera	(Lucas)		Orb Weavers	Expected

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46	Arthropoda	Arachnida	Araneae	Araneidae	Neoscona	oaxancensis	(Keyseling)	Orb Weavers	Expected
47	Arthropoda	Arachnida	Araneae	Corinnidae	Castianeira	occidens	Reiskind	Antmimic	Expected
48	Arthropoda	Arachnida	Araneae	Corinnidae	Corinna	bicalcarata	(Simon)	Antmimic	Expected
49	Arthropoda	Arachnida	Araneae	Corinnidae	Meriola	deceptus	(Banks)	Antmimic	Expected
50	Arthropoda	Arachnida	Araneae	Corinnidae	Trachelas	mexicanus	Banks	Antmimic	Expected
51	Arthropoda	Arachnida	Araneae	Dictytnidae	Cicurina	ludoviciana	Simon	Mesh Web Weaver	Expected
52	Arthropoda	Arachnida	Araneae	Dictytnidae	Cicurina	parma	Chamberlin	Mesh Web Weaver	Expected
53	Arthropoda	Arachnida	Araneae	Dictytnidae	Dictyna	annexa	Gertsch and Mulaik	Mesh Web Weaver	Expected
54	Arthropoda	Arachnida	Araneae	Dictytnidae	Dictyna	calcarata	Banks	Mesh Web Weaver	Expected
55	Arthropoda	Arachnida	Araneae	Dictytnidae	Dictyna	oasa	Ivie	Mesh Web Weaver	Expected
56	Arthropoda	Arachnida	Araneae	Dictytnidae	Dictyna	personata	Gertsch and Mulaik	Mesh Web Weaver	Expected
57	Arthropoda	Arachnida	Araneae	Dictytnidae	Dictyna	reticulata	Gertsch and Ivie	Mesh Web Weaver	Expected
58	Arthropoda	Arachnida	Araneae	Diguetidae	Diguetia	canities	McCook	Desert Shrub Spider	Expected
59	Arthropoda	Arachnida	Araneae	Diguetidae	Diguetia	imperiosa	Gertsch and Mulaik	Desert Shrub Spider	Expected
60	Arthropoda	Arachnida	Araneae	Diguetidae	Diguetia	signata	Gertsch	Desert Shrub Spider	Expected
61	Arthropoda	Arachnida	Araneae	Dyseridae	Dysdera	crocata	Koch	Woodlouse Hunter	Expected
62	Arthropoda	Arachnida	Araneae	Filistatidae	Kuculcania	arizonica	(Chamberlin and Ivie)	Crevice Weaver	Expected
63	Arthropoda	Arachnida	Araneae	Gnaphosidae	Callilepis	gosoga	Chamberlin and Gertsch	Ground Spider	Expected
64	Arthropoda	Arachnida	Araneae	Gnaphosidae	Callilepis	mumai	Platnick	Ground Spider	Expected
65	Arthropoda	Arachnida	Araneae	Gnaphosidae	Cesonia	sincera	Chamberlin and Gertsch	Ground Spider	Expected
66	Arthropoda	Arachnida	Araneae	Gnaphosidae	Drassylus	insularis	Banks	Ground Spider	Expected
67	Arthropoda	Arachnida	Araneae	Gnaphosidae	Drassylus	notonus	Chamberlin	Ground Spider	Expected
68	Arthropoda	Arachnida	Araneae	Gnaphosidae	Gnaphosa	clara	(Keyserling)	Ground Spider	Expected
69	Arthropoda	Arachnida	Araneae	Gnaphosidae	Gnaphosa	hirsutipes	Banks	Ground Spider	Expected
70	Arthropoda	Arachnida	Araneae	Gnaphosidae	Gnaphosa	mumai	Platnick and Shadab	Ground Spider	Expected
71	Arthropoda	Arachnida	Araneae	Gnaphosidae	Herphyllus	bulbulcus	Chamberlin	Ground Spider	Expected
72	Arthropoda	Arachnida	Araneae	Gnaphosidae	Herphyllus	cockerelli	(Banks)	Ground Spider	Expected
73	Arthropoda	Arachnida	Araneae	Gnaphosidae	Herphyllus	ecclesiasticus	Hentz	Parson spider	Expected
74	Arthropoda	Arachnida	Araneae	Gnaphosidae	Herphyllus	hesperolus	Chamberlin	Ground Spider	Expected
75	Arthropoda	Arachnida	Araneae	Gnaphosidae	Herphyllus	propinquus	(Keyserling)	Ground Spider	Expected
76	Arthropoda	Arachnida	Araneae	Gnaphosidae	Micaria	deserticola	Gertsch	Ground Spider	Expected
77	Arthropoda	Arachnida	Araneae	Gnaphosidae	Micaria	longipes	Emerton	Ground Spider	Expected
78	Arthropoda	Arachnida	Araneae	Gnaphosidae	Sergiolus	angustus	(Banks)	Ground Spider	Expected
79	Arthropoda	Arachnida	Araneae	Gnaphosidae	Trachyzelotes	lyonneti (nr.)	(Audouin)	Ground Spider	Expected
80	Arthropoda	Arachnida	Araneae	Gnaphosidae	Zelotes	anglo	Gertsch and Reichert	Ground Spider	Expected
81	Arthropoda	Arachnida	Araneae	Gnaphosidae	Zelotes	tuobus	Chamberlin	Ground Spider	Expected
82	Arthropoda	Arachnida	Araneae	Heteropodidae	Olios	giganteus	Keyserling	Giant Crab Spider	Expected
83	Arthropoda	Arachnida	Araneae	Linyphiidae	Erigone	whymperi	Cambridge	Dwarf Spider	Expected
84	Arthropoda	Arachnida	Araneae	Linyphiidae	Frontinella	communis	(Hentz)	Sheetweb Spider	Expected
85	Arthropoda	Arachnida	Araneae	Linyphiidae	Grammonota	pictilis (nr.)	Cambridge	Sheetweb Spider	Expected
86	Arthropoda	Arachnida	Araneae	Liocranidae	Neoanagraphis	chamberlini	Gertsch and Mulaik	Liocranid Spider	Expected
87	Arthropoda	Arachnida	Araneae	Corinnidae	Piabuna	brevispina	Chamberlin and Ivie	Antmimic	Expected
88	Arthropoda	Arachnida	Araneae	Lycosidae	Allocosa	pylora	Chamberlin	Wolf Spider	Expected
89	Arthropoda	Arachnida	Araneae	Lycosidae	Alopecosa	kochii	(Keyserling)	Wolf Spider	Expected
90	Arthropoda	Arachnida	Araneae	Lycosidae	Geolycosa	raphaelana	Chamberlin	Burrowing wolf spider	Expected
91	Arthropoda	Arachnida	Araneae	Lycosidae	Hesperocosa	unica	(Gertsch and Wallace)	Wolf Spider	Expected

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92	Arthropoda	Arachnida	Araneae	Lycosidae	Lycosa	antelucana	Montgomery	Wolf Spider	Expected
93	Arthropoda	Arachnida	Araneae	Lycosidae	Lycosa	celerior	(Chamberlin)	Wolf Spider	Expected
94	Arthropoda	Arachnida	Araneae	Lycosidae	Lycosa	coloradensis	Banks	Wolf Spider	Expected
95	Arthropoda	Arachnida	Araneae	Lycosidae	Pardosa	sternalis	(Thorell)	Thinlegged wolf spider	Expected
96	Arthropoda	Arachnida	Araneae	Mimetidae	Mimetus	hesperus	Chamberlin	Pirate Spider	Expected
97	Arthropoda	Arachnida	Araneae	Nesticidae	Eidmanella	pallida	(Emerton)	Spider	Expected
98	Arthropoda	Arachnida	Araneae	Oecobiidae	Oecobius	cellariorum	(Duges)	Wall Spider	Expected
99	Arthropoda	Arachnida	Araneae	Oonopidae	Scaphiella	hespera	Chamberlin	Goblin Spider	Expected
100	Arthropoda	Arachnida	Araneae	Oxyopidae	Oxyopes	apollo	Brady	Lynx Spider	Expected
101	Arthropoda	Arachnida	Araneae	Oxyopidae	Oxyopes	scalaris	Hentz	Western lynx spider	Expected
102	Arthropoda	Arachnida	Araneae	Oxyopidae	Oxyopes	tridens	Brady	Lynx Spider	Expected
103	Arthropoda	Arachnida	Araneae	Oxyopidae	Peucetia	longipalpus	F.O.P.-Cambridge	Lynx Spider	Expected
104	Arthropoda	Arachnida	Araneae	Philodromidae	Apollophanes	margareta	Lowrie and Gertsch	Running Crab Spider	Expected
105	Arthropoda	Arachnida	Araneae	Philodromidae	Apollophanes	texanus	(Banks)	Running Crab Spider	Expected
106	Arthropoda	Arachnida	Araneae	Philodromidae	Ebo	magnificus	(Chamberlin and Ivie)	Running Crab Spider	Expected
107	Arthropoda	Arachnida	Araneae	Philodromidae	Ebo	mexicanus	Banks	Running Crab Spider	Expected
108	Arthropoda	Arachnida	Araneae	Philodromidae	Ebo	pepinensis	Gertsch	Running Crab Spider	Expected
109	Arthropoda	Arachnida	Araneae	Philodromidae	Philodromus	spectabilis	Keyserling	Running Crab Spider	Expected
110	Arthropoda	Arachnida	Araneae	Philodromidae	Thanatus	vulgaris	(Hentz)	Running Crab Spider	Expected
111	Arthropoda	Arachnida	Araneae	Pholcidae	Holocnemus	pluchei	(Scopoli)	Cellar Spider	Expected
112	Arthropoda	Arachnida	Araneae	Pholcidae	Psilochorus	imitatus	Gertsch and Mulaik	Cellar Spider	Expected
113	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	clypeatus	(Banks)	Jumping Spider	Expected
114	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	conjunctus	(Banks)	Jumping Spider	Expected
115	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	hirsutus	(Peckham and Peckham)	Jumping Spider	Expected
116	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	klauserii	Peckham and Peckham	Jumping Spider	Expected
117	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	tranquillus	(Peckham and Peckham)	Jumping Spider	Expected
118	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	tuberculatus	(Gertsch and Mulaik)	Jumping Spider	Expected
119	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	ustalatus	(Griswold)	Jumping Spider	Expected
120	Arthropoda	Arachnida	Araneae	Salticidae	Habronattus	virgulatus	Griswold	Jumping Spider	Expected
121	Arthropoda	Arachnida	Araneae	Salticidae	Marpissa	lineata	(Koch)	Jumping Spider	Expected
122	Arthropoda	Arachnida	Araneae	Salticidae	Metacyrba	taeniola	(Hentz)	Jumping Spider	Expected
123	Arthropoda	Arachnida	Araneae	Salticidae	Metaphidippus	arizonensis	(Peckham and Peckham)	Jumping Spider	Expected
124	Arthropoda	Arachnida	Araneae	Salticidae	Metaphidippus	chera	(Chamberlin)	Jumping Spider	Expected
125	Arthropoda	Arachnida	Araneae	Salticidae	Phidippus	apacheanus	Chamberlin and Gertsch	Jumping Spider	Expected
126	Arthropoda	Arachnida	Araneae	Salticidae	Phidippus	audax	(Hentz)	Bold jumper	Expected
127	Arthropoda	Arachnida	Araneae	Salticidae	Phidippus	californicus	Peckham and Peckham	Jumping Spider	Expected
128	Arthropoda	Arachnida	Araneae	Salticidae	Phidippus	comatus	Peckham and Peckham	Jumping Spider	Expected
129	Arthropoda	Arachnida	Araneae	Salticidae	Platycryptus	arizonensis	(Barnes)	Jumping Spider	Expected
130	Arthropoda	Arachnida	Araneae	Salticidae	Platycryptus	californicus	(Peckham and Peckham)	Jumping Spider	Expected
131	Arthropoda	Arachnida	Araneae	Salticidae	Plexippus	paykulli	(Audoin)	Pantropical jumper	Expected
132	Arthropoda	Arachnida	Araneae	Salticidae	Pseudicius	piraticus	(Peckham and Peckham)	Jumping Spider	Expected
133	Arthropoda	Arachnida	Araneae	Salticidae	Salticus	peckhamae	(Cockerell)	Jumping Spider	Expected
134	Arthropoda	Arachnida	Araneae	Salticidae	Sassacus	papenhoei	Peckham and Peckham	Jumping Spider	Expected
135	Arthropoda	Arachnida	Araneae	Salticidae	Synageles	noxiosa	(Hentz)	Jumping Spider	Expected
136	Arthropoda	Arachnida	Araneae	Scytodidae	Scytodes	thoracica (nr.)	(Latreille)	Spitting Spider	Expected
137	Arthropoda	Arachnida	Araneae	Segestriidae	Ariadna	bicolor	(Hentz)	Tube Web Spider	Expected

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138	Arthropoda	Arachnida	Araneae	Sicariidae	Loxoscles	apachea	Gertsch and Ennik	Apache recluse	Expected
139	Arthropoda	Arachnida	Araneae	Tetragnathidae	Tetragnatha	laboriosa	Hentz	Silver longjawed orbweaver	Expected
140	Arthropoda	Arachnida	Araneae	Tetragnathidae	Tetragnatha	versicolor	Walckenaer	Long-jawed Orb Weaver	Expected
141	Arthropoda	Arachnida	Araneae	Theridiidae	Achaearanea	tepidariorum	(Koch)	Cobweb Spider	Expected
142	Arthropoda	Arachnida	Araneae	Theridiidae	Dipoena	abdita	Gertsch and Mulaik	Cobweb Spider	Expected
143	Arthropoda	Arachnida	Araneae	Theridiidae	Euryopis	texana	Banks	Cobweb Spider	Expected
144	Arthropoda	Arachnida	Araneae	Theridiidae	Latrodectus	hesperus	Chamberlin and Ivie	Western widow	Expected
145	Arthropoda	Arachnida	Araneae	Theridiidae	Steatoda	fulva	Keyserling	Cobweb Spider	Expected
146	Arthropoda	Arachnida	Araneae	Theridiidae	Steatoda	variata	Gertsch	Cobweb Spider	Expected
147	Arthropoda	Arachnida	Araneae	Thomisidae	Bassaniana	versicolor	Keyserling	Crab Spider	Expected
148	Arthropoda	Arachnida	Araneae	Thomisidae	Misumenoides	formosipes	(Walckenaer)	Redbanded crab spider	Expected
149	Arthropoda	Arachnida	Araneae	Thomisidae	Misumenops	celer	(Hentz)	Celer crab spider	Expected
150	Arthropoda	Arachnida	Araneae	Thomisidae	Misumenops	coloradensis	Gertsch	Crab Spider	Expected
151	Arthropoda	Arachnida	Araneae	Thomisidae	Xysticus	gulosus	Keyserling	Crab Spider	Expected
152	Arthropoda	Arachnida	Araneae	Thomisidae	Xysticus	lassanus	Chamberlin	Crab Spider	Expected
153	Arthropoda	Arachnida	Araneae	Thomisidae	Xysticus	lutzi	Gertsch	Crab Spider	Expected
154	Arthropoda	Arachnida	Araneae	Thomisidae	Xysticus	paiutus	Gertsch	Crab Spider	Expected
155	Arthropoda	Arachnida	Araneae	Titanoceidae	Titanocea	nigrella	(Chamberlin)	True Spider	Expected
156	Arthropoda	Arachnida	Opiliones	Phalangiidae	Trachyrhinus	marmoratus	Banks	Harvestmen	Expected
157	Arthropoda	Arachnida	Opiliones	Phalangiidae	Trachyrhinus	mesillensis	Cokendolpher	Harvestmen	Expected
158	Arthropoda	Arachnida	Pseudoscorpiones	Chernetidae	Dinocheirus	aequalis	(Banks)	Pseudoscorpion	Expected
159	Arthropoda	Arachnida	Scorpiones	Buthidae	Centruroides	vittatus	(Say)	Striped centruroides	Expected
160	Arthropoda	Arachnida	Scorpiones	Vaejovidae	Paruroctonus	aquilonalis	(Stahnke)	Scorpion	Expected
161	Arthropoda	Arachnida	Scorpiones	Vaejovidae	Paruroctonus	utahensis	(Williams)	Scorpion	Expected
162	Arthropoda	Arachnida	Scorpiones	Vaejovidae	Vaejovis	coahuilae	Williams	Lesser Stripetail Scorpion	Expected
163	Arthropoda	Arachnida	Scorpiones	Vaejovidae	Vaejovis	crassimanus	Pocock	Scorpion	Expected
164	Arthropoda	Arachnida	Scorpiones	Vaejovidae	Vaejovis	russeli	Williams	Scorpion	Expected
165	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Arenotherus	puebloensis	(Brookhart)	Windscorpion	Expected
166	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremobates	arizonicus	(Roewer)	Windscorpion	Expected
167	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremobates	marathoni	Muma	Windscorpion	Expected
168	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremobates	pallipes	(Say)	Windscorpion	Expected
169	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremobates	palpisetulosus (?)	Fichter	Windscorpion	Expected
170	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremochelis	bilobatus	(Muma)	Windscorpion	Expected
171	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremoperna	bajadae	(Muma and Brookhart)	Windscorpion	Expected
172	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremoperna	nodularis	(Muma)	Windscorpion	Expected
173	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremoperna	norrisi	(Muma and Brookhart)	Windscorpion	Expected
174	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Eremopus	gigasallus	(Muma)	Windscorpion	Expected
175	Arthropoda	Arachnida	Solifugae	Eremobaetidae	Hemerotrecha	fruitana	Muma	Windscorpion	Expected
176	Arthropoda	Arachnida	Uropygi	Thelyphonidae	Mastigoproctus	giganteus	(Lucas)	Giant vinegaroon	Expected
177	Arthropoda	Chilopoda	Scolopendromorpha	Scolopendridae	Scolopendra	polymorpha	Wood	Desert Centipede	Expected
178	Arthropoda	Chilopoda	Scolopendromorpha	Scolopendridae	Scolopendra	viridis	Say	Florida Blue Centipede	Expected
179	Arthropoda	Chilopoda	Scutigeromorpha	Scutigeridae	Scutigera	coleoptrata	(Linnaeus)	House centipede	Expected
180	Arthropoda	Crustacea	Anostraca	Streptocephalidae	Streptocephalus	texanus	Packard	Fork-tailed fairy shrimp	Expected
181	Arthropoda	Crustacea	Anostraca	Thamnocephalidae	Thamnocephalus	platyurus	Packard	Broad-tailed fairy shrimp	Expected
182	Arthropoda	Crustacea	Cladocera	Daphnidae	Moina	wierzejskii	(Richards)	Water flea	Expected
183	Arthropoda	Crustacea	Notostraca	Caenestheriidae	Triops	longicaudas (nr.)	(LeConte)	Tadpole shrimp	Expected

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184	Arthropoda	Diplopoda	Julida	Parajulidae	Apacheilus	guadalupensis	Lommis	Millipede	Expected
185	Arthropoda	Diplopoda	Spirostreptida	Spirostreptidae	Orthoporus	ornatus	(Girard)	Texas striped millipede	Expected
186	Arthropoda	Insecta	Anoplura	Haematopinidae	Haematopinus	asini	(Linnaeus)	Ungulate Lice	Expected
187	Arthropoda	Insecta	Anoplura	Haematopinidae	Haematopinus	eurysternus	(Nitzsch)	Ungulate Lice	Expected
188	Arthropoda	Insecta	Anoplura	Hoplopleuridae	Hoplopleura	reithrodontomydis	Ferris	Armoured Lice	Expected
189	Arthropoda	Insecta	Anoplura	Polyplacidae	Fahrenholzia	zacatecae	Ferris	Spiny Rat Lice	Expected
190	Arthropoda	Insecta	Anoplura	Polyplacidae	Neohaematopinus	neotomae	Ferris	Spiny Rat Lice	Expected
191	Arthropoda	Insecta	Blattodea	Blatellidae	Blatella	germanica	(Linnaeus)	German cockroach	Expected
192	Arthropoda	Insecta	Blattodea	Blatellidae	Blatella	vaga	Hebard	Field cockroach	Expected
193	Arthropoda	Insecta	Blattodea	Blatellidae	Parcoblatta	desertae	(Rehn and Hebard)	Cockroaches	Expected
194	Arthropoda	Insecta	Blattodea	Blatellidae	Supella	supellectilium	(Serville)	Brown-banded cockroach	Expected
195	Arthropoda	Insecta	Blattodea	Blattidae	Blatta	lateralis	Walker	Turkestan cockroach	Expected
196	Arthropoda	Insecta	Blattodea	Blattidae	Blatta	orientalis	Linnaeus	Oriental cockroach	Expected
197	Arthropoda	Insecta	Blattodea	Blattidae	Periplaneta	americana	(Linnaeus)	American cockroach	Expected
198	Arthropoda	Insecta	Blattodea	Polyphagidae	Arenivaga	erratica	Rehn	Sand cockroach	Expected
199	Arthropoda	Insecta	Blattodea	Polyphagidae	Eremoblatta	subdiaphana	(Scudder)	Sand cockroach	Expected
200	Arthropoda	Insecta	Coleoptera	Anobiidae	Gastrallus	fasciatus	White	Death Watch Beetle	Expected
201	Arthropoda	Insecta	Coleoptera	Anthicidae	Anthicus	cervinus	LaFerte	Antlike Flower Beetles	Expected
202	Arthropoda	Insecta	Coleoptera	Anthicidae	Anthicus	confinus	LeConte	Antlike Flower Beetles	Expected
203	Arthropoda	Insecta	Coleoptera	Anthicidae	Anthicus	hastatus	Casey	Antlike Flower Beetles	Expected
204	Arthropoda	Insecta	Coleoptera	Anthicidae	Anthicus	obliquus (nr.)	Casey	Antlike Flower Beetles	Expected
205	Arthropoda	Insecta	Coleoptera	Anthicidae	Ishyropalpus	nitidulus	(LeConte)	Antlike Flower Beetles	Expected
206	Arthropoda	Insecta	Coleoptera	Anthicidae	Ishyropalpus	subtilissimus	(Pic)	Antlike Flower Beetles	Expected
207	Arthropoda	Insecta	Coleoptera	Anthicidae	Mecynotarsus	candidus	LeConte	Antlike Flower Beetles	Expected
208	Arthropoda	Insecta	Coleoptera	Anthicidae	Mecynotarsus	falcatus	Chandler	Antlike Flower Beetles	Expected
209	Arthropoda	Insecta	Coleoptera	Anthicidae	Notoxus	apicalis	LeConte	Antlike Flower Beetles	Expected
210	Arthropoda	Insecta	Coleoptera	Anthicidae	Notoxus	calcaratus	Horn	Antlike Flower Beetles	Expected
211	Arthropoda	Insecta	Coleoptera	Anthicidae	Notoxus	hastatus	Chandler	Antlike Flower Beetles	Expected
212	Arthropoda	Insecta	Coleoptera	Anthicidae	Notoxus	marginatus	LeConte	Antlike Flower Beetles	Expected
213	Arthropoda	Insecta	Coleoptera	Anthicidae	Notoxus	nuperus	Horn	Antlike Flower Beetles	Expected
214	Arthropoda	Insecta	Coleoptera	Anthicidae	Notoxus	serratus	(LeConte)	Antlike Flower Beetles	Expected
215	Arthropoda	Insecta	Coleoptera	Anthicidae	Tanarthrus	brevipennis	Casey	Antlike Flower Beetles	Expected
216	Arthropoda	Insecta	Coleoptera	Anthicidae	Tanarthrus	cochisus	Chandler	Antlike Flower Beetles	Expected
217	Arthropoda	Insecta	Coleoptera	Anthicidae	Tanarthrus	iselini	Chandler	Antlike Flower Beetles	Expected
218	Arthropoda	Insecta	Coleoptera	Bostrichidae	Amphicerus	cornutus	(Pallas)	Bostrichid Beetles	Expected
219	Arthropoda	Insecta	Coleoptera	Bostrichidae	Rhyzopertha	dominica	(Fabricius)	Lesser grain borer	Expected
220	Arthropoda	Insecta	Coleoptera	Bruchidae	Acanthoscelides	collusus	(Fall)	Seed Weevil	Expected
221	Arthropoda	Insecta	Coleoptera	Bruchidae	Acanthoscelides	mixtus	(Horn)	Seed Weevil	Expected
222	Arthropoda	Insecta	Coleoptera	Bruchidae	Algorobius	bottimeri	Kingsolver	Seed Weevil	Expected
223	Arthropoda	Insecta	Coleoptera	Bruchidae	Algorobius	prosopis	LeConte	Seed Weevil	Expected
224	Arthropoda	Insecta	Coleoptera	Bruchidae	Callosobruchus	maculatus	(Fabricius)	Cowpea weevil	Expected
225	Arthropoda	Insecta	Coleoptera	Bruchidae	Mimosestes	amicus	Horn	Seed Weevil	Expected
226	Arthropoda	Insecta	Coleoptera	Bruchidae	Neltumius	arizonensis	(Schaeffer)	Seed Weevil	Expected
227	Arthropoda	Insecta	Coleoptera	Bruchidae	Sennius	morosus	(Sharp)	Seed Weevil	Expected
228	Arthropoda	Insecta	Coleoptera	Bruchidae	Stator	pruinosus	(Horn)	Seed Weevil	Expected
229	Arthropoda	Insecta	Coleoptera	Bruchidae	Stator	pygidialis	(Schaeffer)	Seed Weevil	Expected

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230	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	amplicollis	LeConte	Jewel Beetle	Expected
231	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	cribricollis	Horn	Jewel Beetle	Expected
232	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	decipiens	LeConte	Jewel Beetle	Expected
233	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	delumbis	Horn	Jewel Beetle	Expected
234	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	disjuncta	Fall	Jewel Beetle	Expected
235	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	flavopicta	(Waterhouse)	Jewel Beetle	Expected
236	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	gibbula	LeConte	Jewel Beetle	Expected
237	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	maculifera	Horn	Jewel Beetle	Expected
238	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	mixta	LeConte	Jewel Beetle	Expected
239	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	quadrivittatoides	Nelson and Westcott	Jewel Beetle	Expected
240	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeodera	sphaeralceae	Barr	Jewel Beetle	Expected
241	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeoderopsis	hulli	(Knull)	Jewel Beetle	Expected
242	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeoderopsis	junki	(Thery)	Jewel Beetle	Expected
243	Arthropoda	Insecta	Coleoptera	Buprestidae	Acmaeoderopsis	rockefelleri	(Cazier)	Jewel Beetle	Expected
244	Arthropoda	Insecta	Coleoptera	Buprestidae	Actenodes	mendax	Horn	Jewel Beetle	Expected
245	Arthropoda	Insecta	Coleoptera	Buprestidae	Agaeocera	gentilis	(Horn)	Jewel Beetle	Expected
246	Arthropoda	Insecta	Coleoptera	Buprestidae	Agrilus	addendus	Crotch	Jewel Beetle	Expected
247	Arthropoda	Insecta	Coleoptera	Buprestidae	Agrilus	aureus	Chevrolat	Jewel Beetle	Expected
248	Arthropoda	Insecta	Coleoptera	Buprestidae	Agrilus	felix	Horn	Jewel Beetle	Expected
249	Arthropoda	Insecta	Coleoptera	Buprestidae	Agrilus	malvastri	Fisher	Jewel Beetle	Expected
250	Arthropoda	Insecta	Coleoptera	Buprestidae	Agrilus	palmacollis	Horn	Jewel Beetle	Expected
251	Arthropoda	Insecta	Coleoptera	Buprestidae	Agrilus	pulchellus	Bland	Jewel Beetle	Expected
252	Arthropoda	Insecta	Coleoptera	Buprestidae	Anthaxia	retifera	LeConte	Jewel Beetle	Expected
253	Arthropoda	Insecta	Coleoptera	Buprestidae	Chrysobothris	ephedrae	Knull	Jewel Beetle	Expected
254	Arthropoda	Insecta	Coleoptera	Buprestidae	Chrysobothris	lateralis	Waterhouse	Jewel Beetle	Expected
255	Arthropoda	Insecta	Coleoptera	Buprestidae	Chrysobothris	ococola	LeConte	Jewel Beetle	Expected
256	Arthropoda	Insecta	Coleoptera	Buprestidae	Chrysobothris	rossi	Van Dyke	Jewel Beetle	Expected
257	Arthropoda	Insecta	Coleoptera	Buprestidae	Chrysobothris	ulkei	LeConte	Jewel Beetle	Expected
258	Arthropoda	Insecta	Coleoptera	Buprestidae	Chrysobothris	viridiceps	Melsheimer	Jewel Beetle	Expected
259	Arthropoda	Insecta	Coleoptera	Buprestidae	Dicerca	prolongata	Leconte	Jewel Beetle	Expected
260	Arthropoda	Insecta	Coleoptera	Buprestidae	Hippomelas	caelata	(LeConte)	Jewel Beetle	Expected
261	Arthropoda	Insecta	Coleoptera	Buprestidae	Hippomelas	carolinensis	Horn	Jewel Beetle	Expected
262	Arthropoda	Insecta	Coleoptera	Buprestidae	Hippomelas	planicosta	(LeConte)	Jewel Beetle	Expected
263	Arthropoda	Insecta	Coleoptera	Buprestidae	Melanophila	acuminata	De Geer	Jewel Beetle	Expected
264	Arthropoda	Insecta	Coleoptera	Buprestidae	Psiloptera	drummondi	Cast.	Jewel Beetle	Expected
265	Arthropoda	Insecta	Coleoptera	Buprestidae	Psiloptera	webbii	LeConte	Jewel Beetle	Expected
266	Arthropoda	Insecta	Coleoptera	Buprestidae	Thrincopyge	alacris (nr.)	LeConte	Jewel Beetle	Expected
267	Arthropoda	Insecta	Coleoptera	Buprestidae	Thrincopyge	ambiens	LeConte	Jewel Beetle	Expected
268	Arthropoda	Insecta	Coleoptera	Cantharidae	Cantharis	ruficollis	(LeConte)	Soldier Beetle	Expected
269	Arthropoda	Insecta	Coleoptera	Cantharidae	Chauliognathus	discus	LeConte	Soldier Beetle	Expected
270	Arthropoda	Insecta	Coleoptera	Cantharidae	Chauliognathus	scutellaris	LeConte	Soldier Beetle	Expected
271	Arthropoda	Insecta	Coleoptera	Cantharidae	Discodon	patatyderum	Gemminger and Harold	Soldier Beetle	Expected
272	Arthropoda	Insecta	Coleoptera	Carabidae	Agonoderus	comma	(Fabricius)	Ground Beetle	Expected
273	Arthropoda	Insecta	Coleoptera	Carabidae	Agonoderus	lineola	(Fabricius)	Ground Beetle	Expected
274	Arthropoda	Insecta	Coleoptera	Carabidae	Agonoderus	pallipes	Fabricius	Ground Beetle	Expected
275	Arthropoda	Insecta	Coleoptera	Carabidae	Agonum	extimum	Liebherr	Ground Beetle	Expected

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276	Arthropoda	Insecta	Coleoptera	Carabidae	Agonum	texanum	LeConte		Ground Beetle	Expected
277	Arthropoda	Insecta	Coleoptera	Carabidae	Amara	bowditchi	Hayward		Ground Beetle	Expected
278	Arthropoda	Insecta	Coleoptera	Carabidae	Amara	californica	DeJean		Ground Beetle	Expected
279	Arthropoda	Insecta	Coleoptera	Carabidae	Axinopalpus	biplagiatus	DeJean		Ground Beetle	Expected
280	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	bifossulatum	LeConte		Ground Beetle	Expected
281	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	coxendrix	Say		Ground Beetle	Expected
282	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	impotens	Casey		Ground Beetle	Expected
283	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	lucidum	(LeConte)		Ground Beetle	Expected
284	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	nubiculosum	Chaudior		Ground Beetle	Expected
285	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	rapidum	(LeConte)		Ground Beetle	Expected
286	Arthropoda	Insecta	Coleoptera	Carabidae	Bembidion	striola (nr.)	LeConte		Ground Beetle	Expected
287	Arthropoda	Insecta	Coleoptera	Carabidae	Brachinus	alterans	DeJean		Bombardier beetle	Expected
288	Arthropoda	Insecta	Coleoptera	Carabidae	Brachinus	imperialensis	Erwin		Bombardier beetle	Expected
289	Arthropoda	Insecta	Coleoptera	Carabidae	Brachinus	javalinopsis	Erwin		Bombardier beetle	Expected
290	Arthropoda	Insecta	Coleoptera	Carabidae	Bradycellus	rupestris	Say		Ground Beetle	Expected
291	Arthropoda	Insecta	Coleoptera	Carabidae	Calosoma	perigrinator	Guerin-Meneville		Caterpillar hunter	Expected
292	Arthropoda	Insecta	Coleoptera	Carabidae	Calosoma	scrutator	Fabricius		Caterpillar hunter	Expected
293	Arthropoda	Insecta	Coleoptera	Carabidae	Chlaenius	chaudoir	Horn		Ground Beetle	Expected
294	Arthropoda	Insecta	Coleoptera	Carabidae	Chlaenius	sericeus	(Forster)		Ground Beetle	Expected
295	Arthropoda	Insecta	Coleoptera	Carabidae	Clivina	bipustulata	(Fabricius)		Ground Beetle	Expected
296	Arthropoda	Insecta	Coleoptera	Carabidae	Clivina	ferrea	LeConte		Ground Beetle	Expected
297	Arthropoda	Insecta	Coleoptera	Carabidae	Cratacanthus	dubius	Beavois		Ground Beetle	Expected
298	Arthropoda	Insecta	Coleoptera	Carabidae	Diplochaetus	lecontei	Horn		Ground Beetle	Expected
299	Arthropoda	Insecta	Coleoptera	Carabidae	Discoderus	amoenus	LeConte		Ground Beetle	Expected
300	Arthropoda	Insecta	Coleoptera	Carabidae	Discoderus	impotens	(LeConte)		Ground Beetle	Expected
301	Arthropoda	Insecta	Coleoptera	Carabidae	Discoderus	robustus	Horn		Ground Beetle	Expected
302	Arthropoda	Insecta	Coleoptera	Carabidae	Euryderus	grossus	Say		Ground Beetle	Expected
303	Arthropoda	Insecta	Coleoptera	Carabidae	Harpalus	fimbriolata	(Melsheimer)		Ground Beetle	Expected
304	Arthropoda	Insecta	Coleoptera	Carabidae	Harpalus	obliquus	(Horn)		Ground Beetle	Expected
305	Arthropoda	Insecta	Coleoptera	Carabidae	Harpalus	pennsylvanicus	De Geer		Ground Beetle	Expected
306	Arthropoda	Insecta	Coleoptera	Carabidae	Hellumorpha	ferrugineus	LeConte		Ground Beetle	Expected
307	Arthropoda	Insecta	Coleoptera	Carabidae	Lebia	bivittata	Fabricius		Ground Beetle	Expected
308	Arthropoda	Insecta	Coleoptera	Carabidae	Lebia	grandis	Hentz		Ground Beetle	Expected
309	Arthropoda	Insecta	Coleoptera	Carabidae	Lebia	guttula	LeConte		Ground Beetle	Expected
310	Arthropoda	Insecta	Coleoptera	Carabidae	Lebia	pleuritica	LeConte		Ground Beetle	Expected
311	Arthropoda	Insecta	Coleoptera	Carabidae	Lebia	viridis	Say		Ground Beetle	Expected
312	Arthropoda	Insecta	Coleoptera	Carabidae	Pasimachus	californicus	Chaudoir		Ground Beetle	Expected
313	Arthropoda	Insecta	Coleoptera	Carabidae	Pasimachus	duplicatus	LeConte		Ground Beetle	Expected
314	Arthropoda	Insecta	Coleoptera	Carabidae	Pasimachus	elongatus	LeConte		Ground Beetle	Expected
315	Arthropoda	Insecta	Coleoptera	Carabidae	Pinacodera	punctigera	LeConte		Ground Beetle	Expected
316	Arthropoda	Insecta	Coleoptera	Carabidae	Platynus	extensicollis	(Say)	cyanescens	Ground Beetle	Expected
317	Arthropoda	Insecta	Coleoptera	Carabidae	Platynus	placidus	(Say)		Ground Beetle	Expected
318	Arthropoda	Insecta	Coleoptera	Carabidae	Platynus	simplex	LeConte		Ground Beetle	Expected
319	Arthropoda	Insecta	Coleoptera	Carabidae	Platynus	texanus	LeConte		Ground Beetle	Expected
320	Arthropoda	Insecta	Coleoptera	Carabidae	Pseudaptinus	horni	Chaudoir		Ground Beetle	Expected
321	Arthropoda	Insecta	Coleoptera	Carabidae	Pseudaptinus	tenuicollis	LeConte		Ground Beetle	Expected

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322	Arthropoda	Insecta	Coleoptera	Carabidae	Pterostichus	chalcites	(Say)		Ground Beetle	Expected
323	Arthropoda	Insecta	Coleoptera	Carabidae	Pterostichus	laetulus	(LeConte)		Ground Beetle	Expected
324	Arthropoda	Insecta	Coleoptera	Carabidae	Pterostichus	scitulus	(LeConte)		Ground Beetle	Expected
325	Arthropoda	Insecta	Coleoptera	Carabidae	Pterostichus	splendidulus	(LeConte)		Ground Beetle	Expected
326	Arthropoda	Insecta	Coleoptera	Carabidae	Scarites	substriatus	Holdeman		Ground Beetle	Expected
327	Arthropoda	Insecta	Coleoptera	Carabidae	Scarites	subterraneus	Fabricius		Ground Beetle	Expected
328	Arthropoda	Insecta	Coleoptera	Carabidae	Selenophorus	famulus	Casey		Ground Beetle	Expected
329	Arthropoda	Insecta	Coleoptera	Carabidae	Selenophorus	pedicularius	DeJean		Ground Beetle	Expected
330	Arthropoda	Insecta	Coleoptera	Carabidae	Selenophorus	planipennis	LeConte		Ground Beetle	Expected
331	Arthropoda	Insecta	Coleoptera	Carabidae	Stenolophus	ochropezus	Say		Ground Beetle	Expected
332	Arthropoda	Insecta	Coleoptera	Carabidae	Stenolophus	pallipes	(Fabricius)		Ground Beetle	Expected
333	Arthropoda	Insecta	Coleoptera	Carabidae	Stenomorphus	scolopax	Casey		Ground Beetle	Expected
334	Arthropoda	Insecta	Coleoptera	Carabidae	Tecnophilus	croceicollis	(Menetries)	pilatei	Ground Beetle	Expected
335	Arthropoda	Insecta	Coleoptera	Carabidae	Zuphium	americanum	DeJean		Ground Beetle	Expected
336	Arthropoda	Insecta	Coleoptera	Cerambycidae	Aethecerinus	letecinctus	(Horn)		Long-horned Beetles	Expected
337	Arthropoda	Insecta	Coleoptera	Cerambycidae	Aneflomorpha	rectilinea	Casey		Long-horned Beetles	Expected
338	Arthropoda	Insecta	Coleoptera	Cerambycidae	Aneflus	chisosensis	Casey		Long-horned Beetles	Expected
339	Arthropoda	Insecta	Coleoptera	Cerambycidae	Aneflus	protensis	LeConte		Long-horned Beetles	Expected
340	Arthropoda	Insecta	Coleoptera	Cerambycidae	Anelephus	brevidens (nr.)	(Schaeffer)		Long-horned Beetles	Expected
341	Arthropoda	Insecta	Coleoptera	Cerambycidae	Anoplocurius	altus	Knull		Long-horned Beetles	Expected
342	Arthropoda	Insecta	Coleoptera	Cerambycidae	Archodontes	melanoplus	(Linnaeus)	serrulatus	Long-horned Beetles	Expected
343	Arthropoda	Insecta	Coleoptera	Cerambycidae	Axestinus	obscurus	LeConte		Long-horned Beetles	Expected
344	Arthropoda	Insecta	Coleoptera	Cerambycidae	Batyle	ignicollis	(Say)		Long-horned Beetles	Expected
345	Arthropoda	Insecta	Coleoptera	Cerambycidae	Batyle	melancollis	Linsley		Long-horned Beetles	Expected
346	Arthropoda	Insecta	Coleoptera	Cerambycidae	Batyle	suturalis	Say	cylindrella	Long-horned Beetles	Expected
347	Arthropoda	Insecta	Coleoptera	Cerambycidae	Batyleoma	pearsalli	(Bland)		Long-horned Beetles	Expected
348	Arthropoda	Insecta	Coleoptera	Cerambycidae	Callidum	antennatum	Casey		Black-horned pine borer	Expected
349	Arthropoda	Insecta	Coleoptera	Cerambycidae	Chrotoma	dunniana	Casey		Long-horned Beetles	Expected
350	Arthropoda	Insecta	Coleoptera	Cerambycidae	Coenopoeus	palmeri	(LeConte)		Cactus longhorn	Expected
351	Arthropoda	Insecta	Coleoptera	Cerambycidae	Crossidius	discoideus	(Say)		Long-horned Beetles	Expected
352	Arthropoda	Insecta	Coleoptera	Cerambycidae	Crossidius	intermedius	LeConte		Long-horned Beetles	Expected
353	Arthropoda	Insecta	Coleoptera	Cerambycidae	Crossidius	pulchellus	LeConte		Long-horned Beetles	Expected
354	Arthropoda	Insecta	Coleoptera	Cerambycidae	Crossidius	suturalis	LeConte		Long-horned Beetles	Expected
355	Arthropoda	Insecta	Coleoptera	Cerambycidae	Dectes	spinosus	Say		Long-horned Beetles	Expected
356	Arthropoda	Insecta	Coleoptera	Cerambycidae	Dectes	texanus	LeConte	alticola	Long-horned Beetles	Expected
357	Arthropoda	Insecta	Coleoptera	Cerambycidae	Derobrachus	geminatus	LeConte		Long-horned Beetles	Expected
358	Arthropoda	Insecta	Coleoptera	Cerambycidae	Derobrachus	mandibularis	Serville		Long-horned Beetles	Expected
359	Arthropoda	Insecta	Coleoptera	Cerambycidae	Eburia	haldemani	LeConte		Long-horned Beetles	Expected
360	Arthropoda	Insecta	Coleoptera	Cerambycidae	Enaphalodes	hispicornis	(Linnaeus)		Long-horned Beetles	Expected
361	Arthropoda	Insecta	Coleoptera	Cerambycidae	Eustromula	validum	LeConte		Long-horned Beetles	Expected
362	Arthropoda	Insecta	Coleoptera	Cerambycidae	Haplidus	laticeps	Knull		Long-horned Beetles	Expected
363	Arthropoda	Insecta	Coleoptera	Cerambycidae	Hesperophanes	moestum	LeConte		Long-horned Beetles	Expected
364	Arthropoda	Insecta	Coleoptera	Cerambycidae	Leptura	gigas	LeConte		Long-horned Beetles	Expected
365	Arthropoda	Insecta	Coleoptera	Cerambycidae	Megacyllene	snowi	(Casey)	zumara	Long-horned Beetles	Expected
366	Arthropoda	Insecta	Coleoptera	Cerambycidae	Methia	mormona	Linell		Long-horned Beetles	Expected
367	Arthropoda	Insecta	Coleoptera	Cerambycidae	Moneilema	armata	LeConte		Black cactus longhorn	Expected

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368	Arthropoda	Insecta	Coleoptera	Cerambycidae	Neaneflus	brevispinus	Chemsak	Long-horned Beetles	Expected
369	Arthropoda	Insecta	Coleoptera	Cerambycidae	Neoclytus	acuminatus	(Fabricius)	Red-headed ash borer	Expected
370	Arthropoda	Insecta	Coleoptera	Cerambycidae	Neoclytus	approximatus	LeConte	Long-horned Beetles	Expected
371	Arthropoda	Insecta	Coleoptera	Cerambycidae	Neoclytus	caprea	(Say)	Long-horned Beetles	Expected
372	Arthropoda	Insecta	Coleoptera	Cerambycidae	Oncideres	rhodosticta	Bates	Mesquite twig girdler	Expected
373	Arthropoda	Insecta	Coleoptera	Cerambycidae	Plectrodera	scalator	(Fabricius)	Cottonwood borer	Expected
374	Arthropoda	Insecta	Coleoptera	Cerambycidae	Plionoma	suturalis	LeConte	Long-horned Beetles	Expected
375	Arthropoda	Insecta	Coleoptera	Cerambycidae	Prionus	californicus	Motschultsky	California Prionus	Expected
376	Arthropoda	Insecta	Coleoptera	Cerambycidae	Prionus	curvatus	LeConte	Long-horned Beetles	Expected
377	Arthropoda	Insecta	Coleoptera	Cerambycidae	Rhopalophora	laevicollis	LeConte	Long-horned Beetles	Expected
378	Arthropoda	Insecta	Coleoptera	Cerambycidae	Schizax	senex	LeConte	Long-horned Beetles	Expected
379	Arthropoda	Insecta	Coleoptera	Cerambycidae	Stenaspis	solitaria	(Say)	Long-horned Beetles	Expected
380	Arthropoda	Insecta	Coleoptera	Cerambycidae	Stenaspis	verticalis	Serville	Long-horned Beetles	Expected
381	Arthropoda	Insecta	Coleoptera	Cerambycidae	Stenosphenus	texanus	Knull	Long-horned Beetles	Expected
382	Arthropoda	Insecta	Coleoptera	Cerambycidae	Stenostrophia	tribalteata	LeConte	Tiger-spotted flower lepturir	Expected
383	Arthropoda	Insecta	Coleoptera	Cerambycidae	Sternidius	setipes	(Casey)	Long-horned Beetles	Expected
384	Arthropoda	Insecta	Coleoptera	Cerambycidae	Taranomis	bivitatta	(DuPont)	Long-horned Beetles	Expected
385	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tetraopes	canescens	LeConte	Long-horned Beetles	Expected
386	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tetraopes	discoideus	LeConte	Long-horned Beetles	Expected
387	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tetraopes	femoratus	LeConte	Long-horned Beetles	Expected
388	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tigrinestola	tigrina	(Skinner)	Long-horned Beetles	Expected
389	Arthropoda	Insecta	Coleoptera	Cerambycidae	Trachyderes	mandibularis	(Serville)	Long-horned Beetles	Expected
390	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tragidion	annulatum	LeConte	Wasplike longhorn	Expected
391	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tragidion	armatum	LeConte	Long-horned Beetles	Expected
392	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tragidion	auripenne	Casey	Long-horned Beetles	Expected
393	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tragidion	coquus	Linnaeus	Long-horned Beetles	Expected
394	Arthropoda	Insecta	Coleoptera	Cerambycidae	Trichastylopsis	albidus	(LeConte)	Long-horned Beetles	Expected
395	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tylosis	jimenezi	Duges	Long-horned Beetles	Expected
396	Arthropoda	Insecta	Coleoptera	Cerambycidae	Tylosis	maculatus	LeConte	Long-horned Beetles	Expected
397	Arthropoda	Insecta	Coleoptera	Cerambycidae	Valenus	inornatus	(Casey)	Long-horned Beetles	Expected
398	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Acalymma	blandulum	(LeConte)	Leaf Beetle	Expected
399	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Acalymma	trivittata	(Mannerheim)	Western striped cucumber b	Expected
400	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Altica	foliacea	LeConte	Leaf Beetle	Expected
401	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Altica	obliterata	LeConte	Leaf Beetle	Expected
402	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Altica	torquata	LeConte	Leaf Beetle	Expected
403	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Anisostena	nigrita	(Olivier)	Leaf Beetle	Expected
404	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Babia	quadriguttata	(Olivier)	Four-spotted baboon beetle	Expected
405	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Babia	tetraspilota	LeConte	Leaf Beetle	Expected
406	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Blepharida	dorthea	Mignot	Leaf Beetle	Expected
407	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Blepharida	rhois	(Forster)	Leaf Beetle	Expected
408	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Calligrapha	dislocata	Rogers	Leaf Beetle	Expected
409	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Calligrapha	serpentina	(Rogers)	Leaf Beetle	Expected
410	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Calomicrus	chiricahuensis	(Blake)	Leaf Beetle	Expected
411	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Calomicrus	popenoei	(Blake)	Leaf Beetle	Expected
412	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cassidia	bivittata		Leaf Beetle	Expected
413	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cerotoma	trifurcata	(Forster)	Bean leaf beetle	Expected

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414	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chaetocnema	brunnescens	Horn		Leaf Beetle	Expected
415	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chaetocnema	cribrifrons	LeConte		Leaf Beetle	Expected
416	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chaetocnema	ectypa	Horn		Desert corn flea beetle	Expected
417	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chaetocnema	minuta	Melsheimer		Leaf Beetle	Expected
418	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chelymorpha	phytophagica	Cresson		Leaf Beetle	Expected
419	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chrysochus	auratus	(Fabricius)		Dogbane beetle	Expected
420	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Chrysomela	exclamationis	Fabricius		Leaf Beetle	Expected
421	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Colaspis	brunnea	(Fabricius)		Grape Colaspis	Expected
422	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Coscinoptera	aenipennis	LeConte		Leaf Beetle	Expected
423	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Coscinoptera	axillaris	LeConte	quadratominor	Leaf Beetle	Expected
424	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Coscinoptera	dominicana	(Fabricius)		Leaf Beetle	Expected
425	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Coscinoptera	mucorea	LeConte		Leaf Beetle	Expected
426	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Coscinoptera	seminuda	Horn		Leaf Beetle	Expected
427	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	arizonensis (nr.)	Schaeffer		Leaf Beetle	Expected
428	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	armatus	Haldeman		Leaf Beetle	Expected
429	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	confluens	Say		Leaf Beetle	Expected
430	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	dorsatus	White		Leaf Beetle	Expected
431	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	leucomelas	Suffrian		Leaf Beetle	Expected
432	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	snowi	Schaeffer		Leaf Beetle	Expected
433	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Cryptocephalus	spurcus	LeConte		Leaf Beetle	Expected
434	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Ctenochira	bonvoulori	Boheman		Leaf Beetle	Expected
435	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Diabrotica	duodecimpunctata	(Fabricius)	howardi	Leaf Beetle	Expected
436	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Diabrotica	tricincta	Say		Leaf Beetle	Expected
437	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Diabrotica	undecimpunctata	LeConte		Spotted cucumber beetle	Expected
438	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Diabrotica	virgifera	LeConte		Western corn rootworm	Expected
439	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Diachus	auratus	(Fabricius)		Bronze leaf beetle	Expected
440	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Disonycha	crenicollis	(Say)		Leaf Beetle	Expected
441	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Disonycha	fumata	LeConte		Leaf Beetle	Expected
442	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Disonycha	glabrata	(Fabricius)		Leaf Beetle	Expected
443	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Disonycha	politula	Horn		Leaf Beetle	Expected
444	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Disonycha	tenuicornis	Horn		Leaf Beetle	Expected
445	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Epitrix	cucumeris	Harris		Potato flea beetle	Expected
446	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Epitrix	hirtipennis	(Melsh.)		Tobacco flea beetle	Expected
447	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Epitrix	parvula	Fabricius		Leaf Beetle	Expected
448	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Erynephala	puncticollis	(Say)		Beet leaf beetle	Expected
449	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Euryscopa	lecontei	Crotch		Leaf Beetle	Expected
450	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Euryscopa	pilatei	Lacordaire		Leaf Beetle	Expected
451	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Euryscopa	vittata	LeConte		Leaf Beetle	Expected
452	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Exema	conspersa	(Mannerheim)		Leaf Beetle	Expected
453	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Galeruca	notulata	Fabricius		Leaf Beetle	Expected
454	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Glyptina	atriventris	Horn		Leaf Beetle	Expected
455	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Glyptina	brunnea	Horn		Leaf Beetle	Expected
456	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Graphops	tenuis	Blake		Leaf Beetle	Expected
457	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Gratiana	pallidula	(Boheman)		Leaf Beetle	Expected
458	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Kuschelina	flavida	Horn		Leaf Beetle	Expected
459	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Lema	confusa	Chevrolat		Leaf Beetle	Expected

460	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Lema	nigrovittata	Guerin		Leaf Beetle	Expected
461	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Lema	trilineata	(Olivier)		Three-lined potato beetle	Expected
462	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Leptinotarsa	decemlineata	(Say)		Colorado potato beetle	Expected
463	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Leptinotarsa	haldemani	(Rogers)		Leaf Beetle	Expected
464	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Leptinotarsa	lineolata	Stal		Leaf Beetle	Expected
465	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Longitarsis	bicolor	Horn		Leaf Beetle	Expected
466	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Luperodes	nigrovirescens (nr.)	Fabricius		Leaf Beetle	Expected
467	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Luperosoma	subsulcatum	(Horn)		Leaf Beetle	Expected
468	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Metachroma	aterrimum	Horn		Leaf Beetle	Expected
469	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Metachroma	californicum	Crotch	anatolicum	Leaf Beetle	Expected
470	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Metachroma	interruptum	(Say)		Leaf Beetle	Expected
471	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Metachroma	longulum	Horn		Leaf Beetle	Expected
472	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Metachroma	occidentale	Blake		Leaf Beetle	Expected
473	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Microrhopala	cyanea	(Say)		Leaf Beetle	Expected
474	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Microrhopala	excavata	(Say)	cyanea	Leaf Beetle	Expected
475	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Microrhopala	rubrolineata	(Mannerheim)		Leaf Beetle	Expected
476	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Monoxia	consputa	(LeConte)		Leaf Beetle	Expected
477	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Monoxia	elegans	Blake		Leaf Beetle	Expected
478	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Monoxia	puberla	Blake		Leaf Beetle	Expected
479	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Monoxia	sordida	(LeConte)		Leaf Beetle	Expected
480	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Myochrous	cyphus	Blake		Leaf Beetle	Expected
481	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Myochrous	longulus	LeConte		Leaf Beetle	Expected
482	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Neochlamisus	scabripennis	(Schaeffer)		Leaf Beetle	Expected
483	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Nodonota	parkeri	White		Leaf Beetle	Expected
484	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Octotoma	marginicollis	Horn		Leaf Beetle	Expected
485	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Ophraella	notulata	(Fabricius)		Leaf Beetle	Expected
486	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	bivittatus	(Say)		Leaf Beetle	Expected
487	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	caelatus	LeConte		Leaf Beetle	Expected
488	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	haematodes	Suffrian		Leaf Beetle	Expected
489	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	hepaticus	(Melsheimer)		Leaf Beetle	Expected
490	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	hybridus	Suffrian		Leaf Beetle	Expected
491	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	immaculata	Jacoby		Leaf Beetle	Expected
492	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	jacobyi	Bowditch		Leaf Beetle	Expected
493	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	marmoratus	Jacoby		Leaf Beetle	Expected
494	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	minor	Bowditch		Leaf Beetle	Expected
495	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	nero	Bowditch		Leaf Beetle	Expected
496	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	pinguescens (nr.)	Fall		Leaf Beetle	Expected
497	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	placidus	Fall		Leaf Beetle	Expected
498	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	snowi	Bowditch		Leaf Beetle	Expected
499	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	sonorensis (nr.)	Jacoby		Leaf Beetle	Expected
500	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	vau	Fall		Leaf Beetle	Expected
501	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	vulnerosus (nr.)	Fall		Leaf Beetle	Expected
502	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pachybrachis	xanti	Crotch		Leaf Beetle	Expected
503	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Paria	opacicollis	LeConte		Leaf Beetle	Expected
504	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Phyllotreta	pusilla	Horn		Western black flea beetle	Expected
505	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Plagiometriona	clavata	(Fabricius)		Leaf Beetle	Expected

506	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pseudoluperus	fulgidus (nr.)	Wilcox		Leaf Beetle	Expected
507	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Psylliodes	convexior	LeConte		Leaf Beetle	Expected
508	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pyrrhalta	luteola	(Muller)		Elm leaf beetle	Expected
509	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Pyrrhalta	nympheae	(Linnaeus)		Leaf Beetle	Expected
510	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Saxinus	deserticola	Moldenke		Leaf Beetle	Expected
511	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Saxinus	omogera	Lacordaire	chiricahuae	Leaf Beetle	Expected
512	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Saxinus	sonorensis	Jacoby		Leaf Beetle	Expected
513	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Stenopodius	flavidus	Horn		Leaf Beetle	Expected
514	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Stenopodius	martini	Blaisdell		Leaf Beetle	Expected
515	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Systaena	blanda	Melsheimer		Pale flea beetle	Expected
516	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Systaena	taeniata	(Say)		Leaf Beetle	Expected
517	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Systena	ligata	(Melsheimer)		Leaf Beetle	Expected
518	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Trirhabda	convergens	LeConte		Leaf Beetle	Expected
519	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Trirhabda	schwartzi	Blake		Leaf Beetle	Expected
520	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Tyrophorus	canellus	Fabricius		Leaf Beetle	Expected
521	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Xanthonia	villosula	(Melsheimer)		Leaf Beetle	Expected
522	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Zygogramma	peicicollis	Stal		Leaf Beetle	Expected
523	Arthropoda	Insecta	Coleoptera	Chrysomelidae	Zygogramma	tortuosa	Rogers		Leaf Beetle	Expected
524	Arthropoda	Insecta	Coleoptera	Cicindelidae	Amblychila	picolomini	Reiche		Tiger Beetle	Expected
525	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	debilis	Bates		Tiger Beetle	Expected
526	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	fulgoris	Casey	abilata	Tiger Beetle	Expected
527	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	fulgoris	Casey	fulgoris	Tiger Beetle	Expected
528	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	lemniscata	LeConte	rebaptisata	Tiger Beetle	Expected
529	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	lepida	Dejean		Tiger Beetle	Expected
530	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	marutha	Dow		Tiger Beetle	Expected
531	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	nevadica	LeConte	olmosa	Tiger Beetle	Expected
532	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	nigrocoerula	Leconte		Tiger Beetle	Expected
533	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	obsoleta	Say	santaclarae	Tiger Beetle	Expected
534	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	ocellata	Klug	rectilatera	Tiger Beetle	Expected
535	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	politula	LeConte	barbarannae	Tiger Beetle	Expected
536	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	praetextata	LeConte		Tiger Beetle	Expected
537	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	punctulata	Olivier	chihuahuae	Tiger Beetle	Expected
538	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	repanda	Dejean		Tiger Beetle	Expected
539	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	sedecimpunctata	Klug		Tiger Beetle	Expected
540	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	sperata	LeConte		Tiger Beetle	Expected
541	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	tenuisignata	LeConte		Tiger Beetle	Expected
542	Arthropoda	Insecta	Coleoptera	Cicindelidae	Cicindela	willistoni	LeConte		Tiger Beetle	Expected
543	Arthropoda	Insecta	Coleoptera	Cicindelidae	Megacephala	carolina	(Linneaus)		Tiger Beetle	Expected
544	Arthropoda	Insecta	Coleoptera	Cleridae	Aulicus	apache	Barr and Foster		Checkered Beetle	Expected
545	Arthropoda	Insecta	Coleoptera	Cleridae	Aulicus	dentipes	Schaeffer		Checkered Beetle	Expected
546	Arthropoda	Insecta	Coleoptera	Cleridae	Cymatodera	antennata	Schaeffer		Checkered Beetle	Expected
547	Arthropoda	Insecta	Coleoptera	Cleridae	Cymatodera	brunnea	Spinola		Checkered Beetle	Expected
548	Arthropoda	Insecta	Coleoptera	Cleridae	Cymatodera	sobara	Barr		Checkered Beetle	Expected
549	Arthropoda	Insecta	Coleoptera	Cleridae	Enoclerus	cocinneus	Schenkling		Checkered Beetle	Expected
550	Arthropoda	Insecta	Coleoptera	Cleridae	Enoclerus	laetus	Klug	coccineus	Checkered Beetle	Expected
551	Arthropoda	Insecta	Coleoptera	Cleridae	Enoclerus	moestus	Klug		Checkered Beetle	Expected

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552	Arthropoda	Insecta	Coleoptera	Cleridae	Enoclerus	quadrisignatus	Say		Checkered Beetle	Expected
553	Arthropoda	Insecta	Coleoptera	Cleridae	Enoclerus	spinolae	LeConte		Checkered Beetle	Expected
554	Arthropoda	Insecta	Coleoptera	Cleridae	Isohydnocera	cribripennis	(Fall)		Checkered Beetle	Expected
555	Arthropoda	Insecta	Coleoptera	Cleridae	Necrobia	rufipes	(De Geer)		Redlegged ham beetle	Expected
556	Arthropoda	Insecta	Coleoptera	Cleridae	Phyllobaenus	discoideus	LeConte		Checkered Beetle	Expected
557	Arthropoda	Insecta	Coleoptera	Cleridae	Trichodes	ornatus	Say		Ornate checkered beetle	Expected
558	Arthropoda	Insecta	Coleoptera	Coccinellidae	Anovia	virginalis	Wickham		Ladybird	Expected
559	Arthropoda	Insecta	Coleoptera	Coccinellidae	Anovia	virginialis	(Wickham)		Ladybird	Expected
560	Arthropoda	Insecta	Coleoptera	Coccinellidae	Brumoides	septentrionis	(Weise)	hogei	Ladybird	Expected
561	Arthropoda	Insecta	Coleoptera	Coccinellidae	Chilocoris	cacti	(Linnaeus)		Ladybird	Expected
562	Arthropoda	Insecta	Coleoptera	Coccinellidae	Coccinella	monticola	Mulsant		Ladybird	Expected
563	Arthropoda	Insecta	Coleoptera	Coccinellidae	Diomus	debilis	(LeConte)		Ladybird	Expected
564	Arthropoda	Insecta	Coleoptera	Coccinellidae	Epilachra	varivestris	Mulsant		Ladybird	Expected
565	Arthropoda	Insecta	Coleoptera	Coccinellidae	Exochomus	fasciatus	Casey		Ladybird	Expected
566	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hippodamia	convergens	Guerin-Menneville		Convergent lady beetle	Expected
567	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspidius	ingenitus	Casey		Ladybird	Expected
568	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspidius	oblongus	Casey		Ladybird	Expected
569	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspidius	trimaculataus	Linnaeus		Ladybird	Expected
570	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	caseyi	Gordon		Ladybird	Expected
571	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	cruenta	Leconte		Ladybird	Expected
572	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	gemma (nr.)	Casey		Ladybird	Expected
573	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	pleuralis	Casey		Ladybird	Expected
574	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	revocans	Casey		Ladybird	Expected
575	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	significans	Casey		Ladybird	Expected
576	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspis	trifurcata	Schaeffer		Ladybird	Expected
577	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspsis	connectens			Ladybird	Expected
578	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspsis	fimbriolata	Melsheimer		Ladybird	Expected
579	Arthropoda	Insecta	Coleoptera	Coccinellidae	Hyperaspsis	lateralis	Mulsant		Ladybird	Expected
580	Arthropoda	Insecta	Coleoptera	Coccinellidae	Microweisia	misella	LeConte		Ladybird	Expected
581	Arthropoda	Insecta	Coleoptera	Coccinellidae	Olla	sayi	(Crotch)		Ash-gray ladybird beetle	Expected
582	Arthropoda	Insecta	Coleoptera	Coccinellidae	Olla	v-negra	(Mulsant)		Ladybird	Expected
583	Arthropoda	Insecta	Coleoptera	Coccinellidae	Rhyzobius	lophanthae	(Blaisdell)		Ladybird	Expected
584	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	ardelio	Horn		Ladybird	Expected
585	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	aridus	Casey		Ladybird	Expected
586	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	cockerelli	Casey		Ladybird	Expected
587	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	creperus	Mulsant		Ladybird	Expected
588	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	horni	Gorham		Ladybird	Expected
589	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	loweii	Mulsant		Ladybird	Expected
590	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	marginicollis	Mannerheim		Ladybird	Expected
591	Arthropoda	Insecta	Coleoptera	Coccinellidae	Scymnus	uteanus	Casey		Ladybird	Expected
592	Arthropoda	Insecta	Coleoptera	Coccinellidae	Selradicus	rectus	Casey		Ladybird	Expected
593	Arthropoda	Insecta	Coleoptera	Coccinellidae	Stethorus	caseyi	Gordon and Chapin		Ladybird	Expected
594	Arthropoda	Insecta	Coleoptera	Curculionidae	Amydrogmus	variabilis	Pierce		True Weevils	Expected
595	Arthropoda	Insecta	Coleoptera	Curculionidae	Anthonomus	appositus	Fall		True Weevils	Expected
596	Arthropoda	Insecta	Coleoptera	Curculionidae	Anthonomus	eugenii	Cano		Pepper weevil	Expected
597	Arthropoda	Insecta	Coleoptera	Curculionidae	Anthonomus	grandis	Boheman		Boll weevil	Expected

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598	Arthropoda	Insecta	Coleoptera	Curculionidae	Anthonomus	sphaeralciae	Fall	True Weevils	Expected
599	Arthropoda	Insecta	Coleoptera	Curculionidae	Anthonomus	tenuis	Fall	True Weevils	Expected
600	Arthropoda	Insecta	Coleoptera	Curculionidae	Anthonomus	texanus	Dietz	True Weevils	Expected
601	Arthropoda	Insecta	Coleoptera	Curculionidae	Apion	occidentale	Fall	True Weevils	Expected
602	Arthropoda	Insecta	Coleoptera	Curculionidae	Barilepsis	grisea	(LeConte)	True Weevils	Expected
603	Arthropoda	Insecta	Coleoptera	Curculionidae	Calendra	phoeniciensis	(Chittenden)	True Weevils	Expected
604	Arthropoda	Insecta	Coleoptera	Curculionidae	Centrinaspis	penicellus	(Herbst)	True Weevils	Expected
605	Arthropoda	Insecta	Coleoptera	Curculionidae	Cionomimus	insolens	(Dietz)	True Weevils	Expected
606	Arthropoda	Insecta	Coleoptera	Curculionidae	Cleonidius	modestus	(Mannerheim)	True Weevils	Expected
607	Arthropoda	Insecta	Coleoptera	Curculionidae	Cleonidius	quadrilineatus	Cher.	True Weevils	Expected
608	Arthropoda	Insecta	Coleoptera	Curculionidae	Coccotorus	scutellaris	(LeConte)	True Weevils	Expected
609	Arthropoda	Insecta	Coleoptera	Curculionidae	Conotrachelus	nivosus	LeConte	True Weevils	Expected
610	Arthropoda	Insecta	Coleoptera	Curculionidae	Conotrachelus	seniculus	LeConte	True Weevils	Expected
611	Arthropoda	Insecta	Coleoptera	Curculionidae	Curculio	caryae	Horn	Pecan weevil	Expected
612	Arthropoda	Insecta	Coleoptera	Curculionidae	Cylindrocopturus	adspensus	Casey	True Weevils	Expected
613	Arthropoda	Insecta	Coleoptera	Curculionidae	Dorytomus	brevisetosus	Casey	True Weevils	Expected
614	Arthropoda	Insecta	Coleoptera	Curculionidae	Endalus	limatulus	(Gyllenhal)	True Weevils	Expected
615	Arthropoda	Insecta	Coleoptera	Curculionidae	Ericydeus	lautus	LeConte	True Weevils	Expected
616	Arthropoda	Insecta	Coleoptera	Curculionidae	Euclyptus	derivatus		True Weevils	Expected
617	Arthropoda	Insecta	Coleoptera	Curculionidae	Eupagoderes	cretaceus	Sharp	True Weevils	Expected
618	Arthropoda	Insecta	Coleoptera	Curculionidae	Eupagoderes	decipiens	(LeConte)	True Weevils	Expected
619	Arthropoda	Insecta	Coleoptera	Curculionidae	Eupagoderes	wickhami	Sharp	True Weevils	Expected
620	Arthropoda	Insecta	Coleoptera	Curculionidae	Geraeus	acuminatus	Casey	True Weevils	Expected
621	Arthropoda	Insecta	Coleoptera	Curculionidae	Lixus	mucidus	LeConte	True Weevils	Expected
622	Arthropoda	Insecta	Coleoptera	Curculionidae	Microlarinus	lareyniei	(J. du Val)	Puncturevine seed weevil	Expected
623	Arthropoda	Insecta	Coleoptera	Curculionidae	Minyomerus	languidus	Horn	True Weevils	Expected
624	Arthropoda	Insecta	Coleoptera	Curculionidae	Myrmex	lineata	Pasco	True Weevils	Expected
625	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	collaris	Champion	True Weevils	Expected
626	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	nivosus	(Fall)	True Weevils	Expected
627	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	schufeldi	(Casey)	True Weevils	Expected
628	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	sulcirostris	Say	True Weevils	Expected
629	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	tuberosis	LeConte	True Weevils	Expected
630	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	turbimatus	(Champion)	True Weevils	Expected
631	Arthropoda	Insecta	Coleoptera	Curculionidae	Ophyrastes	vittatus	(Say)	True Weevils	Expected
632	Arthropoda	Insecta	Coleoptera	Curculionidae	Pandeleteinus	elytroplanatus	Howden	True Weevils	Expected
633	Arthropoda	Insecta	Coleoptera	Curculionidae	Pandeleteinus	submetallicus	(Schaeffer)	True Weevils	Expected
634	Arthropoda	Insecta	Coleoptera	Curculionidae	Pantomorus	cervinus	(Boheman)	Fuller rose beetle	Expected
635	Arthropoda	Insecta	Coleoptera	Curculionidae	Pantomorus	godmani	(Crotch)	True Weevils	Expected
636	Arthropoda	Insecta	Coleoptera	Curculionidae	Pantomorus	pallidus	(Horn)	True Weevils	Expected
637	Arthropoda	Insecta	Coleoptera	Curculionidae	Paritaxia	hispida	Horn	True Weevils	Expected
638	Arthropoda	Insecta	Coleoptera	Curculionidae	Rhynchites	aeratoides	Fall	True Weevils	Expected
639	Arthropoda	Insecta	Coleoptera	Curculionidae	Rhyssomatus	parvulus	Casey	True Weevils	Expected
640	Arthropoda	Insecta	Coleoptera	Curculionidae	Rhyssomatus	pruinosus	(Boheman)	True Weevils	Expected
641	Arthropoda	Insecta	Coleoptera	Curculionidae	Rynchophorus	cruentatus	Boheman	True Weevils	Expected
642	Arthropoda	Insecta	Coleoptera	Curculionidae	Scyphophorus	acupunctatus	Gyllenhal	Agave weevil	Expected
643	Arthropoda	Insecta	Coleoptera	Curculionidae	Scyphophorus	yuccae	Horn	True Weevils	Expected

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644	Arthropoda	Insecta	Coleoptera	Curculionidae	Sitona	californica	Fahraeus		True Weevils	Expected
645	Arthropoda	Insecta	Coleoptera	Curculionidae	Sitona	lineellus	(Bonsdorf)		True Weevils	Expected
646	Arthropoda	Insecta	Coleoptera	Curculionidae	Sitona	vittatus	LeConte		True Weevils	Expected
647	Arthropoda	Insecta	Coleoptera	Curculionidae	Sitophilus	granarius	(Linnaeus)		Granary weevil	Expected
648	Arthropoda	Insecta	Coleoptera	Curculionidae	Sitophilus	oryzae	(Linnaeus)		Rice weevil	Expected
649	Arthropoda	Insecta	Coleoptera	Curculionidae	Smicronyx	fulvus	LeConte		True Weevils	Expected
650	Arthropoda	Insecta	Coleoptera	Curculionidae	Smicronyx	sordidus	(LeConte)		True Weevils	Expected
651	Arthropoda	Insecta	Coleoptera	Curculionidae	Sphenophorus	apicalis	LeConte		True Weevils	Expected
652	Arthropoda	Insecta	Coleoptera	Curculionidae	Sphenophorus	cicatristriatus	Fahr		True Weevils	Expected
653	Arthropoda	Insecta	Coleoptera	Curculionidae	Sphenophorus	coesifrons	Gyllenhal		True Weevils	Expected
654	Arthropoda	Insecta	Coleoptera	Curculionidae	Sphenophorus	venatus	(Say)		Hunting billbug	Expected
655	Arthropoda	Insecta	Coleoptera	Curculionidae	Sphenophorus	vomerinus	LeConte		True Weevils	Expected
656	Arthropoda	Insecta	Coleoptera	Curculionidae	Stictobaris	subacuta	Casey		True Weevils	Expected
657	Arthropoda	Insecta	Coleoptera	Curculionidae	Trichobaris	mucorea	LeConte		Tobacco stalk borer	Expected
658	Arthropoda	Insecta	Coleoptera	Curculionidae	Yuccaboris	frontalis	LeConte		True Weevils	Expected
659	Arthropoda	Insecta	Coleoptera	Curculionidae	Zascelius	oblonga	Horn		True Weevils	Expected
660	Arthropoda	Insecta	Coleoptera	Dermestidae	Attagenus	megatoma	(Fabricius)		Skin Beetle	Expected
661	Arthropoda	Insecta	Coleoptera	Dermestidae	Cryptorhopalum	balteatum	LeConte		Skin Beetle	Expected
662	Arthropoda	Insecta	Coleoptera	Dermestidae	Cryptorhopalum	reversum	Casey		Skin Beetle	Expected
663	Arthropoda	Insecta	Coleoptera	Dermestidae	Dermestes	marmoratus	Say		Skin Beetle	Expected
664	Arthropoda	Insecta	Coleoptera	Dermestidae	Dermestes	vulpinus	Fabricius		Skin Beetle	Expected
665	Arthropoda	Insecta	Coleoptera	Dermestidae	Novelsis	horni	(Jayne)		Skin Beetle	Known
666	Arthropoda	Insecta	Coleoptera	Dermestidae	Trogoderma	sternale	Jayne	aspercollae	Skin Beetle	Expected
667	Arthropoda	Insecta	Coleoptera	Dermestidae	Trogoderma	variable	Ballion		Skin Beetle	Expected
668	Arthropoda	Insecta	Coleoptera	Dermestidae	Trogoderma	versicolor	(Creutzer)		Skin Beetle	Expected
669	Arthropoda	Insecta	Coleoptera	Dytiscidae	Deronectes	coelamboides	Fall		Predaceous Diving Beetle	Expected
670	Arthropoda	Insecta	Coleoptera	Dytiscidae	Eretes	sticticus	Linnaeus		Predaceous Diving Beetle	Expected
671	Arthropoda	Insecta	Coleoptera	Dytiscidae	Hydroporus	dimidiatus	Gemminger and Harold		Predaceous Diving Beetle	Expected
672	Arthropoda	Insecta	Coleoptera	Dytiscidae	Hydroporus	vilis	LeConte		Predaceous Diving Beetle	Expected
673	Arthropoda	Insecta	Coleoptera	Dytiscidae	Hygrotus	medialis	LeConte		Predaceous Diving Beetle	Expected
674	Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	fasciatus	Aube		Predaceous Diving Beetle	Expected
675	Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	maculosus	Say	shermani	Predaceous Diving Beetle	Expected
676	Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	mexicanus	Aube		Predaceous Diving Beetle	Expected
677	Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	pictus	L. de Castelnau	coccinelloides	Predaceous Diving Beetle	Expected
678	Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	proximus	Say		Predaceous Diving Beetle	Expected
679	Arthropoda	Insecta	Coleoptera	Dytiscidae	Laccophilus	quadrilineatus	Horn		Predaceous Diving Beetle	Expected
680	Arthropoda	Insecta	Coleoptera	Dytiscidae	Liodessus	youngei	Larson and Roughley		Predaceous Diving Beetle	Expected
681	Arthropoda	Insecta	Coleoptera	Dytiscidae	Rhantus	atricolor	Aube		Predaceous Diving Beetle	Expected
682	Arthropoda	Insecta	Coleoptera	Dytiscidae	Rhantus	gutticollis	Say		Predaceous Diving Beetle	Expected
683	Arthropoda	Insecta	Coleoptera	Elateridae	Agrypnus	rectangularis	Say		Click Beetle	Expected
684	Arthropoda	Insecta	Coleoptera	Elateridae	Agrypnus	scotti	LeConte		Click Beetle	Expected
685	Arthropoda	Insecta	Coleoptera	Elateridae	Alaus	luciosus	Hope		Click Beetle	Expected
686	Arthropoda	Insecta	Coleoptera	Elateridae	Cardiophorus	longior	LeConte		Click Beetle	Expected
687	Arthropoda	Insecta	Coleoptera	Elateridae	Conoderus	athoides	(LeConte)		Click Beetle	Expected
688	Arthropoda	Insecta	Coleoptera	Elateridae	Conoderus	vespertinus	(Fabricius)		Tobacco wireworm	Expected
689	Arthropoda	Insecta	Coleoptera	Elateridae	Glyphonyx	recticollis	Say		Click Beetle	Expected

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690	Arthropoda	Insecta	Coleoptera	Elateridae	Horistonotus	simplex	LeConte	Click Beetle	Expected
691	Arthropoda	Insecta	Coleoptera	Elateridae	Melanotus	fissilis	(Say)	Click Beetle	Expected
692	Arthropoda	Insecta	Coleoptera	Elateridae	Neotrichophorus	arizonensis	Schaeffer	Click Beetle	Expected
693	Arthropoda	Insecta	Coleoptera	Erotylidae	Cypherotylus	californicus	LeConte	Pleasing Fungus Beetle	Expected
694	Arthropoda	Insecta	Coleoptera	Gyrinidae	Gyrinus	plicifer	LeConte	Whirligig Beetle	Expected
695	Arthropoda	Insecta	Coleoptera	Histeridae	Hister	militaris	Horn	Hister Beetle	Expected
696	Arthropoda	Insecta	Coleoptera	Histeridae	Hister	ulkei	Horn	Hister Beetle	Expected
697	Arthropoda	Insecta	Coleoptera	Histeridae	Hololepta	populnea	LeConte	Flat clown beetle	Expected
698	Arthropoda	Insecta	Coleoptera	Histeridae	Paromalus	aequalis	Say	Hister Beetle	Expected
699	Arthropoda	Insecta	Coleoptera	Histeridae	Platysoma	depressum	LeConte	Hister Beetle	Expected
700	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	alienus	LeConte	Hister Beetle	Expected
701	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	contractus	Casey	Hister Beetle	Expected
702	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	discoidalis	LeConte	Hister Beetle	Expected
703	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	lugens	Erichson	Hister Beetle	Expected
704	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	oregonensis	LeConte	Hister Beetle	Expected
705	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	pectoralis	LeConte	Hister Beetle	Expected
706	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	pennsylvanicus	(Paykull)	Hister Beetle	Expected
707	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	plenus	LeConte	Hister Beetle	Expected
708	Arthropoda	Insecta	Coleoptera	Histeridae	Saprinus	vitiosus	LeConte	Hister Beetle	Expected
709	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Berosus	hoplites	Sharp	Water Scavenger Beetle	Expected
710	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Berosus	infuscatus	LeConte	Water Scavenger Beetle	Expected
711	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta	dorsalis	(Motschulsky)	Water Scavenger Beetle	Expected
712	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Cymbiodyta	morata	Horn	Water Scavenger Beetle	Expected
713	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Enochrus	pygmaeus	(LeConte)	Water Scavenger Beetle	Expected
714	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Helophorus	linearis	LeConte	Water Scavenger Beetle	Expected
715	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Hydrochara	leechi	Smetana	Water Scavenger Beetle	Expected
716	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Hydrophilus	triangularis	Say	Water Scavenger Beetle	Expected
717	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Sphaeridium	scarabaeoides	(Linnaeus)	Water Scavenger Beetle	Expected
718	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Tropisternus	columbianus	Brown	Water Scavenger Beetle	Expected
719	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Tropisternus	ellipticus	(LeConte)	Water Scavenger Beetle	Expected
720	Arthropoda	Insecta	Coleoptera	Hydrophilidae	Tropisternus	sublaevis	LeConte	Water Scavenger Beetle	Expected
721	Arthropoda	Insecta	Coleoptera	Lampyridae	Ellychnia	flavicollis	(LeConte)	Lightning Bug	Expected
722	Arthropoda	Insecta	Coleoptera	Lampyridae	Microphotus	octarthrus	Fall	Lightning Bug	Expected
723	Arthropoda	Insecta	Coleoptera	Lampyridae	Pyropyga	dicipiens	Harris	Lightning Bug	Expected
724	Arthropoda	Insecta	Coleoptera	Limnichidae	Physemus	minutus	LeConte	Minute Marsh-loving Beetles	Expected
725	Arthropoda	Insecta	Coleoptera	Lycidae	Lucaina	discoidalis	(Horn)	Net-winged Beetle	Expected
726	Arthropoda	Insecta	Coleoptera	Lycidae	Lycus	fernandezi	Duges	Desert net-winged beetle	Expected
727	Arthropoda	Insecta	Coleoptera	Melandryidae	Pentaria	fusculus	(LeConte)	False Darkling Beetle	Expected
728	Arthropoda	Insecta	Coleoptera	Melandryidae	Pentaria	lallidulus	(Liljeblad)	False Darkling Beetle	Expected
729	Arthropoda	Insecta	Coleoptera	Melandryidae	Pentaria	pallens	(Liljeblad)	False Darkling Beetle	Expected
730	Arthropoda	Insecta	Coleoptera	Meloidae	Cysteodemus	wislizeni	LeConte	Desert blister beetle	Expected
731	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	andersoni	Werner	Blister Beetle	Expected
732	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	apache	Pinto	Blister Beetle	Expected
733	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	arizonica	Werner	Blister Beetle	Expected
734	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	aspera	Werner	Blister Beetle	Expected
735	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	atrivittata	(LeConte)	Blister Beetle	Expected

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736	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	bilineata	Horn	Blister Beetle	Expected
737	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	bispinosa	Werner	Blister Beetle	Expected
738	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	brunnea	Werner	Blister Beetle	Expected
739	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	callosa	LeConte	Blister Beetle	Expected
740	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	candidata	Champion	Blister Beetle	Expected
741	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	cazieri	Dillon	Blister Beetle	Expected
742	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	conferta	(Say)	Blister Beetle	Expected
743	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	corvina	(LeConte)	Blister Beetle	Expected
744	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	costata	(LeConte)	Blister Beetle	Expected
745	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	diversipubescens	Maydell	Blister Beetle	Expected
746	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	emarginata	Champion	Blister Beetle	Expected
747	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	fabricii	(LeConte)	Ash-gray blister beetle	Expected
748	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	ferruginea	Say	Blister Beetle	Expected
749	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	fortis	Werner	Blister Beetle	Expected
750	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	funebris	Horn	Blister Beetle	Expected
751	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	hirsutipubescens	(Maydell)	Blister Beetle	Expected
752	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	immaculata	(Say)	Blister Beetle	Expected
753	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	lauta	Horn	Blister Beetle	Expected
754	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	longicollis	(LeConte)	Blister Beetle	Expected
755	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	macroplexi	Dillon	Blister Beetle	Expected
756	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	nigritarsis	(LeConte)	Blister Beetle	Expected
757	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	pardalis	LeConte	Blister Beetle	Expected
758	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	pennsylvanica	(De Geer)	Black blister beetle	Expected
759	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	polingi	Werner	Blister Beetle	Expected
760	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	senilis	Werner	Blister Beetle	Expected
761	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	sericans	(LeConte)	Blister Beetle	Expected
762	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	stuarti	LeConte	Blister Beetle	Expected
763	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	tenella	LeConte	Blister Beetle	Expected
764	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	tricostata	(Werner)	Blister Beetle	Expected
765	Arthropoda	Insecta	Coleoptera	Meloidae	Epicauta	uniforma	Werner	Blister Beetle	Expected
766	Arthropoda	Insecta	Coleoptera	Meloidae	Eupompha	fissiceps	LeConte	Blister Beetle	Expected
767	Arthropoda	Insecta	Coleoptera	Meloidae	Gnathium	minimum	Say	Blister Beetle	Expected
768	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	biguttata	LeConte	Blister Beetle	Expected
769	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	convexa	LeConte	Blister Beetle	Expected
770	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	deserticola	Horn	Blister Beetle	Expected
771	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	mirifica	Werner	Anthony blister beetle	Expected
772	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	mutilata	Horn	Blister Beetle	Expected
773	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	reticulata	Say	Blister Beetle	Expected
774	Arthropoda	Insecta	Coleoptera	Meloidae	Lytta	tenella	LeConte	Blister Beetle	Expected
775	Arthropoda	Insecta	Coleoptera	Meloidae	Megetra	cancellata	(Brandt and Ericson)	Blister Beetle	Expected
776	Arthropoda	Insecta	Coleoptera	Meloidae	Megetra	vittata	(LeConte)	Blister Beetle	Expected
777	Arthropoda	Insecta	Coleoptera	Meloidae	Meloe	laevus	Leach	Blister Beetle	Expected
778	Arthropoda	Insecta	Coleoptera	Meloidae	Nemognatha	lurida	(LeConte)	Nectar-sucking blister beetle	Expected
779	Arthropoda	Insecta	Coleoptera	Meloidae	Nemognatha	lutea	LeConte	Blister Beetle	Expected
780	Arthropoda	Insecta	Coleoptera	Meloidae	Nemognatha	sparsa	LeConte	Blister Beetle	Expected
781	Arthropoda	Insecta	Coleoptera	Meloidae	Phodega	marmorata	(Casey)	Blister Beetle	Expected

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782	Arthropoda	Insecta	Coleoptera	Meloidae	Pleuropompha	costata	(LeConte)		Blister Beetle	Expected
783	Arthropoda	Insecta	Coleoptera	Meloidae	Pseudozonitis	pallida	Dillon		Blister Beetle	Expected
784	Arthropoda	Insecta	Coleoptera	Meloidae	Pseudozonitis	vauriae	Enns		Blister Beetle	Expected
785	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	akhurstiana	Horn		Blister Beetle	Expected
786	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	bilineata	Horn		Blister Beetle	Expected
787	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	concinna	Casey		Blister Beetle	Expected
788	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	fasciata	Selander		Blister Beetle	Expected
789	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	palpalis	Champion		Fire blister beetle	Expected
790	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	postica	LeConte		Creosotebush beetle	Expected
791	Arthropoda	Insecta	Coleoptera	Meloidae	Pyrota	punctata	Casey		Blister Beetle	Expected
792	Arthropoda	Insecta	Coleoptera	Meloidae	Tetraonyx	fulvus	LeConte		Blister Beetle	Expected
793	Arthropoda	Insecta	Coleoptera	Meloidae	Zonitis	atripennis	(Say)		Blister Beetle	Expected
794	Arthropoda	Insecta	Coleoptera	Meloidae	Zonitis	vittigera	LeConte	propingud	Blister Beetle	Expected
795	Arthropoda	Insecta	Coleoptera	Melyridae	Attalus	lobulatus	(LeConte)		Soft-winged Flower Beetle	Expected
796	Arthropoda	Insecta	Coleoptera	Melyridae	Collops	limbellus	Gemminger and Harold		Soft-winged Flower Beetle	Expected
797	Arthropoda	Insecta	Coleoptera	Melyridae	Collops	vittatus	(Say)		Two-lined Collops	Expected
798	Arthropoda	Insecta	Coleoptera	Melyridae	Trichochrous	serricollis	LeConte		Soft-winged Flower Beetle	Expected
799	Arthropoda	Insecta	Coleoptera	Melyridae	Trichochrous	simulans	Casey		Soft-winged Flower Beetle	Expected
800	Arthropoda	Insecta	Coleoptera	Mycetophagidae	Litargus	nebulosus	LeConte		Hairy fungus beetle	Expected
801	Arthropoda	Insecta	Coleoptera	Mycetophagidae	Typhaea	stercorea	Linnaeus		Hairy fungus beetle	Expected
802	Arthropoda	Insecta	Coleoptera	Nitidulidae	Carpophilus	hemipterus	(Linnaeus)		Dried-fruit beetle	Expected
803	Arthropoda	Insecta	Coleoptera	Nitidulidae	Carpophilus	pallidipennis	(Say)		Sap Beetle	Expected
804	Arthropoda	Insecta	Coleoptera	Nitidulidae	Carpophilus	yuccae	(Crotch)		Sap Beetle	Expected
805	Arthropoda	Insecta	Coleoptera	Nitidulidae	Conotelus	mexicanus	Murray		Sap Beetle	Expected
806	Arthropoda	Insecta	Coleoptera	Nitidulidae	Nitidula	ziczac	Say		Sap Beetle	Expected
807	Arthropoda	Insecta	Coleoptera	Oedemeridae	Oxacis	cana	(LeConte)		False Blister Beetles	Expected
808	Arthropoda	Insecta	Coleoptera	Oedemeridae	Oxacis	pallida	(LeConte)		False Blister Beetles	Expected
809	Arthropoda	Insecta	Coleoptera	Oedemeridae	Oxacis	soraria	Horn		False Blister Beetles	Expected
810	Arthropoda	Insecta	Coleoptera	Phalacridae	Olibrus	semistriatus	LeConte		Shining Flower Beetle	Expected
811	Arthropoda	Insecta	Coleoptera	Phengodidae	Matinocerus	texanus	LeConte		Glowworms	Expected
812	Arthropoda	Insecta	Coleoptera	Ptinidae	Niptus	ventriculus	LeConte		Spider Beetle	Expected
813	Arthropoda	Insecta	Coleoptera	Rhiphiphoridae	Trigonadura	schaeferi	Rivnay		Wedge-shaped Beetle	Expected
814	Arthropoda	Insecta	Coleoptera	Salpingidae	Mycterus	canescens	Horn		Narrow-waisted Bark Beetle	Expected
815	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Anomala	antennata	Schaeffer		Scarab Beetle	Expected
816	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Anomala	binotata	(Gyllenhal)		Scarab Beetle	Expected
817	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Anomala	cavifrons	LeConte		Scarab Beetle	Expected
818	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Anomala	delicata	Casey		Scarab Beetle	Expected
819	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Anomala	flavipes	Burm.		Scarab Beetle	Expected
820	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Anomala	suavis (nr.)	Potts		Scarab Beetle	Expected
821	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Aphodius	haemorrhoidalis	(Linnaeus)		Scarab Beetle	Expected
822	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Aphodius	lividus	(Olivier)		Scarab Beetle	Expected
823	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Aphodius	perfimbriatus	Gordon		Scarab Beetle	Expected
824	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Aphodius	pumilo	Schmidt		Scarab Beetle	Expected
825	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Aphonides	dunnianus	Rivers		Scarab Beetle	Expected
826	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Ataenius	cognatus	(LeConte)		Scarab Beetle	Expected
827	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Ataenius	inops	Horn		Scarab Beetle	Expected

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828	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Boreocanthon	probus	(Germar)	Scarab Beetle	Expected
829	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Canthon	ebenus	Say	Scarab Beetle	Expected
830	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Canthon	imitator	Brough	Western tumblebug	Expected
831	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Canthon	melanus	Robinson	Scarab Beetle	Expected
832	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Canthon	puncticollis (nr.)	LeConte	Scarab Beetle	Expected
833	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Copris	lecontei	Matthews	Green June beetle	Expected
834	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cotinis	mutabilis	Gory and Percheron	Eastern green fruit beetle	Expected
835	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cotinus	nitida	(Linnaeus)	Scarab Beetle	Expected
836	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cyclocephala	dimidiata	(Burmeister)	Scarab Beetle	Expected
837	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cyclocephala	hirta	LeConte	Scarab Beetle	Expected
838	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cyclocephala	lurida	Bland	Scarab Beetle	Expected
839	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cyclocephala	melanocephala	Fabricius	Scarab Beetle	Expected
840	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Cyclocephala	pasadenae	Casey	Scarab Beetle	Expected
841	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	atratula	LeConte	Scarab Beetle	Expected
842	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	belfragei	Fall	Scarab Beetle	Expected
843	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	brevicornis	Cazier	Scarab Beetle	Expected
844	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	carbonata	LeConte	Scarab Beetle	Expected
845	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	knausii	Schaeffer	Scarab Beetle	Expected
846	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	rufiola	Fall	Scarab Beetle	Expected
847	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	subangulata	LeConte	Scarab Beetle	Expected
848	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Diplotaxis	sulcata (nr.)	Fall	Scarab Beetle	Expected
849	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Dynastes	granti	Horn	Southwestern hercules beetl	Expected
850	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Eucanthus	impressus	Howden	Scarab Beetle	Expected
851	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Eucanthus	lazarus	(Fabricius)	Scarab Beetle	Expected
852	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Euetheola	rugiceps	LeConte	Rough-headed cornstalk bor	Expected
853	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Euphoria	india	(Linnaeus)	Bumble flower beetle	Expected
854	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Euphoria	kerni	Haldeman	Scarab Beetle	Expected
855	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Hybosorus	illigeri	Reiche	Scarab Beetle	Expected
856	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Ligyrus	gibbosus	(De Geer)	Scarab Beetle	Expected
857	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Macrodactylus	uniformis	Horn	Western rose chafer	Expected
858	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Ochodaeus	mandibularis	Linnaeus	Scarab Beetle	Expected
859	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Onthophagus	gazella	(Fabricius)	African dung beetle	Expected
860	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Onthophagus	velutinus	Horn	Scarab Beetle	Expected
861	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Orizabus	clunalis	LeConte	Scarab Beetle	Expected
862	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Oxygrilius	ruginasus	(LeConte)	Scarab Beetle	Expected
863	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Paracotalpa	puncticollis	(LeConte)	Scarab Beetle	Expected
864	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phanaeus	vindex	Mac Leary	Splendid dung beetle	Expected
865	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phileurus	illatus	LeConte	Scarab Beetle	Expected
866	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	crinata	Burmeister	Scarab Beetle	Expected
867	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	cushmani	Saylor	Scarab Beetle	Expected
868	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	ignava	(Horn)	Scarab Beetle	Expected
869	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	mucorea	(LeConte)	Scarab Beetle	Expected
870	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	senex	(Horn)	Scarab Beetle	Expected
871	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	vetula	(Horn)	Scarab Beetle	Expected
872	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Phyllophaga	wickhami	Saylor	Scarab Beetle	Expected
873	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Plusiotus	gloriosa	LeConte	Scarab Beetle	Expected

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874	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Podolasia	ferruginea	(LeConte)		Scarab Beetle	Expected
875	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Podolasia	pilosa	Howden		Scarab Beetle	Expected
876	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Polyphylla	decemlineata	Say		Ten-lined June beetle	Expected
877	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Polyphylla	diffracta	Casey		Broken-lined giant chafer	Expected
878	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Polyphylla	hammondi	(LeConte)		Scarab Beetle	Expected
879	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Serica	porcula	Casey		Scarab Beetle	Expected
880	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Stephanucha	verticalis	(Horn)		Scarab Beetle	Expected
881	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Thryce	squamicollis	LeConte		Scarab Beetle	Expected
882	Arthropoda	Insecta	Coleoptera	Scarabaeidae	Xyloryctes	jamaicencis	(Drury)		Rhinoceros beetle	Expected
883	Arthropoda	Insecta	Coleoptera	Scolytidae	Pityophthorus	franseriae	Wood		Bark Beetle	Expected
884	Arthropoda	Insecta	Coleoptera	Scolytidae	Pityophthorus	pulchellus	Eichoff	tuberculatus	Bark Beetle	Expected
885	Arthropoda	Insecta	Coleoptera	Scolytidae	Pityophthorus	torridus	Wood		Bark Beetle	Expected
886	Arthropoda	Insecta	Coleoptera	Silphidae	Nicrophorus	carolinus	(Linnaeus)		Carrion Beetle	Expected
887	Arthropoda	Insecta	Coleoptera	Silphidae	Nicrophorus	marginatus	Say		Carrion Beetle	Expected
888	Arthropoda	Insecta	Coleoptera	Silphidae	Silpha	truncata	Say		Carrion Beetle	Expected
889	Arthropoda	Insecta	Coleoptera	Staphylinidae	Aleochara	notula	Erichson		Rove Beetle	Expected
890	Arthropoda	Insecta	Coleoptera	Staphylinidae	Apocellus	sphaericollis	(Say)		Rove Beetle	Expected
891	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	eximius	Casey		Rove Beetle	Expected
892	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	ferratus	LeConte		Rove Beetle	Expected
893	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	flavipennis	LeConte		Rove Beetle	Expected
894	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	forcipatus	LeConte		Rove Beetle	Expected
895	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	ineptus	Casey		Rove Beetle	Expected
896	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	mandibularis	Erichson		Rove Beetle	Expected
897	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	rubigiosus	Erichson		Rove Beetle	Expected
898	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bledius	strenuus	Casey		Rove Beetle	Expected
899	Arthropoda	Insecta	Coleoptera	Staphylinidae	Bryoporus	rufescens	LeConte		Rove Beetle	Expected
900	Arthropoda	Insecta	Coleoptera	Staphylinidae	Creophilus	maxillosus	(Linnaeus)		Rove Beetle	Expected
901	Arthropoda	Insecta	Coleoptera	Staphylinidae	Hoplandria	lateralis	(Melsheimer)		Rove Beetle	Expected
902	Arthropoda	Insecta	Coleoptera	Staphylinidae	Leptacinus	pusillus	(Stephens)		Rove Beetle	Expected
903	Arthropoda	Insecta	Coleoptera	Staphylinidae	Microbledius	playanus	Herman		Rove Beetle	Expected
904	Arthropoda	Insecta	Coleoptera	Staphylinidae	Neobisinus	paederoides	(LeConte)		Rove Beetle	Expected
905	Arthropoda	Insecta	Coleoptera	Staphylinidae	Neohypnus	fragilis	(Casey)		Rove Beetle	Expected
906	Arthropoda	Insecta	Coleoptera	Staphylinidae	Neohypnus	obscurus	(Erichson)		Rove Beetle	Expected
907	Arthropoda	Insecta	Coleoptera	Staphylinidae	Paederus	compotens	LeConte		Rove Beetle	Expected
908	Arthropoda	Insecta	Coleoptera	Staphylinidae	Phacophallus	tricolor	(Kraatz)		Rove Beetle	Expected
909	Arthropoda	Insecta	Coleoptera	Staphylinidae	Philonthus	flavolimbatus	Erichson		Rove Beetle	Expected
910	Arthropoda	Insecta	Coleoptera	Staphylinidae	Philonthus	furvus	Nordmann		Rove Beetle	Expected
911	Arthropoda	Insecta	Coleoptera	Staphylinidae	Philonthus	hepaticus	Erichson		Rove Beetle	Expected
912	Arthropoda	Insecta	Coleoptera	Staphylinidae	Philonthus	rufulus	Horn		Rove Beetle	Expected
913	Arthropoda	Insecta	Coleoptera	Staphylinidae	Philonthus	semiruber	Horn		Rove Beetle	Expected
914	Arthropoda	Insecta	Coleoptera	Staphylinidae	Philonthus	varians	Paykull		Rove Beetle	Expected
915	Arthropoda	Insecta	Coleoptera	Staphylinidae	Platystethus	americanus	Erichson		Rove Beetle	Expected
916	Arthropoda	Insecta	Coleoptera	Staphylinidae	Platystethus	spiculus	Erichson		Rove Beetle	Expected
917	Arthropoda	Insecta	Coleoptera	Staphylinidae	Staphylinus	villosus	Gravenhorst		Rove Beetle	Expected
918	Arthropoda	Insecta	Coleoptera	Staphylinidae	Tachyphorus	nitidulus	(Fabricius)		Rove Beetle	Expected
919	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Alaephus	macilentris	Casey		Darkling Beetle	Expected

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920	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Alobates	morio	(Fabricius)		Darkling Beetle	Expected
921	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Alphitobinus	diaperinus	(Panzer)		Lesser mealworm	Expected
922	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Araeoschizus	dicipiens	Horn		Darkling Beetle	Expected
923	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Argoporus	rufipes	Champion	nitida	Darkling Beetle	Expected
924	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Asidopsis	opaca	(Say)		Darkling Beetle	Expected
925	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Blapstinus	dilatatus	LeConte		Darkling Beetle	Expected
926	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Blapstinus	fortis	(LeConte)		Darkling Beetle	Expected
927	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Blapstinus	substriatus	Champion		Darkling Beetle	Expected
928	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Bothrotes	caniculatus	(Say)		Darkling Beetle	Expected
929	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Bothrotes	plumbeus	(LeConte)		Darkling Beetle	Expected
930	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Bothrotes	tenebrosa	Casey		Darkling Beetle	Expected
931	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Conobius	uniformis	Casey		Darkling Beetle	Expected
932	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Cryptoglossa	mexicana	Champion	granulifera	Darkling Beetle	Expected
933	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Cyaneus	angustatus	(LeConte)		Darkling Beetle	Expected
934	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Edrotes	rotundus	(Say)		Darkling Beetle	Expected
935	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	acutus	(Say)		Darkling Beetle	Expected
936	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	carbonarius	(Say)		Darkling Beetle	Expected
937	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	caudiferus	LeConte		Darkling Beetle	Expected
938	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	extricatus	(Say)		Darkling Beetle	Expected
939	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	gracilis	LeConte		Darkling Beetle	Expected
940	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	hispilabris	(Say)	convexus	Darkling Beetle	Expected
941	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	hispilabris	(Say)	sculptilis	Darkling Beetle	Expected
942	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	longicollis	LeConte		Darkling Beetle	Expected
943	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	obscurus	(Say)	dispersus	Darkling Beetle	Expected
944	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	obsoletus	Say		Darkling Beetle	Expected
945	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	sponsus	LeConte		Darkling Beetle	Expected
946	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	suturalis	(Say)		Darkling Beetle	Expected
947	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	tricostata	(Say)		Darkling Beetle	Expected
948	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eleodes	wickhami	Horn		Darkling Beetle	Expected
949	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Embaphion	contusum	LeConte		Darkling Beetle	Expected
950	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Embaphion	planum	Horn		Darkling Beetle	Expected
951	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eupsolophus	castaneus	Horn		Darkling Beetle	Expected
952	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Euryderus	grossus	Say		Darkling Beetle	Expected
953	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eurymetopon	rufipes	Eschscholtz		Darkling Beetle	Expected
954	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eusattus	convexus	LeConte		Darkling Beetle	Expected
955	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eusattus	reticulatus	Say		Darkling Beetle	Expected
956	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eusattus	subnitens	Casey		Darkling Beetle	Expected
957	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Eusattus	subvelutinus	Casey		Darkling Beetle	Expected
958	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Euschides	cribratus	Casey		Darkling Beetle	Expected
959	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Glyptasida	sordida	LeConte		Darkling Beetle	Expected
960	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Gonasida	elata	LeConte		Darkling Beetle	Expected
961	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Gonasida	gravida	Casey		Darkling Beetle	Expected
962	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Gonasida	inferna	Casey		Darkling Beetle	Expected
963	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Helops	arizonensis	Horn		Darkling Beetle	Expected
964	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Lobometopon	fusiforme	Casey		Darkling Beetle	Expected
965	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Lobometopon	plumbeus	(Champion)		Darkling Beetle	Expected

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966	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Mecysmus	parvulus	Casey	Darkling Beetle	Expected
967	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Megasida	obliterata	(Champion)	Darkling Beetle	Expected
968	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Megasida	tenuicollis	Triplehorn	Darkling Beetle	Expected
969	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Metopoloba	pruinosa	Horn	Darkling Beetle	Expected
970	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Microschatia	morata	Horn	Darkling Beetle	Expected
971	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Opatrinus	aciculatus	LeConte	Darkling Beetle	Expected
972	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Pelecyphorus	morbillosus	(LeConte)	Darkling Beetle	Expected
973	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Platydema	americanum	LaPorte and Brulle	Darkling Beetle	Expected
974	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Platydema	excavata	(Say)	Darkling Beetle	Expected
975	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Stenomorpha	convexicollis	LeConte	Darkling Beetle	Expected
976	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Stenomorpha	marginata	(LeConte)	Darkling Beetle	Expected
977	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Stenomorpha	obovata	(LeConte)	Darkling Beetle	Expected
978	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Stenomorpha	rimata	LeConte	Darkling Beetle	Expected
979	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Stenosides	anastomosis	(Say)	Darkling Beetle	Expected
980	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Telabis	famelica	Casey	Darkling Beetle	Expected
981	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Tenebrio	molitor	Linneaus	Yellow mealworm	Expected
982	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Tribolium	castaneum	(Herbst)	Red flour beetle	Expected
983	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Tribolium	confusum	J. du Val	Confused flour beetle	Expected
984	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Triorophus	laevis	LeConte	Darkling Beetle	Expected
985	Arthropoda	Insecta	Coleoptera	Tenebrionidae	Ulus	crassus	LeConte	Darkling Beetle	Expected
986	Arthropoda	Insecta	Coleoptera	Trogidae	Omorgus	carinatus	(Loomis)	Hide Beetle	Expected
987	Arthropoda	Insecta	Coleoptera	Trogidae	Omorgus	inflatus	(Loomis)	Hide Beetle	Expected
988	Arthropoda	Insecta	Coleoptera	Trogidae	Omorgus	nodosus	(Robinson)	Hide Beetle	Expected
989	Arthropoda	Insecta	Coleoptera	Trogidae	Omorgus	suberosus	(Fabricius)	Hide Beetle	Expected
990	Arthropoda	Insecta	Coleoptera	Trogidae	Omorgus	tesselatus	(LeConte)	Hide Beetle	Expected
991	Arthropoda	Insecta	Coleoptera	Trogositidae	Airora	aequalis	Reitter	Bark-gnawing Beetle	Expected
992	Arthropoda	Insecta	Collembola	Entomobryidae	Isotobryoides	ochracius	Maynard	Slender Springtails	Expected
993	Arthropoda	Insecta	Collembola	Entomobryidae	Lepidocyrtus	cyaneus	Tullberg	Slender Springtails	Expected
994	Arthropoda	Insecta	Collembola	Entomobryidae	Pseudosinella	petterseni	Borner	Slender Springtails	Expected
995	Arthropoda	Insecta	Collembola	Entomobryidae	Seira	bipunctata	(Packard)	Slender Springtails	Expected
996	Arthropoda	Insecta	Collembola	Hypogastruridae	Brachystomella	arida	Christiansen	Elongate-bodied Springtails	Expected
997	Arthropoda	Insecta	Collembola	Hypogastruridae	Pseudachorutes	aureofasciatus	(Harvey)	Elongate-bodied Springtails	Expected
998	Arthropoda	Insecta	Collembola	Hypogastruridae	Pseudachorutes	texensis	Christiansen	Elongate-bodied Springtails	Expected
999	Arthropoda	Insecta	Collembola	Isotomidae	Anurophorus	utahensis	(Wray)	Smooth Springtail	Expected
1000	Arthropoda	Insecta	Collembola	Isotomidae	Cryptopygus	ambus	Christiansen	Smooth Springtail	Expected
1001	Arthropoda	Insecta	Collembola	Isotomidae	Folsomides	americanus	Denis	Smooth Springtail	Expected
1002	Arthropoda	Insecta	Collembola	Isotomidae	Isotoma	notabilis	Schaeffer	Smooth Springtail	Expected
1003	Arthropoda	Insecta	Collembola	Isotomidae	Proistoma	brevipenna	(MacGillivray)	Smooth Springtail	Expected
1004	Arthropoda	Insecta	Collembola	Isotomidae	Proistoma	minima	(Absolon)	Smooth Springtail	Expected
1005	Arthropoda	Insecta	Collembola	Isotomidae	Proistoma	minuta	(Tullberg)	Smooth Springtail	Expected
1006	Arthropoda	Insecta	Collembola	Sminthuridae	Bourletiella	wexfordensis	(Snider)	Globular Springtail	Expected
1007	Arthropoda	Insecta	Collembola	Sminthuridae	Sminthurides	pumilis	Krausbauer	Globular Springtail	Expected
1008	Arthropoda	Insecta	Collembola	Sminthuridae	Sminthurides	sexpinnatus	Denis	Globular Springtail	Expected
1009	Arthropoda	Insecta	Dermaptera	Carcinophoridae	Euborellia	annulipes	(Lucas)	Earwig	Expected
1010	Arthropoda	Insecta	Dermaptera	Forficulidae	Doru	taeniatum	(Dohrn)	Common Earwig	Expected
1011	Arthropoda	Insecta	Diptera	Acroceridae	Ocgodes	pallidipennis	(Loew)	Small-headed Flies	Expected

1012	Arthropoda	Insecta	Diptera	Agromyzidae	Phytobia	verbenae	(Hering)	Leaf Miner	Expected
1013	Arthropoda	Insecta	Diptera	Anthomyiidae	Calythea	micropteryx	(Thomson)	Root-Maggot Fly	Expected
1014	Arthropoda	Insecta	Diptera	Anthomyiidae	Coenosia	ovata	Stein	Root-Maggot Fly	Expected
1015	Arthropoda	Insecta	Diptera	Anthomyiidae	Dalea	platura	(Meigen)	Root-Maggot Fly	Expected
1016	Arthropoda	Insecta	Diptera	Anthomyiidae	Eutrichota	arenosa	(Huckett)	Root-Maggot Fly	Expected
1017	Arthropoda	Insecta	Diptera	Anthomyiidae	Hydophoria	plumosa	Van der Wulp	Root-Maggot Fly	Expected
1018	Arthropoda	Insecta	Diptera	Anthomyiidae	Hylemya	platura	(Meigen)	Root-Maggot Fly	Expected
1019	Arthropoda	Insecta	Diptera	Anthomyiidae	Leucophora	innupta	Huckett	Root-Maggot Fly	Expected
1020	Arthropoda	Insecta	Diptera	Anthomyiidae	Pegomya	hyoscyami	(Panzer)	Root-Maggot Fly	Expected
1021	Arthropoda	Insecta	Diptera	Anthomyiidae	Pegomya	triseta (nr.)	Malloch	Root-Maggot Fly	Expected
1022	Arthropoda	Insecta	Diptera	Anthomyiidae	Pegoplata	acutipennis	(Malloch)	Root-Maggot Fly	Expected
1023	Arthropoda	Insecta	Diptera	Apioceridae	Apiocera	bilineata	Painter	Flower-loving Fly	Expected
1024	Arthropoda	Insecta	Diptera	Apioceridae	Apiocera	franckei	Cazier	Flower-loving Fly	Expected
1025	Arthropoda	Insecta	Diptera	Apioceridae	Apiocera	hamata	Cazier	Flower-loving Fly	Expected
1026	Arthropoda	Insecta	Diptera	Apioceridae	Apiocera	rockefelleri	Cazier	Flower-loving Fly	Expected
1027	Arthropoda	Insecta	Diptera	Apioceridae	Rhaphiomidas	painteri	Cazier	Flower-loving Fly	Expected
1028	Arthropoda	Insecta	Diptera	Asilidae	Ablautus	coachellus (nr.)	Wilcox	Robber Fly	Expected
1029	Arthropoda	Insecta	Diptera	Asilidae	Ablautus	flavipes	Coquillett	Robber Fly	Expected
1030	Arthropoda	Insecta	Diptera	Asilidae	Ablautus	rufotibialis	Back	Robber Fly	Expected
1031	Arthropoda	Insecta	Diptera	Asilidae	Atomosia	melanopogon	(Hermann)	Robber Fly	Expected
1032	Arthropoda	Insecta	Diptera	Asilidae	Atomosia	mucida	(Osten Sacken)	Robber Fly	Expected
1033	Arthropoda	Insecta	Diptera	Asilidae	Atomosia	puella	(Wiedemann)	Robber Fly	Expected
1034	Arthropoda	Insecta	Diptera	Asilidae	Atoniomyia	duncani	(Wilcox)	Robber Fly	Expected
1035	Arthropoda	Insecta	Diptera	Asilidae	Backomyia	limpidipennis	Wilcox	Robber Fly	Expected
1036	Arthropoda	Insecta	Diptera	Asilidae	Blepharepium	sonorensis	Papavero and Bernardi	Robber Fly	Expected
1037	Arthropoda	Insecta	Diptera	Asilidae	Cerotainiops	abdominalis	(Brown)	Robber Fly	Expected
1038	Arthropoda	Insecta	Diptera	Asilidae	Cerotainiops	lucyae	Martin	Robber Fly	Expected
1039	Arthropoda	Insecta	Diptera	Asilidae	Cophura	dora	Pritchard	Robber Fly	Expected
1040	Arthropoda	Insecta	Diptera	Asilidae	Cophura	lutzi	Curran	Robber Fly	Expected
1041	Arthropoda	Insecta	Diptera	Asilidae	Cophura	painteri	Pritchard	Robber Fly	Expected
1042	Arthropoda	Insecta	Diptera	Asilidae	Cophura	sculleni	Wilcox	Robber Fly	Expected
1043	Arthropoda	Insecta	Diptera	Asilidae	Dicropaltum	mesae	(Tucker)	Robber Fly	Expected
1044	Arthropoda	Insecta	Diptera	Asilidae	Diogmites	angustipennis	Loew	Robber Fly	Expected
1045	Arthropoda	Insecta	Diptera	Asilidae	Diogmites	neoternatus	(Bromley)	Robber Fly	Expected
1046	Arthropoda	Insecta	Diptera	Asilidae	Diogmites	sallei	(Bellardi)	Robber Fly	Expected
1047	Arthropoda	Insecta	Diptera	Asilidae	Eccritosia	zamon	(Townsend)	Robber Fly	Expected
1048	Arthropoda	Insecta	Diptera	Asilidae	Efferia	albibarbis	(Macquart)	Robber Fly	Expected
1049	Arthropoda	Insecta	Diptera	Asilidae	Efferia	apache	Wilcox	Robber Fly	Expected
1050	Arthropoda	Insecta	Diptera	Asilidae	Efferia	argyrosoma	(Hine)	Robber Fly	Expected
1051	Arthropoda	Insecta	Diptera	Asilidae	Efferia	benedicti	(Bromley)	Robber Fly	Expected
1052	Arthropoda	Insecta	Diptera	Asilidae	Efferia	bicolor	(Bellardi)	Robber Fly	Expected
1053	Arthropoda	Insecta	Diptera	Asilidae	Efferia	costalis	(Williston)	Robber Fly	Expected
1054	Arthropoda	Insecta	Diptera	Asilidae	Efferia	cressoni	(Hine)	Robber Fly	Expected
1055	Arthropoda	Insecta	Diptera	Asilidae	Efferia	cuervana	(Hardy)	Robber Fly	Expected
1056	Arthropoda	Insecta	Diptera	Asilidae	Efferia	helenae	(Bromley)	Robber Fly	Expected
1057	Arthropoda	Insecta	Diptera	Asilidae	Efferia	incognita	Forbes	Robber Fly	Expected

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1058	Arthropoda	Insecta	Diptera	Asilidae	Efferia	jubata	(Williston)	Robber Fly	Expected
1059	Arthropoda	Insecta	Diptera	Asilidae	Efferia	kelloggi	Wilcox	Robber Fly	Expected
1060	Arthropoda	Insecta	Diptera	Asilidae	Efferia	latruncula	(Williston)	Robber Fly	Expected
1061	Arthropoda	Insecta	Diptera	Asilidae	Efferia	luna	Wilcox	Robber Fly	Expected
1062	Arthropoda	Insecta	Diptera	Asilidae	Efferia	mortensoni	Wilcox	Robber Fly	Expected
1063	Arthropoda	Insecta	Diptera	Asilidae	Efferia	ordwayae	Wilcox	Robber Fly	Expected
1064	Arthropoda	Insecta	Diptera	Asilidae	Efferia	pallidula	(Hine)	Robber Fly	Expected
1065	Arthropoda	Insecta	Diptera	Asilidae	Efferia	pilosa	(Hine)	Robber Fly	Expected
1066	Arthropoda	Insecta	Diptera	Asilidae	Efferia	rapax	(Osten Sacken)	Robber Fly	Expected
1067	Arthropoda	Insecta	Diptera	Asilidae	Efferia	spiniventris	(Hine)	Robber Fly	Expected
1068	Arthropoda	Insecta	Diptera	Asilidae	Efferia	subarida	(Bromley)	Robber Fly	Expected
1069	Arthropoda	Insecta	Diptera	Asilidae	Efferia	triton	(Osten Sacken)	Robber Fly	Expected
1070	Arthropoda	Insecta	Diptera	Asilidae	Efferia	truncata	(Hine)	Robber Fly	Expected
1071	Arthropoda	Insecta	Diptera	Asilidae	Efferia	tuberculata	(Coquillett)	Robber Fly	Expected
1072	Arthropoda	Insecta	Diptera	Asilidae	Efferia	tucsoni	Wilcox	Robber Fly	Expected
1073	Arthropoda	Insecta	Diptera	Asilidae	Efferia	varipes	(Williston)	Robber Fly	Expected
1074	Arthropoda	Insecta	Diptera	Asilidae	Efferia	willistoni	(Hine)	Robber Fly	Expected
1075	Arthropoda	Insecta	Diptera	Asilidae	Efferia	zonata	(Hine)	Robber Fly	Expected
1076	Arthropoda	Insecta	Diptera	Asilidae	Furcilla	delicatula	(Hine)	Robber Fly	Expected
1077	Arthropoda	Insecta	Diptera	Asilidae	Haplopogon	erinus	Pritchard	Robber Fly	Expected
1078	Arthropoda	Insecta	Diptera	Asilidae	Heteropogon	cazieri	Wilcox	Robber Fly	Expected
1079	Arthropoda	Insecta	Diptera	Asilidae	Heteropogon	chiricahua	Wilcox	Robber Fly	Expected
1080	Arthropoda	Insecta	Diptera	Asilidae	Heteropogon	johnsoni	Back	Robber Fly	Expected
1081	Arthropoda	Insecta	Diptera	Asilidae	Heteropogon	patruelis	Coquillett	Robber Fly	Expected
1082	Arthropoda	Insecta	Diptera	Asilidae	Hodophylax	aridus	James	Robber Fly	Expected
1083	Arthropoda	Insecta	Diptera	Asilidae	Hodophylax	tolandi	Wilcox	Robber Fly	Expected
1084	Arthropoda	Insecta	Diptera	Asilidae	Holopogon	atripennis	Back	Robber Fly	Expected
1085	Arthropoda	Insecta	Diptera	Asilidae	Holopogon	wilcoxi	Martin	Robber Fly	Expected
1086	Arthropoda	Insecta	Diptera	Asilidae	Laphystia	confusa	(Curran)	Robber Fly	Expected
1087	Arthropoda	Insecta	Diptera	Asilidae	Laphystia	rubra	Hull	Robber Fly	Expected
1088	Arthropoda	Insecta	Diptera	Asilidae	Leptogaster	hesperis	Martin	Robber Fly	Expected
1089	Arthropoda	Insecta	Diptera	Asilidae	Leptogaster	patula	Martin	Robber Fly	Expected
1090	Arthropoda	Insecta	Diptera	Asilidae	Lestomyia	atripes	Wilcox	Robber Fly	Expected
1091	Arthropoda	Insecta	Diptera	Asilidae	Lestomyia	strigipes	Curran	Robber Fly	Expected
1092	Arthropoda	Insecta	Diptera	Asilidae	Machimus	erythocnemius	(Hine)	Robber Fly	Expected
1093	Arthropoda	Insecta	Diptera	Asilidae	Machimus	formosus	(Hine)	Robber Fly	Expected
1094	Arthropoda	Insecta	Diptera	Asilidae	Machimus	griseus	(Hine)	Robber Fly	Expected
1095	Arthropoda	Insecta	Diptera	Asilidae	Mallophora	fautrix	Osten Sacken	Robber Fly	Expected
1096	Arthropoda	Insecta	Diptera	Asilidae	Megaphorus	lascrucensis	(Cole)	Robber Fly	Expected
1097	Arthropoda	Insecta	Diptera	Asilidae	Megaphorus	prudens	(Pritchard)	Robber Fly	Expected
1098	Arthropoda	Insecta	Diptera	Asilidae	Megaphorus	pulcher	(Pritchard)	Robber Fly	Expected
1099	Arthropoda	Insecta	Diptera	Asilidae	Metapogon	punctipennis	Coquillett	Robber Fly	Expected
1100	Arthropoda	Insecta	Diptera	Asilidae	Microstylum	galactodes	Loew	Robber Fly	Expected
1101	Arthropoda	Insecta	Diptera	Asilidae	Nevadasilus	blantoni	(Bromley)	Robber Fly	Expected
1102	Arthropoda	Insecta	Diptera	Asilidae	Omninablautus	arenosus	Pritchard	Robber Fly	Expected
1103	Arthropoda	Insecta	Diptera	Asilidae	Ospriocerus	abdominalis	(Say)	Robber Fly	Expected

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1104	Arthropoda	Insecta	Diptera	Asilidae	Ospriocerus	arizonensis	(Bromley)	Robber Fly	Expected
1105	Arthropoda	Insecta	Diptera	Asilidae	Ospriocerus	longulus	(Loew)	Robber Fly	Expected
1106	Arthropoda	Insecta	Diptera	Asilidae	Ospriocerus	minos	Osten Sacken	Robber Fly	Expected
1107	Arthropoda	Insecta	Diptera	Asilidae	Polacantha	composita	(Hine)	Robber Fly	Expected
1108	Arthropoda	Insecta	Diptera	Asilidae	Proctacanthella	cacopiloga	(Hine)	Robber Fly	Expected
1109	Arthropoda	Insecta	Diptera	Asilidae	Proctacanthella	leucopogon	(Williston)	Robber Fly	Expected
1110	Arthropoda	Insecta	Diptera	Asilidae	Proctacanthus	nearno	Martin	Robber Fly	Expected
1111	Arthropoda	Insecta	Diptera	Asilidae	Proctacanthus	nigrofemoratus	Hine	Robber Fly	Expected
1112	Arthropoda	Insecta	Diptera	Asilidae	Prolepsis	tristis	(Walker)	Robber Fly	Expected
1113	Arthropoda	Insecta	Diptera	Asilidae	Promachus	albifacies	Williston	Robber Fly	Expected
1114	Arthropoda	Insecta	Diptera	Asilidae	Promachus	giganteus	Hine	Robber Fly	Expected
1115	Arthropoda	Insecta	Diptera	Asilidae	Promachus	magnus	Bellardi (?)	Robber Fly	Expected
1116	Arthropoda	Insecta	Diptera	Asilidae	Promachus	nigrialbus	Martin	Robber Fly	Expected
1117	Arthropoda	Insecta	Diptera	Asilidae	Psilocurus	nudiusculus	Loew	Robber Fly	Expected
1118	Arthropoda	Insecta	Diptera	Asilidae	Saropogon	coquillettii	Back	Robber Fly	Expected
1119	Arthropoda	Insecta	Diptera	Asilidae	Saropogon	nitidus	Wilcox	Robber Fly	Expected
1120	Arthropoda	Insecta	Diptera	Asilidae	Scleropogon	duncani	(Bromley)	Robber Fly	Expected
1121	Arthropoda	Insecta	Diptera	Asilidae	Scleropogon	indistinctus	(Bromley)	Robber Fly	Expected
1122	Arthropoda	Insecta	Diptera	Asilidae	Scleropogon	kelloggi	(Wilcox)	Robber Fly	Expected
1123	Arthropoda	Insecta	Diptera	Asilidae	Scleropogon	picticornis	Loew	Robber Fly	Expected
1124	Arthropoda	Insecta	Diptera	Asilidae	Sintoria	cazieri	Wilcox	Robber Fly	Expected
1125	Arthropoda	Insecta	Diptera	Asilidae	Stichopogon	catulus	Osten Sacken	Robber Fly	Expected
1126	Arthropoda	Insecta	Diptera	Asilidae	Stichopogon	colei	Bromley	Robber Fly	Expected
1127	Arthropoda	Insecta	Diptera	Asilidae	Stichopogon	fragilis	Back	Robber Fly	Expected
1128	Arthropoda	Insecta	Diptera	Asilidae	Stichopogon	trifasciatus	(Say)	Robber Fly	Expected
1129	Arthropoda	Insecta	Diptera	Asilidae	Triorla	interrupta	(Macquart)	Snorey Joe fly	Expected
1130	Arthropoda	Insecta	Diptera	Asilidae	Wilcoxia	martinorum	Wilcox	Robber Fly	Expected
1131	Arthropoda	Insecta	Diptera	Bibionidae	Bibio	painteri	James	March Fly	Not Applicable
1132	Arthropoda	Insecta	Diptera	Bombyliidae	Anastoechus	barbatus	Osten Sacken	Bee Fly	Expected
1133	Arthropoda	Insecta	Diptera	Bombyliidae	Anastoechus	hessei	Hall	Bee Fly	Expected
1134	Arthropoda	Insecta	Diptera	Bombyliidae	Anastoechus	leucothrix	Hall and Evenhuis	Bee Fly	Expected
1135	Arthropoda	Insecta	Diptera	Bombyliidae	Anastoechus	melanohalteris	Tucker	Bee Fly	Expected
1136	Arthropoda	Insecta	Diptera	Bombyliidae	Anthrax	analis	Say	Bee Fly	Expected
1137	Arthropoda	Insecta	Diptera	Bombyliidae	Anthrax	atriplex	Marston	Bee Fly	Expected
1138	Arthropoda	Insecta	Diptera	Bombyliidae	Anthrax	irrorata	Say	Bee Fly	Expected
1139	Arthropoda	Insecta	Diptera	Bombyliidae	Anthrax	stellans	(Loew)	Bee Fly	Expected
1140	Arthropoda	Insecta	Diptera	Bombyliidae	Aphoebantus	arenicola	Melander	Bee Fly	Expected
1141	Arthropoda	Insecta	Diptera	Bombyliidae	Apolysis	cinereus	Evenhuis	Bee Fly	Expected
1142	Arthropoda	Insecta	Diptera	Bombyliidae	Apolysis	leberi	Evenhuis	Bee Fly	Expected
1143	Arthropoda	Insecta	Diptera	Bombyliidae	Bombylius	ballmeri	Hall and Evenhuis	Bee Fly	Expected
1144	Arthropoda	Insecta	Diptera	Bombyliidae	Bombylius	comanche	Painter	Bee Fly	Expected
1145	Arthropoda	Insecta	Diptera	Bombyliidae	Bombylius	duncani	Painter	Bee Fly	Expected
1146	Arthropoda	Insecta	Diptera	Bombyliidae	Bombylius	major	Linnaeus	Bee Fly	Expected
1147	Arthropoda	Insecta	Diptera	Bombyliidae	Caenotus	inornatus	Cole	Bee Fly	Expected
1148	Arthropoda	Insecta	Diptera	Bombyliidae	Caenotus	minutus	Cole	Bee Fly	Expected
1149	Arthropoda	Insecta	Diptera	Bombyliidae	Exoprospa	caliptera	(Say)	Bee Fly	Expected

1150	Arthropoda	Insecta	Diptera	Bombyliidae	Exoprospa	eremita	Osten Sacken		Bee Fly	Expected
1151	Arthropoda	Insecta	Diptera	Bombyliidae	Geminaria	canalis	(Coquillett)		Bee Fly	Expected
1152	Arthropoda	Insecta	Diptera	Bombyliidae	Geron	digitarius	Cresson		Bee Fly	Expected
1153	Arthropoda	Insecta	Diptera	Bombyliidae	Geron	nudus	Painter		Bee Fly	Expected
1154	Arthropoda	Insecta	Diptera	Bombyliidae	Heterostylum	croceum	Painter		Bee Fly	Expected
1155	Arthropoda	Insecta	Diptera	Bombyliidae	Heterostylum	robustum	Osten sacken		Bee Fly	Expected
1156	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	apiculus	Coquillett		Bee Fly	Expected
1157	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	bipartitus	Painter		Bee Fly	Expected
1158	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	gibbus	Loew		Bee Fly	Expected
1159	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	lutescens	Johnson and Johnson		Bee Fly	Expected
1160	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	miscellus	Coquillett		Bee Fly	Expected
1161	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	pulchrissimus	Williston	luteolus	Bee Fly	Expected
1162	Arthropoda	Insecta	Diptera	Bombyliidae	Lordotus	sonorculus	Williston		Bee Fly	Expected
1163	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	armata	Cresson		Bee Fly	Expected
1164	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	armipes	Cresson		Bee Fly	Expected
1165	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	atra	Cresson		Bee Fly	Expected
1166	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	flavipes	Cresson		Bee Fly	Expected
1167	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	irrupta	Melander		Bee Fly	Expected
1168	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	ministra	Melander		Bee Fly	Expected
1169	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	minuta	Greene		Bee Fly	Expected
1170	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomya	pictipes	Coquillett		Bee Fly	Expected
1171	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomyia	rileyi	Coquillett		Bee Fly	Expected
1172	Arthropoda	Insecta	Diptera	Bombyliidae	Mythicomyia	scutellata	Coquillett		Bee Fly	Expected
1173	Arthropoda	Insecta	Diptera	Bombyliidae	Oligodranes	marginalis	(Cresson)		Bee Fly	Expected
1174	Arthropoda	Insecta	Diptera	Bombyliidae	Oligodranes	mitis	(Cresson)		Bee Fly	Expected
1175	Arthropoda	Insecta	Diptera	Bombyliidae	Oligodranes	obscurus	(Cresson)		Bee Fly	Expected
1176	Arthropoda	Insecta	Diptera	Bombyliidae	Pantarbes	earinus	Hall and Evenhuis		Bee Fly	Expected
1177	Arthropoda	Insecta	Diptera	Bombyliidae	Pantarbes	pusio	Osten Sacken		Bee Fly	Expected
1178	Arthropoda	Insecta	Diptera	Bombyliidae	Pantarbes	willistoni	Osten Sacken		Bee Fly	Expected
1179	Arthropoda	Insecta	Diptera	Bombyliidae	Parabombylius	rutilus	Hall		Bee Fly	Expected
1180	Arthropoda	Insecta	Diptera	Bombyliidae	Parabombylius	syndesmus	(Coquillett)		Bee Fly	Expected
1181	Arthropoda	Insecta	Diptera	Bombyliidae	Parabombylius	vittatus	Painter		Bee Fly	Expected
1182	Arthropoda	Insecta	Diptera	Bombyliidae	Paraconsors	timberlakei	Hall		Bee Fly	Expected
1183	Arthropoda	Insecta	Diptera	Bombyliidae	Paravilla	hulli	Hall		Bee Fly	Expected
1184	Arthropoda	Insecta	Diptera	Bombyliidae	Paravilla	inatra	Hall		Bee Fly	Expected
1185	Arthropoda	Insecta	Diptera	Bombyliidae	Paravilla	syrtis	(Coquillett)		Bee Fly	Expected
1186	Arthropoda	Insecta	Diptera	Bombyliidae	Paravilla	texana	Hall		Bee Fly	Expected
1187	Arthropoda	Insecta	Diptera	Bombyliidae	Phthiria	bicolor	Coquillett		Bee Fly	Expected
1188	Arthropoda	Insecta	Diptera	Bombyliidae	Phthiria	melanoscuta	Coquillett		Bee Fly	Expected
1189	Arthropoda	Insecta	Diptera	Bombyliidae	Phthiria	nebeculosa	Coquillett		Bee Fly	Expected
1190	Arthropoda	Insecta	Diptera	Bombyliidae	Phthiria	sulphurea	Loew		Bee Fly	Expected
1191	Arthropoda	Insecta	Diptera	Bombyliidae	Poecilanthrax	arethusa	(Osten Sacken)		Bee Fly	Expected
1192	Arthropoda	Insecta	Diptera	Bombyliidae	Poecilanthrax	californicus	(Cole)		Bee Fly	Expected
1193	Arthropoda	Insecta	Diptera	Bombyliidae	Poecilanthrax	effrenus	(Coquillett)		Bee Fly	Expected
1194	Arthropoda	Insecta	Diptera	Bombyliidae	Poecilanthrax	flaviceps	(Loew)		Bee Fly	Expected
1195	Arthropoda	Insecta	Diptera	Bombyliidae	Prorates	claripennis	Melander		Bee Fly	Expected

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1196	Arthropoda	Insecta	Diptera	Bombyliidae	Sparnopolius	confusus	Wiedemann	Bee Fly	Expected
1197	Arthropoda	Insecta	Diptera	Bombyliidae	Sparnopolius	ochrobasis	Hall and Evenhuis	Bee Fly	Expected
1198	Arthropoda	Insecta	Diptera	Bombyliidae	Systoechus	oreas	Osten Sacken	Bee Fly	Expected
1199	Arthropoda	insecta	Diptera	Bombyliidae	Systropus	ammophiloides	Townsend	Bee Fly	Expected
1200	Arthropoda	insecta	Diptera	Bombyliidae	Triploechus	novus	(Williston)	Bee Fly	Expected
1201	Arthropoda	insecta	Diptera	Bombyliidae	Villa	comanche	Painter	Bee Fly	Expected
1202	Arthropoda	insecta	Diptera	Bombyliidae	Villa	melanoptera	Hall	Bee Fly	Expected
1203	Arthropoda	Insecta	Diptera	Calliphoridae	Calliphora	coloradensis	Hough	Blow Fly	Expected
1204	Arthropoda	Insecta	Diptera	Calliphoridae	Calliphora	vicina	Robineau-Desvoidy	Blow Fly	Expected
1205	Arthropoda	Insecta	Diptera	Calliphoridae	Calliphora	vomitaria	(Linnaeus)	Blow Fly	Expected
1206	Arthropoda	Insecta	Diptera	Calliphoridae	Cochliomyia	homnivorax	(Coquerel)	Primary screw-worm fly	Expected
1207	Arthropoda	Insecta	Diptera	Calliphoridae	Cochliomyia	macellaria	(Fabricius)	Secondary screw-worm fly	Expected
1208	Arthropoda	Insecta	Diptera	Calliphoridae	Eucalliphora	lilaea	(Walker)	Blow Fly	Expected
1209	Arthropoda	Insecta	Diptera	Calliphoridae	Phaenicia	mexicana	(Macquart)	Blow Fly	Expected
1210	Arthropoda	Insecta	Diptera	Calliphoridae	Phaenicia	sericata	(Meigen)	Greenbottle fly	Expected
1211	Arthropoda	Insecta	Diptera	Calliphoridae	Phormia	regina	(Meigen)	Black blow fly	Expected
1212	Arthropoda	Insecta	Diptera	Calliphoridae	Protocalliphora	cuprina	(Hall)	Blow Fly	Expected
1213	Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia	brevipennis	(Macquart)	No-see-ums	Expected
1214	Arthropoda	Insecta	Diptera	Ceratopogonidae	Forcipomyia	pilosa	(Coquillett)	No-see-ums	Expected
1215	Arthropoda	Insecta	Diptera	Ceratopogonidae	Leptoconops	torrens	(Townsend)	No-see-ums	Expected
1216	Arthropoda	Insecta	Diptera	Chironomidae	Ablabesmyia	mallochi	(Walley)	Midges	Expected
1217	Arthropoda	Insecta	Diptera	Chironomidae	Apedilum	subcinctum	Townes	Midges	Expected
1218	Arthropoda	Insecta	Diptera	Chironomidae	Chironomus	decorus	Johannsen (species group)	Midges	Expected
1219	Arthropoda	Insecta	Diptera	Chironomidae	Cricotopus	bicinctus	(Meigen)	Midges	Expected
1220	Arthropoda	Insecta	Diptera	Chironomidae	Cricotopus	blinni	Sublette	Midges	Expected
1221	Arthropoda	Insecta	Diptera	Chironomidae	Cricotopus	infuscatus	(Malloch)	Midges	Expected
1222	Arthropoda	Insecta	Diptera	Chironomidae	Cricotopus	sylvestris	(Fabricius)	Midges	Expected
1223	Arthropoda	Insecta	Diptera	Chironomidae	Cyphomella	gibbera	Saether	Midges	Expected
1224	Arthropoda	Insecta	Diptera	Chironomidae	Diamesa	heteropus	(Coquillett)	Midges	Expected
1225	Arthropoda	Insecta	Diptera	Chironomidae	Dicrotendipes	californicus	(Johannsen)	Midges	Expected
1226	Arthropoda	Insecta	Diptera	Chironomidae	Hydrobaenus	pilipes	(Malloch)	Midges	Expected
1227	Arthropoda	Insecta	Diptera	Chironomidae	Labrundinia	pilosella	(Loew)	Midges	Expected
1228	Arthropoda	Insecta	Diptera	Chironomidae	Lopescladius	inormis	(Saether)	Midges	Expected
1229	Arthropoda	Insecta	Diptera	Chironomidae	Nanocladius	distinctus	Malloch	Midges	Expected
1230	Arthropoda	Insecta	Diptera	Chironomidae	Orthocladius	mallochi	Kieffer	Midges	Expected
1231	Arthropoda	Insecta	Diptera	Chironomidae	Paracladopelma	alphaeus	(Sublette)	Midges	Expected
1232	Arthropoda	Insecta	Diptera	Chironomidae	Phaenospectra	profusa	(Townes)	Midges	Expected
1233	Arthropoda	Insecta	Diptera	Chironomidae	Polypedilum	illinoense	(Malloch)	Midges	Expected
1234	Arthropoda	Insecta	Diptera	Chironomidae	Polypedilum	laetum	(Meigen)	Midges	Expected
1235	Arthropoda	Insecta	Diptera	Chironomidae	Polypedilum	scalaenum	(Schrank)	Midges	Expected
1236	Arthropoda	Insecta	Diptera	Chironomidae	Tanypus	neopunctopennis	Sublette	Midges	Expected
1237	Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsus	buckleyi	Sublette	Midges	Expected
1238	Arthropoda	Insecta	Diptera	Chironomidae	Tanytarsus	dendyi	Sublette	Midges	Expected
1239	Arthropoda	Insecta	Diptera	Chironomidae	Telopelopia	okoboji	(Walley)	Midges	Expected
1240	Arthropoda	Insecta	Diptera	Chironomidae	Thienemanniella	mallochi	Sublette	Midges	Expected
1241	Arthropoda	Insecta	Diptera	Chloropidae	Apallates	hermsi	(Sabrosky)	Frit Flies	Expected

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1242	Arthropoda	Insecta	Diptera	Chloropidae	Neodiplotaxa	pulchripes	(Loew)	Frit Flies	Expected
1243	Arthropoda	Insecta	Diptera	Chloropidae	Olcella	parva	(Adams)	Frit Flies	Expected
1244	Arthropoda	Insecta	Diptera	Chloropidae	Olcella	projecta	(Malloch)	Frit Flies	Expected
1245	Arthropoda	Insecta	Diptera	Chloropidae	Olcella	punctifrons	(Becker)	Frit Flies	Expected
1246	Arthropoda	Insecta	Diptera	Chloropidae	Oscinella	frit	(Linnaeus)	Frit Flies	Expected
1247	Arthropoda	Insecta	Diptera	Chloropidae	Oscinella	frontoorbitalis	Sabrosky	Frit Flies	Expected
1248	Arthropoda	Insecta	Diptera	Chloropidae	Parectecephala	maculosa	(Loew)	Frit Flies	Expected
1249	Arthropoda	Insecta	Diptera	Chloropidae	Siphonella	neglecta	Becker	Frit Flies	Expected
1250	Arthropoda	Insecta	Diptera	Chloropidae	Thaumatomyia	appropinqua	(Adams)	Frit Flies	Expected
1251	Arthropoda	Insecta	Diptera	Conopidae	Lathyrophthalmus	aeneus	(Scopoli)	Thick-headed Flies	Expected
1252	Arthropoda	Insecta	Diptera	Conopidae	Pachyconops	brachyrhynchus	(Macquart)	Thick-headed Flies	Expected
1253	Arthropoda	Insecta	Diptera	Conopidae	Physocephala	texana (nr.)	(Williston)	Thick-headed Flies	Expected
1254	Arthropoda	Insecta	Diptera	Conopidae	Physoconops	fronto	(Williston)	Thick-headed Flies	Expected
1255	Arthropoda	Insecta	Diptera	Conopidae	Physoconops	gracilis	(Williston)	Thick-headed Flies	Expected
1256	Arthropoda	Insecta	Diptera	Conopidae	Physoconops	sylvosus	(Williston)	Thick-headed Flies	Expected
1257	Arthropoda	Insecta	Diptera	Conopidae	Zodion	fulvifrons	Say	Thick-headed Flies	Expected
1258	Arthropoda	Insecta	Diptera	Conopidae	Zodion	intermedium	Banks	Thick-headed Flies	Expected
1259	Arthropoda	Insecta	Diptera	Culicidae	Aedes	aegypti	(Linnaeus, 1762)	Yellow fever mosquito	Known
1260	Arthropoda	Insecta	Diptera	Culicidae	Aedes	campestris	Dyar and Knab	Mosquito	Expected
1261	Arthropoda	Insecta	Diptera	Culicidae	Aedes	increpitus	Dyar	Mosquito	Expected
1262	Arthropoda	Insecta	Diptera	Culicidae	Aedes	melanimon	Dyar	Mosquito	Expected
1263	Arthropoda	Insecta	Diptera	Culicidae	Aedes	mulleri	Dyar	Mosquito	Expected
1264	Arthropoda	Insecta	Diptera	Culicidae	Aedes	sollicitans	(Walker)	Mosquito	Expected
1265	Arthropoda	Insecta	Diptera	Culicidae	Aedes	vexans	(Meigen)	Mosquito	Known
1266	Arthropoda	Insecta	Diptera	Culicidae	Anopheles	franciscanus	McCracken	Mosquito	Expected
1267	Arthropoda	Insecta	Diptera	Culicidae	Anopheles	freeborni	Aitken	Mosquito	Expected
1268	Arthropoda	Insecta	Diptera	Culicidae	Anopheles	punctipennis	(Say)	Mosquito	Expected
1269	Arthropoda	Insecta	Diptera	Culicidae	Culex	coronator	Dyar and Knab	Mosquito	Expected
1270	Arthropoda	Insecta	Diptera	Culicidae	Culex	erythrothorax	Dyar	Mosquito	Expected
1271	Arthropoda	Insecta	Diptera	Culicidae	Culex	quinquefasciatus	Say	Mosquito	Known
1272	Arthropoda	Insecta	Diptera	Culicidae	Culex	salinarius	Coquillett, 1904	Mosquito	Known
1273	Arthropoda	Insecta	Diptera	Culicidae	Culex	tarsalis	Coquillett	Mosquito	Known
1274	Arthropoda	Insecta	Diptera	Culicidae	Culex	thriambus	Dyar	Mosquito	Expected
1275	Arthropoda	Insecta	Diptera	Culicidae	Culisteta	incidens	(Thomson)	Mosquito	Expected
1276	Arthropoda	Insecta	Diptera	Culicidae	Culisteta	inornata	(Williston)	Mosquito	Known
1277	Arthropoda	Insecta	Diptera	Culicidae	Ochlerotatus	dorsalis	(Meigen)	Mosquito	Known
1278	Arthropoda	Insecta	Diptera	Culicidae	Ochlerotatus	nigromaculis	(Ludlow)	Mosquito	Known
1279	Arthropoda	Insecta	Diptera	Culicidae	Ochlerotatus	thelcter		Mosquito	Known
1280	Arthropoda	Insecta	Diptera	Culicidae	Ochlerotatus	trivattatus	(Coquillett)	Mosquito	Known
1281	Arthropoda	Insecta	Diptera	Culicidae	Psorophora	columbiae	Lynch Arribalzaga	Glades Mosquito	Known
1282	Arthropoda	Insecta	Diptera	Culicidae	Psorophora	cyanescens	(Coquillett, 1902)	Mosquito	Known
1283	Arthropoda	Insecta	Diptera	Culicidae	Psorophora	signipennis	(Coquillett)	Mosquito	Known
1284	Arthropoda	Insecta	Diptera	Cuterebridae	Cuterebra	nitida	Coquillett	Robust Bot Fly	Expected
1285	Arthropoda	Insecta	Diptera	Dolichopodidae	Asyndetus	latus	Van Duzee	Longlegged Fly	Expected
1286	Arthropoda	Insecta	Diptera	Dolichopodidae	Chrysotus	parvulus	M. C. Van Duzee	Longlegged Fly	Expected
1287	Arthropoda	Insecta	Diptera	Dolichopodidae	Hydrophorus	cerutias	Loew	Longlegged Fly	Expected

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1288	Arthropoda	Insecta	Diptera	Dolichopodidae	Hydrophorus	eldoradensis	Wheeler	Longlegged Fly	Expected
1289	Arthropoda	Insecta	Diptera	Dolichopodidae	Hydrophorus	philombrius	Wheeler	Longlegged Fly	Expected
1290	Arthropoda	Insecta	Diptera	Dolichopodidae	Medetera	californiensis	Wheeler	Longlegged Fly	Expected
1291	Arthropoda	Insecta	Diptera	Dolichopodidae	Neurigona	perbrevis	M. C. Van Duzee	Longlegged Fly	Expected
1292	Arthropoda	Insecta	Diptera	Dolichopodidae	Parasyntormon	occidentale	(Aldrich)	Longlegged Fly	Expected
1293	Arthropoda	Insecta	Diptera	Dolichopodidae	Peleropeodes	fuscipes	(M. C. Van Duzee)	Longlegged Fly	Expected
1294	Arthropoda	Insecta	Diptera	Dolichopodidae	Sympycnus	clavatus	M. C. Van Duzee	Longlegged Fly	Expected
1295	Arthropoda	Insecta	Diptera	Dolichopodidae	Thinophilus	magnipalpus	M. C. Van Duzee	Longlegged Fly	Expected
1296	Arthropoda	Insecta	Diptera	Drosophilidae	Drosophila	funebris	Fabricius	Pomace Fly	Expected
1297	Arthropoda	Insecta	Diptera	Drosophilidae	Drosophila	pseudoobscura	Frolova	Pomace Fly	Expected
1298	Arthropoda	Insecta	Diptera	Empididae	Hemerodromia	glabella	MacDonald	Dance Fly	Expected
1299	Arthropoda	Insecta	Diptera	Ephydridae	Mosillus	bidentatus	(Cresson)	Shore Fly	Expected
1300	Arthropoda	Insecta	Diptera	Ephydridae	Mosillus	tibialis	Cresson	Shore Fly	Expected
1301	Arthropoda	Insecta	Diptera	Ephydridae	Ochthera	mantis	(DeGeer)	Shore Fly	Expected
1302	Arthropoda	Insecta	Diptera	Ephydridae	Philygria	debilis	Loew	Shore Fly	Expected
1303	Arthropoda	Insecta	Diptera	Ephydridae	Scatella	stagnalis	(Fallen)	Shore Fly	Expected
1304	Arthropoda	Insecta	Diptera	Lauxaniidae	Camptoprospella	ocellaris	(Townsend)	Lauxaniid Fly	Expected
1305	Arthropoda	Insecta	Diptera	Lonchaeidae	Dasiops	alveofrons	McAlpine	Lance Fly	Expected
1306	Arthropoda	Insecta	Diptera	Micropezidae	Compsobata	univitta	(Walker)	Stilt Flies	Expected
1307	Arthropoda	Insecta	Diptera	Micropezidae	Micropeza	stigmatica	Wulp	Stilt Flies	Expected
1308	Arthropoda	Insecta	Diptera	Micropezidae	Micropeza	turcana	Townsend	Stilt Flies	Expected
1309	Arthropoda	Insecta	Diptera	Milichiidae	Desmotopia	tarsalis	Loew	Freeloader Flies	Expected
1310	Arthropoda	Insecta	Diptera	Milichiidae	Leptometopa	halteralis	(Coquillett)	Freeloader Flies	Expected
1311	Arthropoda	Insecta	Diptera	Muscidae	Coenosia	tigrina	(Fabricius)	House Fly	Expected
1312	Arthropoda	Insecta	Diptera	Muscidae	Fannia	canicularis	(Linnaeus)	House Fly	Expected
1313	Arthropoda	Insecta	Diptera	Muscidae	Fannia	femoralis	Stein	House Fly	Expected
1314	Arthropoda	Insecta	Diptera	Muscidae	Fannia	laevis	Stein	House Fly	Expected
1315	Arthropoda	Insecta	Diptera	Muscidae	Fannia	pusio	(Wied.)	House Fly	Expected
1316	Arthropoda	Insecta	Diptera	Muscidae	Fannia	scalaris	(Fabricius)	House Fly	Expected
1317	Arthropoda	Insecta	Diptera	Muscidae	Fannia	tescorum	Chillcott	House Fly	Expected
1318	Arthropoda	Insecta	Diptera	Muscidae	Fannia	trianguligera	Malloch	House Fly	Expected
1319	Arthropoda	Insecta	Diptera	Muscidae	Haematobia	irritans	(Linnaeus)	Horn fly	Expected
1320	Arthropoda	Insecta	Diptera	Muscidae	Musca	domestica	Linnaeus	Common house fly	Expected
1321	Arthropoda	Insecta	Diptera	Muscidae	Muscina	assimilis	(Fallen)	House Fly	Expected
1322	Arthropoda	Insecta	Diptera	Muscidae	Muscina	stabulans	(Fallen)	House Fly	Expected
1323	Arthropoda	Insecta	Diptera	Muscidae	Orthellia	caesarion	(Meigen)	House Fly	Expected
1324	Arthropoda	Insecta	Diptera	Muscidae	Stomoxys	calcitrans	(Linnaeus)	Stable fly	Expected
1325	Arthropoda	Insecta	Diptera	Mydidae	Mydas	luteipennis	Loew	Mydas Fly	Expected
1326	Arthropoda	Insecta	Diptera	Mydidae	Mydas	ventralis	Gerstacker	Mydas Fly	Expected
1327	Arthropoda	Insecta	Diptera	Mydidae	Mydas	xanthopterus	Loew	Mydas Fly	Expected
1328	Arthropoda	Insecta	Diptera	Mydidae	Neomydas	venosus	(Loew)	Mydas Fly	Expected
1329	Arthropoda	Insecta	Diptera	Mydidae	Opomydas	townsendi	(Williston)	Mydas Fly	Expected
1330	Arthropoda	Insecta	Diptera	Mydidae	Phyllomydas	phyllocerus	Bigot	Mydas Fly	Expected
1331	Arthropoda	Insecta	Diptera	Otitidae	Acrosticta	bicolor	Cresson	Picture-winged Fly	Expected
1332	Arthropoda	Insecta	Diptera	Otitidae	Acrosticta	dichroa	Loew	Picture-winged Fly	Expected
1333	Arthropoda	Insecta	Diptera	Otitidae	Ceroxys	latiusculus	(Loew)	Picture-winged Fly	Expected

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1334	Arthropoda	Insecta	Diptera	Otitidae	Chaetopsis	aenea	(Wiedemann)	Picture-winged Fly	Expected
1335	Arthropoda	Insecta	Diptera	Otitidae	Chaetopsis	fulvifrons (nr.)	(Macquart)	Picture-winged Fly	Expected
1336	Arthropoda	Insecta	Diptera	Otitidae	Delphinia	picta	(Fabricius)	Picture-winged Fly	Expected
1337	Arthropoda	Insecta	Diptera	Otitidae	Diacrita	plana	Steyskal	Picture-winged Fly	Expected
1338	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	abana	(Curran)	Picture-winged Fly	Expected
1339	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	fervida	Curran	Picture-winged Fly	Expected
1340	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	minor	Cresson	Picture-winged Fly	Expected
1341	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	nitidiventris	Loew	Picture-winged Fly	Expected
1342	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	notata	(Wiedemann)	Picture-winged Fly	Expected
1343	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	pulchella	Cresson	Picture-winged Fly	Expected
1344	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	scutellaris	Curran	Picture-winged Fly	Expected
1345	Arthropoda	Insecta	Diptera	Otitidae	Euxesta	xeres	Curran	Picture-winged Fly	Expected
1346	Arthropoda	Insecta	Diptera	Otitidae	Hiatus	fulvipes	Cresson	Picture-winged Fly	Expected
1347	Arthropoda	Insecta	Diptera	Otitidae	Melieria	occidentalis	Coquillett	Picture-winged Fly	Expected
1348	Arthropoda	Insecta	Diptera	Otitidae	Oedopa	capito	Loew	Picture-winged Fly	Expected
1349	Arthropoda	Insecta	Diptera	Otitidae	Paraoedopa	punctigera	Coquillett	Picture-winged Fly	Expected
1350	Arthropoda	Insecta	Diptera	Otitidae	Physiophora	demandata	(Fabricius)	Picture-winged Fly	Expected
1351	Arthropoda	Insecta	Diptera	Otitidae	Stictomyia	longicornis	Bigot	Picture-winged Fly	Expected
1352	Arthropoda	Insecta	Diptera	Piophilidae	Piophila	casei	(Linnaeus)	Skipper Fly	Expected
1353	Arthropoda	Insecta	Diptera	Psychodidae	Psychoda	alternata	Say	Sandfly and Mothfly	Expected
1354	Arthropoda	Insecta	Diptera	Psychodidae	Telmatoscopus	albipunctatus	(Williston)	Sandfly and Mothfly	Expected
1355	Arthropoda	Insecta	Diptera	Rhagionidae	Chrysopilus	xanthopus	Hardy	Snipe Fly	Expected
1356	Arthropoda	Insecta	Diptera	Sarcophagidae	Amobia	erythrura	(Wulp)	Flesh Fly	Expected
1357	Arthropoda	Insecta	Diptera	Sarcophagidae	Blaesoxipha	eleodis	(Aldrich)	Flesh Fly	Expected
1358	Arthropoda	Insecta	Diptera	Sarcophagidae	Blaesoxipha	kellyi	(Aldrich)	Flesh Fly	Expected
1359	Arthropoda	Insecta	Diptera	Sarcophagidae	Blaesoxipha	masculina (nr.)	(Aldrich)	Flesh Fly	Expected
1360	Arthropoda	Insecta	Diptera	Sarcophagidae	Blaesoxipha	plinthopyga	(Wiedemann)	Flesh Fly	Expected
1361	Arthropoda	Insecta	Diptera	Sarcophagidae	Eumacronychia	decens	Townsend	Flesh Fly	Expected
1362	Arthropoda	Insecta	Diptera	Sarcophagidae	Eumacronychia	elita	Townsend	Flesh Fly	Expected
1363	Arthropoda	Insecta	Diptera	Sarcophagidae	Eumacronychia	montana	Allen	Flesh Fly	Expected
1364	Arthropoda	Insecta	Diptera	Sarcophagidae	Eumacronychia	sternalis	Allen	Flesh Fly	Expected
1365	Arthropoda	Insecta	Diptera	Sarcophagidae	Helicobia	rapax	Walker	Flesh Fly	Expected
1366	Arthropoda	Insecta	Diptera	Sarcophagidae	Hilarella	hilarella	(Zetterstedt)	Flesh Fly	Expected
1367	Arthropoda	Insecta	Diptera	Sarcophagidae	Metoposarcophaga	sulculata	(Aldrich)	Flesh Fly	Expected
1368	Arthropoda	Insecta	Diptera	Sarcophagidae	Oxysarcodexia	conclausa	(Walker)	Flesh Fly	Expected
1369	Arthropoda	Insecta	Diptera	Sarcophagidae	Oxysarcodexia	ochripyga	(Wulp)	Flesh Fly	Expected
1370	Arthropoda	Insecta	Diptera	Sarcophagidae	Ravinia	errabunda	(Wulp)	Flesh Fly	Expected
1371	Arthropoda	Insecta	Diptera	Sarcophagidae	Ravinia	laakei	(Hall)	Flesh Fly	Expected
1372	Arthropoda	Insecta	Diptera	Sarcophagidae	Ravinia	lherminieri	(Robineau-Desvoidy)	Flesh Fly	Expected
1373	Arthropoda	Insecta	Diptera	Sarcophagidae	Ravinia	planifrons	Aldrich	Flesh Fly	Expected
1374	Arthropoda	Insecta	Diptera	Sarcophagidae	Ravinia	querula	(Walker)	Flesh Fly	Expected
1375	Arthropoda	Insecta	Diptera	Sarcophagidae	Sarcophaga	arizonica	(Townsend)	Flesh Fly	Expected
1376	Arthropoda	Insecta	Diptera	Sarcophagidae	Sarcophaga	kesseli	Dodge	Flesh Fly	Expected
1377	Arthropoda	Insecta	Diptera	Sarcophagidae	Sarcophaga	sarracenoides	Aldrich	Flesh Fly	Expected
1378	Arthropoda	Insecta	Diptera	Sarcophagidae	Sarcophaga	utilis	Aldrich	Flesh Fly	Expected
1379	Arthropoda	Insecta	Diptera	Sarcophagidae	Senotainia	flavicornis	(Townsend)	Flesh Fly	Expected

1380	Arthropoda	Insecta	Diptera	Sarcophagidae	Senotainia	nana	Coquillett	Flesh Fly	Expected
1381	Arthropoda	Insecta	Diptera	Sarcophagidae	Senotainia	rubriventris	Macquart	Flesh Fly	Expected
1382	Arthropoda	Insecta	Diptera	Sarcophagidae	Senotainia	trilineata	(Wulp)	Flesh Fly	Expected
1383	Arthropoda	Insecta	Diptera	Sarcophagidae	Wolfahrtia	vigil	(Walker)	Flesh Fly	Expected
1384	Arthropoda	Insecta	Diptera	Scatopsidae	Scatopse	fuscipes	Meigen	Minute Black Scavenger Fly	Expected
1385	Arthropoda	Insecta	Diptera	Scenopinidae	Brevitrichia	griseola	(Coquillett)	Window fly	Expected
1386	Arthropoda	Insecta	Diptera	Scenopinidae	Metatrichia	bulbosus	Osten Sacken	Window fly	Expected
1387	Arthropoda	Insecta	Diptera	Scenopinidae	Pseudatrichia	unicolor	Coquillett	Window fly	Expected
1388	Arthropoda	Insecta	Diptera	Scenopinidae	Scenopinus	nubilipes	Say	Window fly	Expected
1389	Arthropoda	Insecta	Diptera	Sciaridae	Bradysia	coprophila	(Lintner)	Darw-winged Fungus Gnats	Expected
1390	Arthropoda	Insecta	Diptera	Sciomyzidae	Sepodon	praemiosa	Giglio-Tos	Marsh Fly	Expected
1391	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	argus	Williston	Black fly	Expected
1392	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	canadense	Hearle	Black Fly	Expected
1393	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	encisoi	Vargas and Diaz Najera	Black Fly	Expected
1394	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	griseum	Coquillett	Black Fly	Expected
1395	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	meridonale	Riley	Black Fly	Expected
1396	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	piperi	Dyar and Shannon	Black Fly	Expected
1397	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	robynae	Peterson	Black Fly	Expected
1398	Arthropoda	Insecta	Diptera	Simuliidae	Simulium	vittatum	Zetterstedt	Black Fly	Expected
1399	Arthropoda	Insecta	Diptera	Stratiomyidae	Adoxomyia	albopiliosa	(Cresson)	Soldier Fly	Expected
1400	Arthropoda	Insecta	Diptera	Stratiomyidae	Dieuryneura	stigma	(Giglio-Tos)	Soldier Fly	Expected
1401	Arthropoda	Insecta	Diptera	Stratiomyidae	Euparyphus	cinctus	(Osten Sacken)	Soldier Fly	Expected
1402	Arthropoda	Insecta	Diptera	Stratiomyidae	Hedriodiscus	truquii	Bell.	Soldier Fly	Expected
1403	Arthropoda	Insecta	Diptera	Stratiomyidae	Hermetia	concinna	Williston	Soldier Fly	Expected
1404	Arthropoda	Insecta	Diptera	Stratiomyidae	Hermetia	illucens	Linnaeus	Black soldier fly	Expected
1405	Arthropoda	Insecta	Diptera	Stratiomyidae	Hermetia	melanderi	James and Wirth	Soldier Fly	Expected
1406	Arthropoda	Insecta	Diptera	Syrphidae	Allograpta	exotica	(Wiedemann)	Drone Fly	Expected
1407	Arthropoda	Insecta	Diptera	Syrphidae	Allograpta	obliqua	(Say)	Drone Fly	Expected
1408	Arthropoda	Insecta	Diptera	Syrphidae	Baccha	clavata	(Fabricius)	Drone Fly	Expected
1409	Arthropoda	Insecta	Diptera	Syrphidae	Baccha	lemur	Osten Sacken	Drone Fly	Expected
1410	Arthropoda	Insecta	Diptera	Syrphidae	Chrysotoxum	integre	Williston	Drone Fly	Expected
1411	Arthropoda	Insecta	Diptera	Syrphidae	Copestylum	marginatum	Say	Drone Fly	Expected
1412	Arthropoda	Insecta	Diptera	Syrphidae	Eristalis	aeneus	(Scopoli)	Drone Fly	Expected
1413	Arthropoda	Insecta	Diptera	Syrphidae	Eristalis	latifrons	Loew	Drone Fly	Expected
1414	Arthropoda	Insecta	Diptera	Syrphidae	Eristalis	tenax	(Linnaeus)	Drone Fly	Expected
1415	Arthropoda	Insecta	Diptera	Syrphidae	Eumerus	strigatus	(Fallen)	Drone Fly	Expected
1416	Arthropoda	Insecta	Diptera	Syrphidae	Eupeodes	volucris	Osten Sacken	Drone Fly	Expected
1417	Arthropoda	Insecta	Diptera	Syrphidae	Heliophilus	latifrons	Loew	Drone Fly	Expected
1418	Arthropoda	Insecta	Diptera	Syrphidae	Mesograpta	marginata	(Say)	Drone Fly	Expected
1419	Arthropoda	Insecta	Diptera	Syrphidae	Paragus	bicolor	(Fabricius)	Drone Fly	Expected
1420	Arthropoda	Insecta	Diptera	Syrphidae	Paragus	tibialis (nr.)	Fallen	Drone Fly	Expected
1421	Arthropoda	Insecta	Diptera	Syrphidae	Sphaerophoria	cylindrica	(Say)	Drone Fly	Expected
1422	Arthropoda	Insecta	Diptera	Syrphidae	Sphaerophoria	sulphuripes	(Thomson)	Drone Fly	Expected
1423	Arthropoda	Insecta	Diptera	Syrphidae	Tenthredomyia	tridens	(Loew)	Drone Fly	Expected
1424	Arthropoda	Insecta	Diptera	Syrphidae	Volucella	anna	Williston	Drone Fly	Expected
1425	Arthropoda	Insecta	Diptera	Syrphidae	Volucella	apicifera	Townsend	Drone Fly	Expected

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1426	Arthropoda	Insecta	Diptera	Syrphidae	Volucella	comstocki	Williston	Drone Fly	Expected
1427	Arthropoda	Insecta	Diptera	Syrphidae	Volucella	isabellina	Williston	Drone Fly	Expected
1428	Arthropoda	Insecta	Diptera	Syrphidae	Volucella	marginata	Say	Drone Fly	Expected
1429	Arthropoda	Insecta	Diptera	Syrphidae	Volucella	victoria	Williston	Drone Fly	Expected
1430	Arthropoda	Insecta	Diptera	Tabanidae	Chrysops	coquillettii	Hine	Horse Fly	Expected
1431	Arthropoda	Insecta	Diptera	Tabanidae	Silvius	quadrivittatus	(Say)	Horse Fly	Expected
1432	Arthropoda	Insecta	Diptera	Tabanidae	Tabanus	punctifer	Osten Sacken	Horse Fly	Expected
1433	Arthropoda	Insecta	Diptera	Tabanidae	Tabanus	subsimilis	Philip	Horse Fly	Expected
1434	Arthropoda	Insecta	Diptera	Tachinidae	Aplomya	thecarum	(Scudder)	Parasitic Fly	Expected
1435	Arthropoda	Insecta	Diptera	Tachinidae	Athrycia	cinerea	(Coquillett)	Parasitic Fly	Expected
1436	Arthropoda	Insecta	Diptera	Tachinidae	Athyricia	cinerea	(Coquillett)	Parasitic Fly	Expected
1437	Arthropoda	Insecta	Diptera	Tachinidae	Catemophrys	sequens	Townsend	Parasitic Fly	Expected
1438	Arthropoda	Insecta	Diptera	Tachinidae	Celatoria	diabroticae	(Shimer)	Parasitic Fly	Expected
1439	Arthropoda	Insecta	Diptera	Tachinidae	Cenosoma	signiferum	(Wulp)	Parasitic Fly	Expected
1440	Arthropoda	Insecta	Diptera	Tachinidae	Ceratomyiella	bicincta	Reinhard	Parasitic Fly	Expected
1441	Arthropoda	Insecta	Diptera	Tachinidae	Chaetonodexodes	vanderwulpi	(Townsend)	Parasitic Fly	Expected
1442	Arthropoda	Insecta	Diptera	Tachinidae	Chaetoplagia	atripennis	Coquillett	Parasitic Fly	Expected
1443	Arthropoda	Insecta	Diptera	Tachinidae	Clausicella	neomexicana	(Townsend)	Parasitic Fly	Expected
1444	Arthropoda	Insecta	Diptera	Tachinidae	Cloacina	filialis	Reinhard	Parasitic Fly	Expected
1445	Arthropoda	Insecta	Diptera	Tachinidae	Cylindromyia	fumipennis	(Bigot)	Parasitic Fly	Expected
1446	Arthropoda	Insecta	Diptera	Tachinidae	Distichona	georgiae	Braver and Bergenstamm	Parasitic Fly	Expected
1447	Arthropoda	Insecta	Diptera	Tachinidae	Doryphorophaga	doryphorae	(Riley)	Parasitic Fly	Expected
1448	Arthropoda	Insecta	Diptera	Tachinidae	Drepanoglossa	lucens	Townsend	Parasitic Fly	Expected
1449	Arthropoda	Insecta	Diptera	Tachinidae	Eucelatoria	armigera	(Coquillett)	Parasitic Fly	Expected
1450	Arthropoda	Insecta	Diptera	Tachinidae	Eucnephalia	gonoides	Townsend	Parasitic Fly	Expected
1451	Arthropoda	Insecta	Diptera	Tachinidae	Euphasiopteryx	ochracea	(Bigot)	Parasitic Fly	Expected
1452	Arthropoda	Insecta	Diptera	Tachinidae	Euphorocera	claripennis	(Macquart)	Parasitic Fly	Expected
1453	Arthropoda	Insecta	Diptera	Tachinidae	Euphorocera	omissa	(Reinhard)	Parasitic Fly	Expected
1454	Arthropoda	Insecta	Diptera	Tachinidae	Euphorocera	tachinomoides	Townsend	Parasitic Fly	Expected
1455	Arthropoda	Insecta	Diptera	Tachinidae	Euthyprospa	petiolata	Townsend	Parasitic Fly	Expected
1456	Arthropoda	Insecta	Diptera	Tachinidae	Gaediopsis	setosa	Coquillett	Parasitic Fly	Expected
1457	Arthropoda	Insecta	Diptera	Tachinidae	Gonia	sequax	Williston	Parasitic Fly	Expected
1458	Arthropoda	Insecta	Diptera	Tachinidae	Goniochaeta	plagioides	Townsend	Parasitic Fly	Expected
1459	Arthropoda	Insecta	Diptera	Tachinidae	Hyalomyia	aldrichii	Townsend	Parasitic Fly	Expected
1460	Arthropoda	Insecta	Diptera	Tachinidae	Hypertrophocera	parvipes	Townsend	Parasitic Fly	Expected
1461	Arthropoda	Insecta	Diptera	Tachinidae	Hyphantrophaga	hyphantriae	(Townsend)	Parasitic Fly	Expected
1462	Arthropoda	Insecta	Diptera	Tachinidae	Lepesia	aletiae	(Riley)	Parasitic Fly	Expected
1463	Arthropoda	Insecta	Diptera	Tachinidae	Lepesia	archippivora	(Riley)	Parasitic Fly	Expected
1464	Arthropoda	Insecta	Diptera	Tachinidae	Leucostoma	acirostre	Reinhard	Parasitic Fly	Expected
1465	Arthropoda	Insecta	Diptera	Tachinidae	Leucostoma	aterrimum	(Villers)	Parasitic Fly	Expected
1466	Arthropoda	Insecta	Diptera	Tachinidae	Leucostoma	gravipes	Wulp	Parasitic Fly	Expected
1467	Arthropoda	Insecta	Diptera	Tachinidae	Leucostoma	simplex	(Fallen)	Parasitic Fly	Expected
1468	Arthropoda	Insecta	Diptera	Tachinidae	Metoposarcophaga	pachyproctosa	Parker	Parasitic Fly	Expected
1469	Arthropoda	Insecta	Diptera	Tachinidae	Microchaetina	mexicana	(Townsend)	Parasitic Fly	Expected
1470	Arthropoda	Insecta	Diptera	Tachinidae	Microchaetina	valida	(Townsend)	Parasitic Fly	Expected
1471	Arthropoda	Insecta	Diptera	Tachinidae	Micromintho	melania	Townsend	Parasitic Fly	Expected

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1472	Arthropoda	Insecta	Diptera	Tachinidae	Microphthalma	disjuncta	Wiedemann	Parasitic Fly	Expected
1473	Arthropoda	Insecta	Diptera	Tachinidae	Minthozelia	argentosa	Reinhard	Parasitic Fly	Expected
1474	Arthropoda	Insecta	Diptera	Tachinidae	Mochlosoma	validum	Brauer and Bergenstamm	Parasitic Fly	Expected
1475	Arthropoda	Insecta	Diptera	Tachinidae	Nemorilla	floralis	(Fallen)	Parasitic Fly	Expected
1476	Arthropoda	Insecta	Diptera	Tachinidae	Organomyia	frontalis	Townsend	Parasitic Fly	Expected
1477	Arthropoda	Insecta	Diptera	Tachinidae	Paradejeania	rutilioides	(Jaennicke)	Parasitic Fly	Expected
1478	Arthropoda	Insecta	Diptera	Tachinidae	Paradidyma	singularis	(Townsend)	Parasitic Fly	Expected
1479	Arthropoda	Insecta	Diptera	Tachinidae	Paraphasmophaga	clavis	Townsend	Parasitic Fly	Expected
1480	Arthropoda	Insecta	Diptera	Tachinidae	Peleteria	iterans	(Walker)	Parasitic Fly	Expected
1481	Arthropoda	Insecta	Diptera	Tachinidae	Peleteria	thomsoni	Williston	Parasitic Fly	Expected
1482	Arthropoda	Insecta	Diptera	Tachinidae	Plagiomima	spinulosa	(Bigot)	Parasitic Fly	Expected
1483	Arthropoda	Insecta	Diptera	Tachinidae	Schizactia	vitinervis	(Thompson)	Parasitic Fly	Expected
1484	Arthropoda	Insecta	Diptera	Tachinidae	Schizotachina	convecta	(Walker)	Parasitic Fly	Expected
1485	Arthropoda	Insecta	Diptera	Tachinidae	Siphosturmia	oteroensis	(Reinhard)	Parasitic Fly	Expected
1486	Arthropoda	Insecta	Diptera	Tachinidae	Sitophaga	neomexicana	(Townsend)	Parasitic Fly	Expected
1487	Arthropoda	Insecta	Diptera	Tachinidae	Stomatomyia	parvipalpis	(Wulp)	Parasitic Fly	Expected
1488	Arthropoda	Insecta	Diptera	Tachinidae	Vanderwulpia	atrophopoides	Townsend	Parasitic Fly	Expected
1489	Arthropoda	Insecta	Diptera	Tachinidae	Voria	ruralis	(Fallen)	Parasitic Fly	Expected
1490	Arthropoda	Insecta	Diptera	Tachinidae	Xanthoepalpus	bicolor	(Williston)	Parasitic Fly	Expected
1491	Arthropoda	Insecta	Diptera	Tephritidae	Anastrepha	serpentina	(Wiedemann)	Black fruit fly	Expected
1492	Arthropoda	Insecta	Diptera	Tephritidae	Dioxyna	sororcula	(Wiedemann)	Fruit Fly	Expected
1493	Arthropoda	Insecta	Diptera	Tephritidae	Euaresta	aequalis	(Loew)	Fruit Fly	Expected
1494	Arthropoda	Insecta	Diptera	Tephritidae	Euaresta	stigmatica	Coquillett	Fruit Fly	Expected
1495	Arthropoda	Insecta	Diptera	Tephritidae	Euarestoides	acutangulus	(Thomson)	Fruit Fly	Expected
1496	Arthropoda	Insecta	Diptera	Tephritidae	Euarestoides	flavus	(Adams)	Fruit Fly	Expected
1497	Arthropoda	Insecta	Diptera	Tephritidae	Eutreta	angusta	Banks	Fruit Fly	Expected
1498	Arthropoda	Insecta	Diptera	Tephritidae	Neaspilota	aenigma	Friedberg and Mathis	Fruit Fly	Expected
1499	Arthropoda	Insecta	Diptera	Tephritidae	Neotephritis	finalis	(Loew)	Fruit Fly	Expected
1500	Arthropoda	Insecta	Diptera	Tephritidae	Paraterellia	superba	Foote	Fruit Fly	Expected
1501	Arthropoda	Insecta	Diptera	Tephritidae	Paroxyna	clathrata	(Loew)	Fruit Fly	Expected
1502	Arthropoda	Insecta	Diptera	Tephritidae	Rhagoletis	acuticornis	(Steyskal)	Fruit Fly	Expected
1503	Arthropoda	Insecta	Diptera	Tephritidae	Rhagoletis	completa	Cresson	Walnut husk fly	Expected
1504	Arthropoda	Insecta	Diptera	Tephritidae	Rhagoletis	fausta	Osten Sacken	Black cherry fruit fly	Expected
1505	Arthropoda	Insecta	Diptera	Tephritidae	Rhagoletis	juglandis	Cresson	Fruit Fly	Expected
1506	Arthropoda	Insecta	Diptera	Tephritidae	Tephritis	arizonaensis	Quisenberry	Fruit Fly	Expected
1507	Arthropoda	Insecta	Diptera	Tephritidae	Tephritis	stigmatica	(Coquillett)	Fruit Fly	Expected
1508	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	actinobola	(Loew)	Fruit Fly	Expected
1509	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	bisetosa	(Coquillett)	Fruit Fly	Expected
1510	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	jonesi	Curran	Fruit Fly	Expected
1511	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	pseudovicina	Hering	Fruit Fly	Expected
1512	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	radifera	(Coquillett)	Fruit Fly	Expected
1513	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	signata	Foote	Fruit Fly	Expected
1514	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	texana	Malloch	Fruit Fly	Expected
1515	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	vicina	(Wulp)	Fruit Fly	Expected
1516	Arthropoda	Insecta	Diptera	Tephritidae	Trupanea	wheeleri	Curran	Fruit Fly	Expected
1517	Arthropoda	Insecta	Diptera	Tephritidae	Trypeta	angustigena	Foote	Fruit Fly	Expected

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1518	Arthropoda	Insecta	Diptera	Tephritidae	Trypeta	tortile	Coquillett	Fruit Fly	Expected
1519	Arthropoda	Insecta	Diptera	Tephritidae	Zonosemata	vittigera	(Coquillett)	Fruit Fly	Expected
1520	Arthropoda	Insecta	Diptera	Tethinidae	Pelomyia	coronata	(Loew)	Tethinid Fly	Expected
1521	Arthropoda	Insecta	Diptera	Therevidae	Ammonaios	niveus	(Krober)	Stiletto Fly	Expected
1522	Arthropoda	Insecta	Diptera	Therevidae	Brachylinga	cinerea	(Cole)	Stiletto Fly	Expected
1523	Arthropoda	Insecta	Diptera	Therevidae	Brachylinga	pavida	(Coquillett)	Stiletto Fly	Expected
1524	Arthropoda	Insecta	Diptera	Therevidae	Brachylinga	pilosa	(Krober)	Stiletto Fly	Expected
1525	Arthropoda	Insecta	Diptera	Therevidae	Cylotelus	rufiventris	(Loew)	Stiletto Fly	Expected
1526	Arthropoda	Insecta	Diptera	Therevidae	Lysilinga	occipitalis	(Adams)	Stiletto Fly	Expected
1527	Arthropoda	Insecta	Diptera	Therevidae	Ozodiceromyia	anomala	(Adams)	Stiletto Fly	Expected
1528	Arthropoda	Insecta	Diptera	Therevidae	Ozodiceromyia	argentata	(Bellardi)	Stiletto Fly	Expected
1529	Arthropoda	Insecta	Diptera	Therevidae	Ozodiceromyia	metallica	(Krober)	Stiletto Fly	Expected
1530	Arthropoda	Insecta	Diptera	Therevidae	Ozodiceromyia	nanella	(Cole)	Stiletto Fly	Expected
1531	Arthropoda	Insecta	Diptera	Therevidae	Ozodiceromyia	nigrimana	(Krober)	Stiletto Fly	Expected
1532	Arthropoda	Insecta	Diptera	Therevidae	Ozodiceromyia	signatipennis	(Cole)	Stiletto Fly	Expected
1533	Arthropoda	Insecta	Diptera	Therevidae	Pherocera	albihalteralis	Cole	Stiletto Fly	Expected
1534	Arthropoda	Insecta	Diptera	Therevidae	Pherocera	signatifrons	Cole	Stiletto Fly	Expected
1535	Arthropoda	Insecta	Diptera	Therevidae	Psilocephala	aurantiaca	Coquillett	Stiletto Fly	Expected
1536	Arthropoda	Insecta	Diptera	Therevidae	Psilocephala	coloradensis	James	Stiletto Fly	Expected
1537	Arthropoda	Insecta	Diptera	Therevidae	Psilocephala	platancala	Cole	Stiletto Fly	Expected
1538	Arthropoda	Insecta	Diptera	Therevidae	Spiriverpa	cockerelli	(Cole)	Stiletto Fly	Expected
1539	Arthropoda	Insecta	Diptera	Therevidae	Thereva	melanoneura	Loew	Stiletto Fly	Expected
1540	Arthropoda	Insecta	Diptera	Vermileonidae	Vermileo	opacus	(Coquillett)	Wormilion Fly	Expected
1541	Arthropoda	Insecta	Ephemeroptera	Baetidae	Acentrella	insignificans	(McDunnough)	Small Minnow Mayfly	Expected
1542	Arthropoda	Insecta	Ephemeroptera	Baetidae	Callibaetis	montanus	Eaton	Small Minnow Mayfly	Expected
1543	Arthropoda	Insecta	Ephemeroptera	Baetidae	Fallceon	quilleri	(Dodds)	Small Minnow Mayfly	Expected
1544	Arthropoda	Insecta	Ephemeroptera	Isonychiidae	Isonychia	intermedia	(Eaton)	Brushlegged Mayfly	Expected
1545	Arthropoda	Insecta	Ephemeroptera	Leptophlebiidae	Neochoroterpes	oklahoma	(Traver)	Pronggill Mayfly	Expected
1546	Arthropoda	Insecta	Ephemeroptera	Oligoneuriidae	Homoeoneuria	alleni	Pescador and Peters	Mayfly	Expected
1547	Arthropoda	Insecta	Heteroptera	Alydidae	Alydus	eurinus	(Say)	Broad-headed Bugs	Expected
1548	Arthropoda	Insecta	Heteroptera	Alydidae	Alydus	pluto	Uhler	Broad-headed Bugs	Expected
1549	Arthropoda	Insecta	Heteroptera	Alydidae	Alydus	tomentosus	Fracker	Broad-headed Bugs	Expected
1550	Arthropoda	Insecta	Heteroptera	Alydidae	Darmistus	subvittatus	Stal	Broad-headed Bugs	Expected
1551	Arthropoda	Insecta	Heteroptera	Alydidae	Stachyocnemus	apicalis	(Dallas)	Broad-headed Bugs	Expected
1552	Arthropoda	Insecta	Heteroptera	Anthocoridae	Anthocoris	albiger	Reuter	Minute Pirate Bug	Expected
1553	Arthropoda	Insecta	Heteroptera	Anthocoridae	Xylocoris	sordidus	(Reuter)	Minute Pirate Bug	Expected
1554	Arthropoda	Insecta	Heteroptera	Belostomatidae	Belostoma	flumenium	Say	Giant Water Bug	Expected
1555	Arthropoda	Insecta	Heteroptera	Belostomatidae	Lethocerus	americanus	(Leidy)	Giant Water Bug	Expected
1556	Arthropoda	Insecta	Heteroptera	Berytidae	Jalysus	spinosus	(Say)	Stilt Bug	Expected
1557	Arthropoda	Insecta	Heteroptera	Berytidae	Jalysus	wickhami	Van Duzee	Spined stilt bug	Expected
1558	Arthropoda	Insecta	Heteroptera	Berytidae	Metacanthus	multispinus	(Ashmead)	Stilt Bug	Expected
1559	Arthropoda	Insecta	Heteroptera	Berytidae	Pronotacantha	annulata	Uhler	Stilt Bug	Expected
1560	Arthropoda	Insecta	Heteroptera	Cimicidae	Cimex	lectularius	Linnaeus	Bedbug	Expected
1561	Arthropoda	Insecta	Heteroptera	Coreidae	Acanthocephala	thomasi	(Uhler)	Leaf-footed bug	Expected
1562	Arthropoda	Insecta	Heteroptera	Coreidae	Anasa	tristis	(DeGeer)	Squash bug	Expected
1563	Arthropoda	Insecta	Heteroptera	Coreidae	Catorhintha	selector	Stal	Leaf-footed bug	Expected

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1564	Arthropoda	Insecta	Heteroptera	Coreidae	Ceraleptus	americanus	Stal	Leaf-footed bug	Expected
1565	Arthropoda	Insecta	Heteroptera	Coreidae	Chariesterus	antennator	(Fabricius)	Leaf-footed bug	Expected
1566	Arthropoda	Insecta	Heteroptera	Coreidae	Leptoglossus	clypealis	Heid.	Leaf-footed bug	Expected
1567	Arthropoda	Insecta	Heteroptera	Coreidae	Leptoglossus	oppositus	(Say)	Leaf-footed bug	Expected
1568	Arthropoda	Insecta	Heteroptera	Coreidae	Mozena	obtusa	Uhler	Leaf-footed bug	Expected
1569	Arthropoda	Insecta	Heteroptera	Coreidae	Narnia	femorata	Stal	Leaf-footed bug	Expected
1570	Arthropoda	Insecta	Heteroptera	Coreidae	Narnia	pallidicornis	Stal	Leaf-footed bug	Expected
1571	Arthropoda	Insecta	Heteroptera	Coreidae	Scolopocerus	granulosus	Barber	Leaf-footed bug	Expected
1572	Arthropoda	Insecta	Heteroptera	Coreidae	Scolopocerus	secundarius	Uhler	Leaf-footed bug	Expected
1573	Arthropoda	Insecta	Heteroptera	Coreidae	Scolopocerus	uhleri	Distant	Leaf-footed bug	Expected
1574	Arthropoda	Insecta	Heteroptera	Corixidae	Graptocorixia	abdominalis	(Say)	Corises, Water Boatman	Expected
1575	Arthropoda	Insecta	Heteroptera	Corixidae	Sigara	alternata	(Say)	Corises, Water Boatman	Expected
1576	Arthropoda	Insecta	Heteroptera	Cydnidae	Cyrtomenus	crassus (nr.)	Walker	Burrower Bug	Expected
1577	Arthropoda	Insecta	Heteroptera	Cydnidae	Melanaethus	subglaber	(Walker)	Burrower Bug	Expected
1578	Arthropoda	Insecta	Heteroptera	Cydnidae	Microporus	obliquus	Uhler	Burrower Bug	Expected
1579	Arthropoda	Insecta	Heteroptera	Cydnidae	Pangaeus	bilineatus	(Say)	Burrower Bug	Expected
1580	Arthropoda	Insecta	Heteroptera	Gerridae	Gerris	marginatus	Say	Water Strider	Expected
1581	Arthropoda	Insecta	Heteroptera	Gerridae	Gerris	remigis	Say	Water Strider	Expected
1582	Arthropoda	Insecta	Heteroptera	Largidae	Largus	cinctus	Herrich-Schaeffer	Largid Bug	Expected
1583	Arthropoda	Insecta	Heteroptera	Largidae	Largus	succinctus	(Linnaeus)	Red bug	Expected
1584	Arthropoda	Insecta	Heteroptera	Lygaeidae	Arhyssus	lateralis	Say	Chinch Bug	Expected
1585	Arthropoda	Insecta	Heteroptera	Lygaeidae	Aufeius	impressicollis	Stal	Chinch Bug	Expected
1586	Arthropoda	Insecta	Heteroptera	Lygaeidae	Conizus	crassicornis	(Linnaeus)	Chinch Bug	Expected
1587	Arthropoda	Insecta	Heteroptera	Lygaeidae	Craspeduchus	uhleri	(Stal)	Chinch Bug	Expected
1588	Arthropoda	Insecta	Heteroptera	Lygaeidae	Crophius	heidemani	Van Duzee	Chinch Bug	Expected
1589	Arthropoda	Insecta	Heteroptera	Lygaeidae	Emblethis	vicarius	Horvath	Chinch Bug	Expected
1590	Arthropoda	Insecta	Heteroptera	Lygaeidae	Gargaphia	opacula	Uhler	Chinch Bug	Expected
1591	Arthropoda	Insecta	Heteroptera	Lygaeidae	Geocoris	pallens	Stal	Western bigeyed bug	Expected
1592	Arthropoda	Insecta	Heteroptera	Lygaeidae	Geocoris	punctipes	Say	Chinch Bug	Expected
1593	Arthropoda	Insecta	Heteroptera	Lygaeidae	Isthmogeocoris	imperialis	(Distant)	Chinch Bug	Expected
1594	Arthropoda	Insecta	Heteroptera	Lygaeidae	Lygaeospilus	pusio	(Stal)	Chinch Bug	Expected
1595	Arthropoda	Insecta	Heteroptera	Lygaeidae	Lygaeus	belfragei	Stal	Chinch Bug	Expected
1596	Arthropoda	Insecta	Heteroptera	Lygaeidae	Lygaeus	bicrucis	Say	Chinch Bug	Expected
1597	Arthropoda	Insecta	Heteroptera	Lygaeidae	Lygaeus	kalmii	Stal	Small milkweed bug	Expected
1598	Arthropoda	Insecta	Heteroptera	Lygaeidae	Lygaeus	reclivatus	Say	Chinch Bug	Expected
1599	Arthropoda	Insecta	Heteroptera	Lygaeidae	Melanopleurus	belfragei	Stal	Chinch Bug	Expected
1600	Arthropoda	Insecta	Heteroptera	Lygaeidae	Neacoryphus	lateralis	(Dallas)	Chinch Bug	Expected
1601	Arthropoda	Insecta	Heteroptera	Lygaeidae	Nysius	raphanus	Howard	False chinch bug	Expected
1602	Arthropoda	Insecta	Heteroptera	Lygaeidae	Oncopeltus	fasciatus	(Dallas)	Milkweed bug	Expected
1603	Arthropoda	Insecta	Heteroptera	Lygaeidae	Ozophora	puncturata	Uhler	Chinch Bug	Expected
1604	Arthropoda	Insecta	Heteroptera	Lygaeidae	Peritrechus	fraternus	Uhler	Chinch Bug	Expected
1605	Arthropoda	Insecta	Heteroptera	Lygaeidae	Phlegyas	annulicrus	Stal	Chinch Bug	Expected
1606	Arthropoda	Insecta	Heteroptera	Lygaeidae	Pseudopamera	nitidula	(Uhler)	Chinch Bug	Expected
1607	Arthropoda	Insecta	Heteroptera	Lygaeidae	Sphragisticus	nebulosus	(Fallen)	Chinch Bug	Expected
1608	Arthropoda	Insecta	Heteroptera	Lygaeidae	Xynonysius	californicus	(Stal)	Chinch Bug	Expected
1609	Arthropoda	Insecta	Heteroptera	Miridae	Adelphocoris	rapidus	(Say)	Rapid plant bug	Expected

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1610	Arthropoda	Insecta	Heteroptera	Miridae	Adelphocoris	superbus	(Uhler)	Jumping Tree Bug	Expected
1611	Arthropoda	Insecta	Heteroptera	Miridae	Argyrocoris	scurrilus	Van Duzee	Jumping Tree Bug	Expected
1612	Arthropoda	Insecta	Heteroptera	Miridae	Atomoscelis	modestus	(Van Duzee)	Jumping Tree Bug	Expected
1613	Arthropoda	Insecta	Heteroptera	Miridae	Atractotomus	acaciae	Knight	Jumping Tree Bug	Expected
1614	Arthropoda	Insecta	Heteroptera	Miridae	Calcoris	superbus	Uhler	Jumping Tree Bug	Expected
1615	Arthropoda	Insecta	Heteroptera	Miridae	Ceratocapsus	apicalis	Knight	Jumping Tree Bug	Expected
1616	Arthropoda	Insecta	Heteroptera	Miridae	Ceratocapsus	fuscosignatus	Knight	Jumping Tree Bug	Expected
1617	Arthropoda	Insecta	Heteroptera	Miridae	Chlamydatus	associatus	Uhler	Ragweed plant bug	Expected
1618	Arthropoda	Insecta	Heteroptera	Miridae	Clivinema	regalis	Knight	Jumping Tree Bug	Expected
1619	Arthropoda	Insecta	Heteroptera	Miridae	Clivinema	serica	Knight	Jumping Tree Bug	Expected
1620	Arthropoda	Insecta	Heteroptera	Miridae	Coquillettia	albiclava	Knight	Jumping Tree Bug	Expected
1621	Arthropoda	Insecta	Heteroptera	Miridae	Coquillettia	insignis	Uhler	Jumping Tree Bug	Expected
1622	Arthropoda	Insecta	Heteroptera	Miridae	Coquillettia	uhleri	Van Duzee	Jumping Tree Bug	Expected
1623	Arthropoda	Insecta	Heteroptera	Miridae	Cyrtopeltis	modestus	Distant	Tomato bug	Expected
1624	Arthropoda	Insecta	Heteroptera	Miridae	Cyrtopeltis	tenuis	Reuter	Jumping Tree Bug	Expected
1625	Arthropoda	Insecta	Heteroptera	Miridae	Dichrooscytus	elegans	Heidemann	Jumping Tree Bug	Expected
1626	Arthropoda	Insecta	Heteroptera	Miridae	Halticotoma	valida	Townsend	Yucca plant bug	Expected
1627	Arthropoda	Insecta	Heteroptera	Miridae	Halticus	bracatus	(Say)	Garden fleahopper	Expected
1628	Arthropoda	Insecta	Heteroptera	Miridae	Labopella	claripennis	Knight	Jumping Tree Bug	Expected
1629	Arthropoda	Insecta	Heteroptera	Miridae	Litomiris	rubicundus	(Uhler)	Jumping Tree Bug	Expected
1630	Arthropoda	Insecta	Heteroptera	Miridae	Lygus	desertus	Knight	Jumping Tree Bug	Expected
1631	Arthropoda	Insecta	Heteroptera	Miridae	Lygus	elisus	Van Duzee	Jumping Tree Bug	Expected
1632	Arthropoda	Insecta	Heteroptera	Miridae	Lygus	hesperus	Knight	Jumping Tree Bug	Expected
1633	Arthropoda	Insecta	Heteroptera	Miridae	Lygus	lineolaris	(Palisot de Beauvois)	Tarnished plant bug	Expected
1634	Arthropoda	Insecta	Heteroptera	Miridae	Melanotrichus	coagulatus	(Uhler)	Jumping Tree Bug	Expected
1635	Arthropoda	Insecta	Heteroptera	Miridae	Nicholia	erigoni	Knight	Jumping Tree Bug	Expected
1636	Arthropoda	Insecta	Heteroptera	Miridae	Orthyotylus	ramus	Knight	Jumping Tree Bug	Expected
1637	Arthropoda	Insecta	Heteroptera	Miridae	Parthenicus	covilleae	Van Duzee	Jumping Tree Bug	Expected
1638	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	alamogordo	Stonedahl	Jumping Tree Bug	Expected
1639	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	albicuneatus	Stonedahl	Jumping Tree Bug	Expected
1640	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	albidopictus	Knight	Jumping Tree Bug	Expected
1641	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	brevicornis	Knight	Jumping Tree Bug	Expected
1642	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	cercocarpi	Knight	Jumping Tree Bug	Expected
1643	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	cuneotinctus	Knight	Jumping Tree Bug	Expected
1644	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	laevis	(Uhler)	Jumping Tree Bug	Expected
1645	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	mesillae	Knight	Jumping Tree Bug	Expected
1646	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	piceicola	Knight	Jumping Tree Bug	Expected
1647	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	ramosus	Uhler	Jumping Tree Bug	Expected
1648	Arthropoda	Insecta	Heteroptera	Miridae	Phytocoris	vanduzeii	Reuter	Jumping Tree Bug	Expected
1649	Arthropoda	Insecta	Heteroptera	Miridae	Pilophorus	tibialis	Van Duzee	Jumping Tree Bug	Expected
1650	Arthropoda	Insecta	Heteroptera	Miridae	Plagiognathus	guttulosus	(Reuter)	Jumping Tree Bug	Expected
1651	Arthropoda	Insecta	Heteroptera	Miridae	Poeciloscytus	basilis	Reuter	Jumping Tree Bug	Expected
1652	Arthropoda	Insecta	Heteroptera	Miridae	Poeciloscytus	lineatus	Fabricius	Jumping Tree Bug	Expected
1653	Arthropoda	Insecta	Heteroptera	Miridae	Polymerus	basalis	(Reuter)	Jumping Tree Bug	Expected
1654	Arthropoda	Insecta	Heteroptera	Miridae	Polymerus	vittatipennis	Knight	Jumping Tree Bug	Expected
1655	Arthropoda	Insecta	Heteroptera	Miridae	Psallus	pictipes	(Van Duzee)	Jumping Tree Bug	Expected

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1656	Arthropoda	Insecta	Heteroptera	Miridae	Psallus	seriatus	(Reuter)		Jumping Tree Bug	Expected
1657	Arthropoda	Insecta	Heteroptera	Miridae	Pseudopsallus	anograe	Knight		Jumping Tree Bug	Expected
1658	Arthropoda	Insecta	Heteroptera	Miridae	Pseudopsallus	hixsoni	Knight		Jumping Tree Bug	Expected
1659	Arthropoda	Insecta	Heteroptera	Miridae	Rhinacloa	forticornis	Reuter		Western plant bug	Expected
1660	Arthropoda	Insecta	Heteroptera	Miridae	Spanogonicus	albofasciatus	(Reuter)		Whitemarked fleahopper	Expected
1661	Arthropoda	Insecta	Heteroptera	Miridae	Taylorilygus	pallidulus	(Blanch.)		Jumping Tree Bug	Expected
1662	Arthropoda	Insecta	Heteroptera	Miridae	Tuponia	subnitida	Uhler		Jumping Tree Bug	Expected
1663	Arthropoda	Insecta	Heteroptera	Nabidae	Nabis	alternatus	Parshley		Damsel Bug	Expected
1664	Arthropoda	Insecta	Heteroptera	Nabidae	Nabis	americoferus	Carayon		Common damsel bug	Expected
1665	Arthropoda	Insecta	Heteroptera	Nabidae	Nabis	capsiformis	Germar		Damsel Bug	Expected
1666	Arthropoda	Insecta	Heteroptera	Nabidae	Pagasa	fusca	(Stein)		Damsel Bug	Expected
1667	Arthropoda	Insecta	Heteroptera	Nepidae	Ranatra	quadridentata	Stal		Waterscorpion	Expected
1668	Arthropoda	Insecta	Heteroptera	Notonectidae	Buenoa	margaritacea	Bueno		Backswimmer	Expected
1669	Arthropoda	Insecta	Heteroptera	Notonectidae	Notonecta	kirbyi	Hungerford		Backswimmer	Expected
1670	Arthropoda	Insecta	Heteroptera	Notonectidae	Notonecta	undulata	Say		Backswimmer	Expected
1671	Arthropoda	Insecta	Heteroptera	Notonectidae	Notonecta	unifasciata	Guerin-Meneville		Backswimmer	Expected
1672	Arthropoda	Insecta	Heteroptera	Pentatomidae	Acrosternum	hilare	(Say)		Stink Bug	Expected
1673	Arthropoda	Insecta	Heteroptera	Pentatomidae	Arvelius	albopunctatus	De Geer		Stink Bug	Expected
1674	Arthropoda	Insecta	Heteroptera	Pentatomidae	Banasa	euchlora	Stal		Stink Bug	Expected
1675	Arthropoda	Insecta	Heteroptera	Pentatomidae	Brochymena	parva	Ruckes		Stink Bug	Expected
1676	Arthropoda	Insecta	Heteroptera	Pentatomidae	Brochymena	sulcata	Van Duzee		Stink Bug	Expected
1677	Arthropoda	Insecta	Heteroptera	Pentatomidae	Carpoceris	remotus	Horvath		Stink Bug	Expected
1678	Arthropoda	Insecta	Heteroptera	Pentatomidae	Chlorochroa	ligata	(Say)		Conchuela	Expected
1679	Arthropoda	Insecta	Heteroptera	Pentatomidae	Chlorochroa	sayi	(Stal)		Stink Bug	Expected
1680	Arthropoda	Insecta	Heteroptera	Pentatomidae	Chlorochroa	uhleri	(Stal)		Stink Bug	Expected
1681	Arthropoda	Insecta	Heteroptera	Pentatomidae	Cosmopepla	bimaculata	(Thomas)		Stink Bug	Expected
1682	Arthropoda	Insecta	Heteroptera	Pentatomidae	Cosmopepla	conspicillaris	(Dallas)		Stink Bug	Expected
1683	Arthropoda	Insecta	Heteroptera	Pentatomidae	Dendrocornis	contaminatus	Uhler		Stink Bug	Expected
1684	Arthropoda	Insecta	Heteroptera	Pentatomidae	Euschistus	servus	(Say)		Stink Bug	Expected
1685	Arthropoda	Insecta	Heteroptera	Pentatomidae	Mecidea	minor	Ruckes		Stink Bug	Expected
1686	Arthropoda	Insecta	Heteroptera	Pentatomidae	Microporus	obliquus	Uhler		Stink Bug	Expected
1687	Arthropoda	Insecta	Heteroptera	Pentatomidae	Mormidea	tetra	(Walker)		Stink Bug	Expected
1688	Arthropoda	Insecta	Heteroptera	Pentatomidae	Murgantia	histrionica	(Hahn)		Harlequin bug	Expected
1689	Arthropoda	Insecta	Heteroptera	Pentatomidae	Perillus	bioculatus	(Fabricius)		Two-spotted stink bug	Expected
1690	Arthropoda	Insecta	Heteroptera	Pentatomidae	Podisus	acutissimus	Stal		Stink Bug	Expected
1691	Arthropoda	Insecta	Heteroptera	Pentatomidae	Podisus	maculiventris	(Say)		Spined soldier bug	Expected
1692	Arthropoda	Insecta	Heteroptera	Pentatomidae	Prionosoma	podopioides	Uhler		Stink Bug	Expected
1693	Arthropoda	Insecta	Heteroptera	Pentatomidae	Stiretrus	anchorago	(Fabricius)		Anchor stink bug	Expected
1694	Arthropoda	Insecta	Heteroptera	Pentatomidae	Tepa	brevis	(Van Duzee)		Stink Bug	Expected
1695	Arthropoda	Insecta	Heteroptera	Pentatomidae	Thyanta	custator	(Fabricius)		Stink Bug	Expected
1696	Arthropoda	Insecta	Heteroptera	Pentatomidae	Thyanta	pallidovirens	(Stal)	spinosa	Stink Bug	Expected
1697	Arthropoda	Insecta	Heteroptera	Pentatomidae	Thyanta	perditor	(Fabricius)		Stink Bug	Expected
1698	Arthropoda	Insecta	Heteroptera	Pentatomidae	Zicrona	caerulea	(Linnaeus)		Stink Bug	Expected
1699	Arthropoda	Insecta	Heteroptera	Phymatidae	Phymata	pennsylvanica	Handlirsch	coloradensis	Ambush bug	Expected
1700	Arthropoda	Insecta	Heteroptera	Phymatidae	Phymata	rossi	Evans		Ambush bug	Expected
1701	Arthropoda	Insecta	Heteroptera	Piesmatidae	Piesma	cinereum	(Say)		Ash-gray Leaf Bug	Expected

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1702	Arthropoda	Insecta	Heteroptera	Reduviidae	Apiomeris	pictipes	Herrich-Schaeffer		Assasin Bug	Expected
1703	Arthropoda	Insecta	Heteroptera	Reduviidae	Atrachelus	cinereus	(Fabricius)	wygodzynski	Assasin Bug	Expected
1704	Arthropoda	Insecta	Heteroptera	Reduviidae	Melanolestes	abdominalis	(Herrich-Schaeffer)		Assasin Bug	Expected
1705	Arthropoda	Insecta	Heteroptera	Reduviidae	Oncocephalus	nubilus	Van Duzee		Assasin Bug	Expected
1706	Arthropoda	Insecta	Heteroptera	Reduviidae	Rasahus	biguttatus	(Say)		Corsair	Expected
1707	Arthropoda	Insecta	Heteroptera	Reduviidae	Scolopcerus	uhleri	Distant		Assasin Bug	Expected
1708	Arthropoda	Insecta	Heteroptera	Reduviidae	Sinea	diadema	(Fabricius)		Spined assassin bug	Expected
1709	Arthropoda	Insecta	Heteroptera	Reduviidae	Stenolemoides	arizonensis	(Banks)		Assasin Bug	Expected
1710	Arthropoda	Insecta	Heteroptera	Reduviidae	Triatoma	indictiva	Neiva		Assasin Bug	Expected
1711	Arthropoda	Insecta	Heteroptera	Reduviidae	Triatoma	lectularia	Stal		Assasin Bug	Expected
1712	Arthropoda	Insecta	Heteroptera	Reduviidae	Triatoma	neotomae	Neiva		Assasin Bug	Expected
1713	Arthropoda	Insecta	Heteroptera	Reduviidae	Triatoma	protracta	(Uhler)		Western bloodsucking coner	Expected
1714	Arthropoda	Insecta	Heteroptera	Reduviidae	Triatoma	rubida	(Uhler)	uhleri	Assasin Bug	Expected
1715	Arthropoda	Insecta	Heteroptera	Reduviidae	Triatoma	sanguisuga	(LeConte)		Assasin Bug	Expected
1716	Arthropoda	Insecta	Heteroptera	Reduviidae	Zelus	exsanguis	Stal		Assasin Bug	Expected
1717	Arthropoda	Insecta	Heteroptera	Reduviidae	Zelus	luridus	Stal		Assasin Bug	Expected
1718	Arthropoda	Insecta	Heteroptera	Reduviidae	Zelus	renardii	Kolenati		Leafhopper assassin bug	Expected
1719	Arthropoda	Insecta	Heteroptera	Reduviidae	Zelus	socius	(Uhler)		Assasin Bug	Expected
1720	Arthropoda	Insecta	Heteroptera	Rhopalidae	Arhyssus	confusus	Chopra		Scentless Plant Bug	Expected
1721	Arthropoda	Insecta	Heteroptera	Rhopalidae	Arhyssus	punctatus	Signoret		Scentless Plant Bug	Expected
1722	Arthropoda	Insecta	Heteroptera	Rhopalidae	Boisea	trivittata	(Say)		Boxelder bug	Expected
1723	Arthropoda	Insecta	Heteroptera	Rhopalidae	Harmostes	dorsalis	Burmeister		Scentless Plant Bug	Expected
1724	Arthropoda	Insecta	Heteroptera	Rhopalidae	Harmostes	reflexulus	Say		Scentless Plant Bug	Expected
1725	Arthropoda	Insecta	Heteroptera	Rhopalidae	Liorhyssus	hyalinus	(Fabricius)		Hyaline grass bug	Expected
1726	Arthropoda	Insecta	Heteroptera	Rhopalidae	Niesthrea	sidae	(Fabricius)		Scentless Plant Bug	Expected
1727	Arthropoda	Insecta	Heteroptera	Rhopalidae	Stictopleurus	viridicautus	(Uhler)		Scentless Plant Bug	Expected
1728	Arthropoda	Insecta	Heteroptera	Scutellaridae	Homaemus	proteus	Stal		Shield-backed bug	Expected
1729	Arthropoda	Insecta	Heteroptera	Thyreocoridae	Corimelaena	incognita	(McAtee and Malloch)		Negro Bug	Expected
1730	Arthropoda	Insecta	Heteroptera	Thyreocoridae	Cydnoides	albipennis	(Say)		Negro Bug	Expected
1731	Arthropoda	Insecta	Heteroptera	Tingidae	Corythaica	venusta	(Champion)		Lace Bug	Expected
1732	Arthropoda	Insecta	Heteroptera	Tingidae	Corythucha	arcuata	(Say)		Lace Bug	Expected
1733	Arthropoda	Insecta	Heteroptera	Tingidae	Corythucha	morrilli	Osborn and Drake		Morrill lace bug	Expected
1734	Arthropoda	Insecta	Heteroptera	Tingidae	Gargaphia	arizonica	Drake and Carvalho		Lace Bug	Expected
1735	Arthropoda	Insecta	Heteroptera	Tingidae	Gargaphia	iridescens	Champion		Lace Bug	Expected
1736	Arthropoda	Insecta	Heteroptera	Tingidae	Teleonemia	nigrina	Champion		Lace Bug	Expected
1737	Arthropoda	Insecta	Homoptera	Acanaloniidae	Acanalonia	similis	Doering		Acanalonid Planthopper	Expected
1738	Arthropoda	Insecta	Homoptera	Aclerididae	Aclerda	acriditatis	Ferris		Aclerdid Scale	Expected
1739	Arthropoda	Insecta	Homoptera	Aleyrodidae	Aleuroplatus	berbericolus	Quaintance and Baker		Whitefly	Expected
1740	Arthropoda	Insecta	Homoptera	Aleyrodidae	Trialeuroides	abutilonea	(Haldeman)		Whitefly	Expected
1741	Arthropoda	Insecta	Homoptera	Aleyrodidae	Trialeuroides	vaporariorum	(Westwood)		Whitefly	Expected
1742	Arthropoda	Insecta	Homoptera	Aphididae	Acyrthosiphon	kondoi	(Shinjii)		Plantlice	Expected
1743	Arthropoda	Insecta	Homoptera	Aphididae	Acyrthosiphon	pisum	(Harris)		Pea aphid	Expected
1744	Arthropoda	Insecta	Homoptera	Aphididae	Acyrthosiphon	solani	(Kaltenbach)		Foxglove aphid	Expected
1745	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	citricola	Van der Goot		Spirea aphid	Expected
1746	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	craccivora	(Koch)		Plantlice	Expected
1747	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	fabae	Scopoli		Bean aphid	Expected

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1748	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	gossypii	Glover	Cotton aphid	Expected
1749	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	helianthi	Monell	Plantlice	Expected
1750	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	medicaginis	Koch	Plantlice	Expected
1751	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	nerii	Fonscolombe	Plantlice	Expected
1752	Arthropoda	Insecta	Homoptera	Aphididae	Aphis	spiraephila	Patch	Plantlice	Expected
1753	Arthropoda	Insecta	Homoptera	Aphididae	Brevicornye	brassicae	(Linnaeus)	Cabbage aphid	Expected
1754	Arthropoda	Insecta	Homoptera	Aphididae	Capitophorus	hippophaes	(Walker)	Plantlice	Expected
1755	Arthropoda	Insecta	Homoptera	Aphididae	Chaitophorus	stevensi	Sanborn	Plantlice	Expected
1756	Arthropoda	Insecta	Homoptera	Aphididae	Cinara	edulis	(Wilson)	Plantlice	Expected
1757	Arthropoda	Insecta	Homoptera	Aphididae	Cinara	ponderosae	(Williams)	Plantlice	Expected
1758	Arthropoda	Insecta	Homoptera	Aphididae	Cinara	sibericae	(Gillette and Palmer)	Plantlice	Expected
1759	Arthropoda	Insecta	Homoptera	Aphididae	Cinara	strobi	(Fitch)	Plantlice	Expected
1760	Arthropoda	Insecta	Homoptera	Aphididae	Cinara	tujafilina	(Del Guercio)	Plantlice	Expected
1761	Arthropoda	Insecta	Homoptera	Aphididae	Diuraphis	tritici	(Gillette)	Plantlice	Expected
1762	Arthropoda	Insecta	Homoptera	Aphididae	Dysaphis	tulipae	(Fonscolombe)	Tulip bulb aphid	Expected
1763	Arthropoda	Insecta	Homoptera	Aphididae	Eriosoma	lanigerum	(Hausmann)	Plantlice	Expected
1764	Arthropoda	Insecta	Homoptera	Aphididae	Hyalopterus	pruni	(Geoffroy)	Mealy plum aphid	Expected
1765	Arthropoda	Insecta	Homoptera	Aphididae	Hysteroneura	setariae	(Thomas)	Rusty plum aphid	Expected
1766	Arthropoda	Insecta	Homoptera	Aphididae	Macrosiphoniella	zerogutierreziae	(Smith and Knowlton)	Plantlice	Expected
1767	Arthropoda	Insecta	Homoptera	Aphididae	Macrosiphum	euphorbiae	(Thomas)	Potato aphid	Expected
1768	Arthropoda	Insecta	Homoptera	Aphididae	Macrosiphum	rosae	(Linnaeus)	Rose aphid	Expected
1769	Arthropoda	Insecta	Homoptera	Aphididae	Melanocallis	caryaefoliae	(Davis)	Plantlice	Expected
1770	Arthropoda	Insecta	Homoptera	Aphididae	Monellia	costalis	(Fitch)	Black-margined aphid	Expected
1771	Arthropoda	Insecta	Homoptera	Aphididae	Myzocallis	ulmifolii	(Monell)	Plantlice	Expected
1772	Arthropoda	Insecta	Homoptera	Aphididae	Myzus	persicae	(Sulzer)	Green peach aphid	Expected
1773	Arthropoda	Insecta	Homoptera	Aphididae	Pemphigus	bursarius	(Linnaeus)	Lettuce root aphid	Expected
1774	Arthropoda	Insecta	Homoptera	Aphididae	Pemphigus	populiramulorum	Riley	Poplar twig gall aphid	Expected
1775	Arthropoda	Insecta	Homoptera	Aphididae	Pterocomma	smithiae	(Monell)	Plantlice	Expected
1776	Arthropoda	Insecta	Homoptera	Aphididae	Rhopalosiphum	maidis	(Fitch)	Corn leaf aphid	Expected
1777	Arthropoda	Insecta	Homoptera	Aphididae	Rhopalosiphum	padi	(Linnaeus)	Plantlice	Expected
1778	Arthropoda	Insecta	Homoptera	Aphididae	Schizaphis	graminium	(Rondani)	Green bug	Expected
1779	Arthropoda	Insecta	Homoptera	Aphididae	Smynthurodes	betae	Westwood	Plantlice	Expected
1780	Arthropoda	Insecta	Homoptera	Aphididae	Therioaphis	maculata	(Buckton)	Spotted alfalfa aphid	Expected
1781	Arthropoda	Insecta	Homoptera	Aphididae	Tuberolachnus	salignus	(Gmelin)	Plantlice	Expected
1782	Arthropoda	Insecta	Homoptera	Aphididae	Wahlgreniella	nervata	(Gillette)	Plantlice	Expected
1783	Arthropoda	Insecta	Homoptera	Asterolecaniidae	Asterolecanium	agavis	Russell	Pit Scales	Expected
1784	Arthropoda	Insecta	Homoptera	Asterolecaniidae	Lecaniodiaspis	rufescens	(Cockerell)	Pit Scales	Expected
1785	Arthropoda	Insecta	Homoptera	Asterolecaniidae	Lecaniodiaspis	yuccae	Townsend	Pit Scales	Expected
1786	Arthropoda	Insecta	Homoptera	Cicadellidae	Aceratagallia	abrupta	Oman	Leafhopper	Expected
1787	Arthropoda	Insecta	Homoptera	Cicadellidae	Aceratagallia	lyrata	(Baker)	Leafhopper	Expected
1788	Arthropoda	Insecta	Homoptera	Cicadellidae	Aceratagallia	nanella	Oman	Leafhopper	Expected
1789	Arthropoda	Insecta	Homoptera	Cicadellidae	Aceratagallia	uhleri	(Van Duzee)	Leafhopper	Expected
1790	Arthropoda	Insecta	Homoptera	Cicadellidae	Acinopterus	viridis	Ball	Leafhopper	Expected
1791	Arthropoda	Insecta	Homoptera	Cicadellidae	Amblysellus	grex	Oman	Leafhopper	Expected
1792	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	arcana	Ball and Beamer	Leafhopper	Expected
1793	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	blanda	Ball and Beamer	Leafhopper	Expected

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1794	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	concava	Ball and Beamer	Leafhopper	Expected
1795	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	ladella	Johnson	Leafhopper	Expected
1796	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	nigriventralis	Ball and Beamer	Leafhopper	Expected
1797	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	occidentalis	Baker	Leafhopper	Expected
1798	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	sp. nr. vana		Leafhopper	Expected
1799	Arthropoda	Insecta	Homoptera	Cicadellidae	Athysanella	unicincta	Ball and Beamer	Leafhopper	Expected
1800	Arthropoda	Insecta	Homoptera	Cicadellidae	Balclutha	neglecta	(DeLong and Davidson)	Leafhopper	Expected
1801	Arthropoda	Insecta	Homoptera	Cicadellidae	Ceratagallia	bigeloviae	(Baker)	Leafhopper	Expected
1802	Arthropoda	Insecta	Homoptera	Cicadellidae	Ceratagallia	nanella	(Oman)	Leafhopper	Expected
1803	Arthropoda	Insecta	Homoptera	Cicadellidae	Chlorotettix	lucidus	Baker	Leafhopper	Expected
1804	Arthropoda	Insecta	Homoptera	Cicadellidae	Circulifer	tenellus	(Baker)	Beet leafhopper	Expected
1805	Arthropoda	Insecta	Homoptera	Cicadellidae	Cuerna	arida	Osborn and Ball	Leafhopper	Expected
1806	Arthropoda	Insecta	Homoptera	Cicadellidae	Deltazotus	obesus	(Osborn and Ball)	Leafhopper	Expected
1807	Arthropoda	Insecta	Homoptera	Cicadellidae	Deltocephalus	sonorus	Ball	Leafhopper	Expected
1808	Arthropoda	Insecta	Homoptera	Cicadellidae	Dikrella	cockerelli	(Gillette)	Leafhopper	Expected
1809	Arthropoda	Insecta	Homoptera	Cicadellidae	Doleranus	lucidus	(Baker)	Leafhopper	Expected
1810	Arthropoda	Insecta	Homoptera	Cicadellidae	Draeculacephala	portola	(Ball)	Leafhopper	Expected
1811	Arthropoda	Insecta	Homoptera	Cicadellidae	Draeculocephala	minerva	Ball	Grass sharpshooter	Expected
1812	Arthropoda	Insecta	Homoptera	Cicadellidae	Draeculocephala	noveboracensis	(Fitch)	Leafhopper	Expected
1813	Arthropoda	Insecta	Homoptera	Cicadellidae	Driotura	gammaroides (nr.)	(Van Duzee)	Leafhopper	Expected
1814	Arthropoda	Insecta	Homoptera	Cicadellidae	Driotura	vitatta	Ball	Leafhopper	Expected
1815	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	abrupta	DeLong	Leafhopper	Expected
1816	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	acantha	Davidson and DeLong	Leafhopper	Expected
1817	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	alboneura	Gillette	Leafhopper	Expected
1818	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	bidens	DeLong	Leafhopper	Expected
1819	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	bipunctata	(Oshanin)	Leafhopper	Expected
1820	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	calcara	DeLong	Leafhopper	Expected
1821	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	cerea	DeLong	Leafhopper	Expected
1822	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	cothurna	Davidson and DeLong	Leafhopper	Expected
1823	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	dilitara	DeLong and Davidson	Leafhopper	Expected
1824	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	fabae	Harris	Potato leafhopper	Expected
1825	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	mexicana	Gillette	Leafhopper	Expected
1826	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	neaspersa	Oman and Wheeler	Leafhopper	Expected
1827	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	sativae	Poos	Leafhopper	Expected
1828	Arthropoda	Insecta	Homoptera	Cicadellidae	Empoasca	solana	DeLong	Southern garden leafhopper	Expected
1829	Arthropoda	Insecta	Homoptera	Cicadellidae	Erythroneura	coloradensis	(Gillette)	Leafhopper	Expected
1830	Arthropoda	Insecta	Homoptera	Cicadellidae	Erythroneura	comes	(Say)	Leafhopper	Expected
1831	Arthropoda	Insecta	Homoptera	Cicadellidae	Exitianus	exitiosus	(Uhler)	Gray lawn leafhopper	Expected
1832	Arthropoda	Insecta	Homoptera	Cicadellidae	Exitianus	obscurinervis	(Stal)	Leafhopper	Expected
1833	Arthropoda	Insecta	Homoptera	Cicadellidae	Flexamia	arizonensis	Young and Bierne	Leafhopper	Expected
1834	Arthropoda	Insecta	Homoptera	Cicadellidae	Flexamia	zacate	Whitcomb and Hicks	Leafhopper	Expected
1835	Arthropoda	Insecta	Homoptera	Cicadellidae	Gillettiella	labiata	(Gillette)	Leafhopper	Expected
1836	Arthropoda	Insecta	Homoptera	Cicadellidae	Gypona	melanota	Spangb.	Leafhopper	Expected
1837	Arthropoda	Insecta	Homoptera	Cicadellidae	Gyponana	delta	Ball	Leafhopper	Expected
1838	Arthropoda	Insecta	Homoptera	Cicadellidae	Hamana	dictatoria	(Gibson)	Leafhopper	Expected
1839	Arthropoda	Insecta	Homoptera	Cicadellidae	Hecullus	bracteatus	(Ball)	Leafhopper	Expected

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1840	Arthropoda	Insecta	Homoptera	Cicadellidae	Idiocerus	alternatus	Fitch		Leafhopper	Expected
1841	Arthropoda	Insecta	Homoptera	Cicadellidae	Laevicephalus	aridus	Oman		Leafhopper	Expected
1842	Arthropoda	Insecta	Homoptera	Cicadellidae	Laevicephalus	convergens	(DeLong)		Leafhopper	Expected
1843	Arthropoda	Insecta	Homoptera	Cicadellidae	Lonatura	salsura	Ball		Leafhopper	Expected
1844	Arthropoda	Insecta	Homoptera	Cicadellidae	Macropsis	gerhardi	Breakey		Leafhopper	Expected
1845	Arthropoda	Insecta	Homoptera	Cicadellidae	Macropsis	trivialis	Ball		Leafhopper	Expected
1846	Arthropoda	Insecta	Homoptera	Cicadellidae	Macrosteles	divisus	(Uhler)		Leafhopper	Expected
1847	Arthropoda	Insecta	Homoptera	Cicadellidae	Macrosteles	major	(Dorst)		Leafhopper	Expected
1848	Arthropoda	Insecta	Homoptera	Cicadellidae	Macrosteles	sexnotata	Fallen		Leafhopper	Expected
1849	Arthropoda	Insecta	Homoptera	Cicadellidae	Mesamia	coloradensis	Gill and Baker		Leafhopper	Expected
1850	Arthropoda	Insecta	Homoptera	Cicadellidae	Neokolla	gothica	(Signoret)		Leafhopper	Expected
1851	Arthropoda	Insecta	Homoptera	Cicadellidae	Neokolla	hieroglyphica	(Say)		Leafhopper	Expected
1852	Arthropoda	Insecta	Homoptera	Cicadellidae	Norvellina	pulchella	(Baker)		Leafhopper	Expected
1853	Arthropoda	Insecta	Homoptera	Cicadellidae	Norvellina	scitula	(Ball)		Leafhopper	Expected
1854	Arthropoda	Insecta	Homoptera	Cicadellidae	Ollarianus	strictus	Ball		Leafhopper	Expected
1855	Arthropoda	Insecta	Homoptera	Cicadellidae	Oncometopia	alpha	Fowler		Leafhopper	Expected
1856	Arthropoda	Insecta	Homoptera	Cicadellidae	Opsius	stactogalus	(Fieber)		Tamarisk leafhopper	Expected
1857	Arthropoda	Insecta	Homoptera	Cicadellidae	Paraphlepsis	denudatus	(Ball)		Leafhopper	Expected
1858	Arthropoda	Insecta	Homoptera	Cicadellidae	Paraphlepsis	lascivius	(Ball)		Leafhopper	Expected
1859	Arthropoda	Insecta	Homoptera	Cicadellidae	Peconus	scriptanus	(Oman)		Leafhopper	Expected
1860	Arthropoda	Insecta	Homoptera	Cicadellidae	Polyamia	neoyavapai	Kramer		Leafhopper	Expected
1861	Arthropoda	Insecta	Homoptera	Cicadellidae	Polyamia	yavapai	(Tuthill)		Leafhopper	Expected
1862	Arthropoda	Insecta	Homoptera	Cicadellidae	Prairiana	subta	Baker		Leafhopper	Expected
1863	Arthropoda	Insecta	Homoptera	Cicadellidae	Rugosana	ramosa	(Kirkaldy)		Leafhopper	Expected
1864	Arthropoda	Insecta	Homoptera	Cicadellidae	Scaphytopius	frontalis	(E. P. Van Duzee)	frontalis	Leafhopper	Expected
1865	Arthropoda	Insecta	Homoptera	Cicadellidae	Scaphytopius	frontalis	(E. P. Van Duzee)	heldoranus	Leafhopper	Expected
1866	Arthropoda	Insecta	Homoptera	Cicadellidae	Scaphytopius	frontalis	(E. P. Van Duzee)	nigricollis	Leafhopper	Expected
1867	Arthropoda	Insecta	Homoptera	Cicadellidae	Spathanus	acuminatus	(Baker)		Leafhopper	Expected
1868	Arthropoda	Insecta	Homoptera	Cicadellidae	Stragania	bisignata	Ball		Leafhopper	Expected
1869	Arthropoda	Insecta	Homoptera	Cicadellidae	Stragania	robusta	(Uhler)		Robust leafhopper	Expected
1870	Arthropoda	Insecta	Homoptera	Cicadellidae	Texananus	latipex	DeLong		Leafhopper	Expected
1871	Arthropoda	Insecta	Homoptera	Cicadellidae	Texananus	vermiculatus	DeLong		Leafhopper	Expected
1872	Arthropoda	Insecta	Homoptera	Cicadellidae	Xerophloea	peltata	(Uhler)		Leafhopper	Expected
1873	Arthropoda	Insecta	Homoptera	Cicadellidae	Xerophloea	viridis	(Fabricius)		Leafhopper	Expected
1874	Arthropoda	Insecta	Homoptera	Cicadidae	Beameria	venosa	(Uhler)		Grass cicada	Expected
1875	Arthropoda	Insecta	Homoptera	Cicadidae	Beameria	wheeleri	Davis		Cicada	Expected
1876	Arthropoda	Insecta	Homoptera	Cicadidae	Cacama	valvata	Uhler		Cicada	Expected
1877	Arthropoda	Insecta	Homoptera	Cicadidae	Diceroprocta	eurygraphica	(Davis)		Cicada	Expected
1878	Arthropoda	Insecta	Homoptera	Cicadidae	Diceroprocta	viripennis	(Say)		Cicada	Expected
1879	Arthropoda	Insecta	Homoptera	Cicadidae	Okanaga	rimosa	(Say)		Cicada	Expected
1880	Arthropoda	Insecta	Homoptera	Cicadidae	Platypedia	putnami	Uhler		Cicada	Expected
1881	Arthropoda	Insecta	Homoptera	Cicadidae	Tibicen	bifida	(Davis)		Cicada	Expected
1882	Arthropoda	Insecta	Homoptera	Cicadidae	Tibicen	dealbata	(Davis)		Cicada	Expected
1883	Arthropoda	Insecta	Homoptera	Cicadidae	Tibicen	dorsata	(Say)		Cicada	Expected
1884	Arthropoda	Insecta	Homoptera	Cicadidae	Tibicen	townsendi	(Uhler)		Cicada	Expected
1885	Arthropoda	Insecta	Homoptera	Cixiidae	Cixius	stigmatus	(Say)		Cixiid Planthopper	Expected

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1886	Arthropoda	Insecta	Homoptera	Cixiidae	Ocleus	campestris	Ball	Cixiid Planthopper	Expected
1887	Arthropoda	Insecta	Homoptera	Cixiidae	Ocleus	excavatus	Ball	Cixiid Planthopper	Expected
1888	Arthropoda	Insecta	Homoptera	Cixiidae	Ocleus	monilipennis	Van Duzee	Cixiid Planthopper	Expected
1889	Arthropoda	Insecta	Homoptera	Cixiidae	Ocleus	nolinus	Ball and Kramer	Cixiid Planthopper	Expected
1890	Arthropoda	Insecta	Homoptera	Cixiidae	Ocleus	productus	Metcalf	Cixiid Planthopper	Expected
1891	Arthropoda	Insecta	Homoptera	Cixiidae	Oliarus	aridis	Ball	Cixiid Planthopper	Expected
1892	Arthropoda	Insecta	Homoptera	Cixiidae	Oliarus	pygmaeus	Ball	Cixiid Planthopper	Expected
1893	Arthropoda	Insecta	Homoptera	Cixiidae	Oliarus	zyxus	Caldwell	Cixiid Planthopper	Expected
1894	Arthropoda	Insecta	Homoptera	Coccidae	Ceroplastes	irregularis	Cockerell	Soft Scale Insect	Expected
1895	Arthropoda	Insecta	Homoptera	Coccidae	Coccus	hesperidium	(Linnaeus)	Brown soft scale	Expected
1896	Arthropoda	Insecta	Homoptera	Coccidae	Lecanium	imbricatum	Cockerell	Soft Scale Insect	Expected
1897	Arthropoda	Insecta	Homoptera	Coccidae	Lichtensia	lycii	Cockerell	Soft Scale Insect	Expected
1898	Arthropoda	Insecta	Homoptera	Coccidae	Neopulvinaria	innumerabilis	(Rathvon)	Cottony maple scale	Expected
1899	Arthropoda	Insecta	Homoptera	Coccidae	Parthenolecanium	corni (nr.)	(Bouche)	European fruit lecanium	Expected
1900	Arthropoda	Insecta	Homoptera	Coccidae	Parthenolecanium	persicae (nr.)	(Fabricius)	European peach scale	Expected
1901	Arthropoda	Insecta	Homoptera	Coccidae	Parthenolecanium	pruinosum	(Coquillett)	Soft Scale Insect	Expected
1902	Arthropoda	Insecta	Homoptera	Coccidae	Parthenolecanium	quercifex	(Fitch)	Oak lecanium	Expected
1903	Arthropoda	Insecta	Homoptera	Coccidae	Saisseta	coffeae	(Walker)	Hemispherical scale	Expected
1904	Arthropoda	Insecta	Homoptera	Coccidae	Saisseta	oleae	(Olivier)	Black scale	Expected
1905	Arthropoda	Insecta	Homoptera	Coccidae	Toumeyella	mirabilis	(Cockerell)	Soft Scale Insect	Expected
1906	Arthropoda	Insecta	Homoptera	Coccidae	Toumeyella	quadrifasciatum	(Cockerell)	Soft Scale Insect	Expected
1907	Arthropoda	Insecta	Homoptera	Dactylopiidae	Dactylopius	confusus	Cockerell	Cochineal Insect	Expected
1908	Arthropoda	Insecta	Homoptera	Dactylopiidae	Dactylopius	tomentosus	(Lamarck)	Cochineal Insect	Expected
1909	Arthropoda	Insecta	Homoptera	Dactylopiidae	Gymnococcus	adoxus	Ferris	Cochineal Insect	Expected
1910	Arthropoda	Insecta	Homoptera	Dactylopiidae	Gymnococcus	agavium	Douglas	Cochineal Insect	Expected
1911	Arthropoda	Insecta	Homoptera	Dactylopiidae	Gymnococcus	ruber	(Parrott and Cockerell)	Cochineal Insect	Expected
1912	Arthropoda	Insecta	Homoptera	Dactylopiidae	Gymnococcus	yuccae	(Ferris)	Cochineal Insect	Expected
1913	Arthropoda	Insecta	Homoptera	Dactylopiidae	Onceropyga	neglecta	(Cockerell)	Cochineal Insect	Expected
1914	Arthropoda	Insecta	Homoptera	Delphacidae	Delphacodes	muirella	Crawford	Delphacid Planthopper	Expected
1915	Arthropoda	Insecta	Homoptera	Delphacidae	Delphacodes	pacificus	(Crawford)	Delphacid Planthopper	Expected
1916	Arthropoda	Insecta	Homoptera	Delphacidae	Pentagramma	vittatifrons	(Uhler)	Delphacid Planthopper	Expected
1917	Arthropoda	Insecta	Homoptera	Delphacidae	Pissonotus	albovenosus	Osborn	Delphacid Planthopper	Expected
1918	Arthropoda	Insecta	Homoptera	Diaspididae	Abgrallopsis	coloratus	(Cockerell)	Armored Scale Insect	Expected
1919	Arthropoda	Insecta	Homoptera	Diaspididae	Aonidomytilus	concolor	(Cockerell)	Concolor scale	Expected
1920	Arthropoda	Insecta	Homoptera	Diaspididae	Chionaspis	gilli	Liu and Kosztarab	Armored Scale Insect	Expected
1921	Arthropoda	Insecta	Homoptera	Diaspididae	Chionaspis	pinifoliae	(Fitch)	Pine needle scale	Expected
1922	Arthropoda	Insecta	Homoptera	Diaspididae	Chortinaspis	frankliniana	Ferris	Armored Scale Insect	Expected
1923	Arthropoda	Insecta	Homoptera	Diaspididae	Chortinaspis	graminella	(Cockerell)	Armored Scale Insect	Expected
1924	Arthropoda	Insecta	Homoptera	Diaspididae	Chrysomphalus	aonidum	(Linnaeus)	Florida red scale	Expected
1925	Arthropoda	Insecta	Homoptera	Diaspididae	Clavaspis	coursetiae	(Marlatt)	Armored Scale Insect	Expected
1926	Arthropoda	Insecta	Homoptera	Diaspididae	Clavaspis	subsimilis	(Cockerell)	Armored Scale Insect	Expected
1927	Arthropoda	Insecta	Homoptera	Diaspididae	Diaspidiotus	bumeliae	Ferris	Conifer scale	Expected
1928	Arthropoda	Insecta	Homoptera	Diaspididae	Diaspidiotus	osborni	(Newell and Cockerell)	Armored Scale Insect	Expected
1929	Arthropoda	Insecta	Homoptera	Diaspididae	Diaspis	echinocacti	(Bouche)	Cactus scale	Expected
1930	Arthropoda	Insecta	Homoptera	Diaspididae	Diaspis	toumeyi	Cockerell	Armored Scale Insect	Expected
1931	Arthropoda	Insecta	Homoptera	Diaspididae	Hemiberlesia	colorata	(Cockerell)	Armored Scale Insect	Expected

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1932	Arthropoda	Insecta	Homoptera	Diaspididae	Hemiberlesia	populorum	Marlatt	Armored Scale Insect	Expected
1933	Arthropoda	Insecta	Homoptera	Diaspididae	Melanaspis	deliquescens	Ferris	Armored Scale Insect	Expected
1934	Arthropoda	Insecta	Homoptera	Diaspididae	Melanaspis	lilacina	(Cockerell)	Dark oak scale	Expected
1935	Arthropoda	Insecta	Homoptera	Diaspididae	Parlatoria	olaea	(Colvee)	Armored Scale Insect	Expected
1936	Arthropoda	Insecta	Homoptera	Diaspididae	Quadaspidiotus	juglansregiae	(Comstock)	Walnut scale	Expected
1937	Arthropoda	Insecta	Homoptera	Diaspididae	Rhizaspidiotus	dearnessi	(Cockerell)	Dearness scale	Expected
1938	Arthropoda	Insecta	Homoptera	Diaspididae	Situlaspis	yuccae	(Cockerell)	Armored Scale Insect	Expected
1939	Arthropoda	Insecta	Homoptera	Diaspididae	Targionia	yuccarum	(Cockerell)	Armored Scale Insect	Expected
1940	Arthropoda	Insecta	Homoptera	Dictyopharidae	Scolops	angustatus	Uhler	Dictyopharid Planthopper	Expected
1941	Arthropoda	Insecta	Homoptera	Eriococcidae	Apezococcus	idiastes	Ferris	Felt Scale	Expected
1942	Arthropoda	Insecta	Homoptera	Eriococcidae	Eriococcus	cryptus	Cockerell	Felt Scale	Expected
1943	Arthropoda	Insecta	Homoptera	Eriococcidae	Eriococcus	gallicolus	(Cockerell and Rohwer)	Felt Scale	Expected
1944	Arthropoda	Insecta	Homoptera	Eriococcidae	Eriococcus	larreae	Parrott and Cockerell	Felt Scale	Expected
1945	Arthropoda	Insecta	Homoptera	Eriococcidae	Eriococcus	plucheae	Ferris	Felt Scale	Expected
1946	Arthropoda	Insecta	Homoptera	Eriococcidae	Eriococcus	sidae	Ferris	Felt Scale	Expected
1947	Arthropoda	Insecta	Homoptera	Eriococcidae	Eriococcus	tinsleyi	Cockerell	Felt Scale	Expected
1948	Arthropoda	Insecta	Homoptera	Eriococcidae	Oregmopyga	neglectus	(Cockerell)	Felt Scale	Expected
1949	Arthropoda	Insecta	Homoptera	Flatidae	Flatoides	fuscus	Van Duzee	Flatid Planthoppers	Expected
1950	Arthropoda	Insecta	Homoptera	Flatidae	Mistharnophantia	sima	Doering	Flatid Planthoppers	Expected
1951	Arthropoda	Insecta	Homoptera	Flatidae	Ormensis	saucia	Van Duzee	Flatid Planthoppers	Expected
1952	Arthropoda	Insecta	Homoptera	Issidae	Hysteroptera	unum	Ball	Issid Planthoppers	Expected
1953	Arthropoda	Insecta	Homoptera	Kermesidae	Kermes	isileni	Baer and Kosztarab	Gall-like Scale Insect	Expected
1954	Arthropoda	Insecta	Homoptera	Margarodidae	Icerya	purchasi	Maskell	Ground Pearl	Expected
1955	Arthropoda	Insecta	Homoptera	Margarodidae	Icerya	rileyi	Cockerell	Ground Pearl	Expected
1956	Arthropoda	Insecta	Homoptera	Membracidae	Cyrtolobus	clarus	Woods	Treehopper	Expected
1957	Arthropoda	Insecta	Homoptera	Membracidae	Multareis	cornutus	Ball	Treehopper	Expected
1958	Arthropoda	Insecta	Homoptera	Membracidae	Multareoides	digitatus	(Van Duzee)	Treehopper	Expected
1959	Arthropoda	Insecta	Homoptera	Membracidae	Spissistilus	festinus	(Say)	Three-cornered alfalfa treeh	Expected
1960	Arthropoda	Insecta	Homoptera	Membracidae	Stictopelta	marmorata	Goding	Treehopper	Expected
1961	Arthropoda	Insecta	Homoptera	Membracidae	Tortisilus	inermis	(Fabricius)	Treehopper	Expected
1962	Arthropoda	Insecta	Homoptera	Phylloxeridae	Daktulosphaira	vitifoliae	(Fitch)	Grape phylloxera	Expected
1963	Arthropoda	Insecta	Homoptera	Phylloxeridae	Phylloxera	popularia	Pergande	Plant-parasitic Hemipterans	Expected
1964	Arthropoda	Insecta	Homoptera	Phylloxeridae	Pineus	coloradensis	(Gillette)	Plant-parasitic Hemipterans	Expected
1965	Arthropoda	Insecta	Homoptera	Pseudococcidae	Antonioides	parrotti	(Cockerell)	Mealybugs	Expected
1966	Arthropoda	Insecta	Homoptera	Pseudococcidae	Atonina	graminis	(Maskell)	Phodesgrass mealybug	Expected
1967	Arthropoda	Insecta	Homoptera	Pseudococcidae	Chorizococcus	neomexicanus	(Tinsley)	Mealybugs	Expected
1968	Arthropoda	Insecta	Homoptera	Pseudococcidae	Chorizococcus	rostellum	(Lobdell)	Mealybugs	Expected
1969	Arthropoda	Insecta	Homoptera	Pseudococcidae	Distichlicoccus	dasychloae	Ferris	Mealybugs	Expected
1970	Arthropoda	Insecta	Homoptera	Pseudococcidae	Ehrhornia	cupressi	(Ehrhorn)	Mealybugs	Expected
1971	Arthropoda	Insecta	Homoptera	Pseudococcidae	Eurycoccus	yuccae	Ferris	Mealybugs	Expected
1972	Arthropoda	Insecta	Homoptera	Pseudococcidae	Farinococcus	olivaceus	(Cockerell)	Mealybugs	Expected
1973	Arthropoda	Insecta	Homoptera	Pseudococcidae	Humococcus	atriplicis	Ferris	Mealybugs	Expected
1974	Arthropoda	Insecta	Homoptera	Pseudococcidae	Humococcus	hilariae	(Ferris)	Mealybugs	Expected
1975	Arthropoda	Insecta	Homoptera	Pseudococcidae	Paludicoccus	distichlium	(Kuwana)	Mealybugs	Expected
1976	Arthropoda	Insecta	Homoptera	Pseudococcidae	Paracoccus	townsendi	(Cockerell)	Mealybugs	Expected
1977	Arthropoda	Insecta	Homoptera	Pseudococcidae	Phenacoccus	helianthi	(Cockerell)	Mealybugs	Expected

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1978	Arthropoda	Insecta	Homoptera	Pseudococcidae	Phenacoccus	solani	Ferris	Mealybugs	Expected
1979	Arthropoda	Insecta	Homoptera	Pseudococcidae	Phenacoccus	solenopsis	Tinsley	Mealybugs	Expected
1980	Arthropoda	Insecta	Homoptera	Pseudococcidae	Planococcus	citri	Risso	Citrus mealybug	Expected
1981	Arthropoda	Insecta	Homoptera	Pseudococcidae	Spilococcus	atriplicis	(Cockerell	Mealybugs	Expected
1982	Arthropoda	Insecta	Homoptera	Pseudococcidae	Spilococcus	gutierreziae	(Cockerell)	Mealybugs	Expected
1983	Arthropoda	Insecta	Homoptera	Pseudococcidae	Spilococcus	neomexicanus	(Tinsley)	Mealybugs	Expected
1984	Arthropoda	Insecta	Homoptera	Pseudococcidae	Spilococcus	prosopidis	(Cockerell)	Mealybugs	Expected
1985	Arthropoda	Insecta	Homoptera	Pseudococcidae	Spilococcus	steelii	(Cockerell and Townsend)	Mealybugs	Expected
1986	Arthropoda	Insecta	Homoptera	Pseudococcidae	Spilococcus	townsendi	(Cockerell)	Mealybugs	Expected
1987	Arthropoda	Insecta	Homoptera	Psyllidae	Aphalara	gutierreziae	Klyver	Plant-parasitic Hemipterans	Expected
1988	Arthropoda	Insecta	Homoptera	Psyllidae	Aphalara	suadae	Crawford	Plant-parasitic Hemipterans	Expected
1989	Arthropoda	Insecta	Homoptera	Psyllidae	Aphalaroida	pithecolobia	Crawford	Plant-parasitic Hemipterans	Expected
1990	Arthropoda	Insecta	Homoptera	Psyllidae	Calophyla	dubia	Crawford	Plant-parasitic Hemipterans	Expected
1991	Arthropoda	Insecta	Homoptera	Psyllidae	Craspedolepta	gutierreziae	(Klyver)	Plant-parasitic Hemipterans	Expected
1992	Arthropoda	Insecta	Homoptera	Psyllidae	Heteropsylla	texana	Crawford	Plant-parasitic Hemipterans	Expected
1993	Arthropoda	Insecta	Homoptera	Psyllidae	Pachypsylla	pallida	Patch	Plant-parasitic Hemipterans	Expected
1994	Arthropoda	Insecta	Homoptera	Psyllidae	Rhinopsylla	dimorpha	Caldwell	Plant-parasitic Hemipterans	Expected
1995	Arthropoda	Insecta	Homoptera	Kerriidae	Tachardiella	glomerella	(Cockerell)	Lac Scale	Expected
1996	Arthropoda	Insecta	Homoptera	Kerriidae	Tachardiella	larreae	(Comstock)	Lac Scale	Expected
1997	Arthropoda	Insecta	Homoptera	Triozidae	Kuwayama	medicaginus	Crawford	Plant-parasitic Hemipterans	Expected
1998	Arthropoda	Insecta	Homoptera	Triozidae	Leuronota	maculata	(Crawford)	Plant-parasitic Hemipterans	Expected
1999	Arthropoda	Insecta	Homoptera	Triozidae	Paratrioza	cockerelli	Sulc	Tomato psyllid	Expected
2000	Arthropoda	Insecta	Homoptera	Triozidae	Trioza	albifrons	Crawford	Plant-parasitic Hemipterans	Expected
2001	Arthropoda	Insecta	Homoptera	Triozidae	Trioza	collaris	Crawford	Plant-parasitic Hemipterans	Expected
2002	Arthropoda	Insecta	Homoptera	Triozidae	Trioza	minuta	Crawford	Plant-parasitic Hemipterans	Expected
2003	Arthropoda	Insecta	Hymenoptera	Alloxystidae	Alloxysta	schlingeri	Andrews	Aphid Hyperparasitoid	Expected
2004	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	accepta	Viereck	Mining Bee	Expected
2005	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	alamonis	Viereck	Mining Bee	Expected
2006	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	aliciarum	Cockerell	Mining Bee	Expected
2007	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	andrenoides	(Cresson)	Mining Bee	Expected
2008	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	apacheorum	Cockerell	Mining Bee	Expected
2009	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	argemonis	Cockerell	Mining Bee	Expected
2010	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	canadensis	Dalla Torre	Mining Bee	Expected
2011	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	capricornis	Casad and Cockerell	Mining Bee	Expected
2012	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	casadae	Cockerell	Mining Bee	Expected
2013	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	cerasifolii	Cockerell	Mining Bee	Expected
2014	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	electrica	Casad and Cockerell	Mining Bee	Expected
2015	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	fracta	Casad and Cockerell	Mining Bee	Expected
2016	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	helianthi	Robertson	Mining Bee	Expected
2017	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	illinoiensis	Robertson	Mining Bee	Expected
2018	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	jessicae	Cockerell	Mining Bee	Expected
2019	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	macoupinensis	Robertson	Mining Bee	Expected
2020	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	mariae	Robertson	Mining Bee	Expected
2021	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	mellea	Cresson	Mining Bee	Expected
2022	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	mesillae	Cockerell	Mining Bee	Expected
2023	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	monilicornis	Cockerell	Mining Bee	Expected

2024	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	nigerrima	Casad		Mining Bee	Expected
2025	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	pecosana	Cockerell		Mining Bee	Expected
2026	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	pectidis	(Cockerell)		Mining Bee	Expected
2027	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	prima	Casad		Mining Bee	Expected
2028	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	primulifrons	Casad		Mining Bee	Expected
2029	Arthropoda	Insecta	Hymenoptera	Andrenidae	Andrena	prunorum	Cockerell		Mining Bee	Expected
2030	Arthropoda	Insecta	Hymenoptera	Andrenidae	Calliopsis	coloradensis	Cresson		Mining Bee	Expected
2031	Arthropoda	Insecta	Hymenoptera	Andrenidae	Calliopsis	coloratipes	Cockerell		Mining Bee	Expected
2032	Arthropoda	Insecta	Hymenoptera	Andrenidae	Calliopsis	hirsutifrons	Cockerell		Mining Bee	Expected
2033	Arthropoda	Insecta	Hymenoptera	Andrenidae	Calliopsis	hursutifrons	Cockerell		Mining Bee	Expected
2034	Arthropoda	Insecta	Hymenoptera	Andrenidae	Calliopsis	subalpinus	Cockerell		Mining Bee	Expected
2035	Arthropoda	Insecta	Hymenoptera	Andrenidae	Heterosarus	flavocinctus	(Cockerell)		Mining Bee	Expected
2036	Arthropoda	Insecta	Hymenoptera	Andrenidae	Heterosarus	parvus	(Robertson)		Mining Bee	Expected
2037	Arthropoda	Insecta	Hymenoptera	Andrenidae	Heterosarus	townsendi	(Cockerell)		Mining Bee	Expected
2038	Arthropoda	Insecta	Hymenoptera	Andrenidae	Hypomacrotera	subalpinus	(Cockerell)		Mining Bee	Expected
2039	Arthropoda	Insecta	Hymenoptera	Andrenidae	Nomadopsis	australior	(Cockerell)		Mining Bee	Expected
2040	Arthropoda	Insecta	Hymenoptera	Andrenidae	Nomadopsis	callosa	Timberlake		Mining Bee	Expected
2041	Arthropoda	Insecta	Hymenoptera	Andrenidae	Nomadopsis	helianthi	(Swenk and Cockerell)		Mining Bee	Expected
2042	Arthropoda	Insecta	Hymenoptera	Andrenidae	Nomadopsis	meliloti	(Cockerell)		Mining Bee	Expected
2043	Arthropoda	Insecta	Hymenoptera	Andrenidae	Nomadopsis	puellae	(Cockerell)		Mining Bee	Expected
2044	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	albipennis	Cresson	heliophila	Mining Bee	Expected
2045	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	albovitatta	Cockerell		Mining Bee	Expected
2046	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	ashmeadi	Cockerell	vierecki	Mining Bee	Expected
2047	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	asteris	Cockerell		Mining Bee	Expected
2048	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	austini	Cockerell		Mining Bee	Expected
2049	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	beata	Cockerell		Mining Bee	Expected
2050	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	bequaertiana	Cockerell		Mining Bee	Expected
2051	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	bigeloviae	Cockerell		Mining Bee	Expected
2052	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	biparticeps	Cockerell		Mining Bee	Expected
2053	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	bradleyana	Timberlake		Mining Bee	Expected
2054	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	callicerata	Cockerell		Mining Bee	Expected
2055	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	chamaeserache	Cockerell		Mining Bee	Expected
2056	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	chrysophila	Cockerell		Mining Bee	Expected
2057	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	cladothricis	Cockerell		Mining Bee	Expected
2058	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	claripennis	Timberlake		Mining Bee	Expected
2059	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	coahuilensis	Timberlake		Mining Bee	Expected
2060	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	confusa	Timberlake		Mining Bee	Expected
2061	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	crassula	Timberlake		Mining Bee	Expected
2062	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	crotonis	Cockerell		Mining Bee	Expected
2063	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	dalyi	Timberlake		Mining Bee	Expected
2064	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	dasylirii	Cockerell		Mining Bee	Expected
2065	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	difficilis	Timberlake		Mining Bee	Expected
2066	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	dispar	Timberlake		Mining Bee	Expected
2067	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	diversa	Timberlake		Mining Bee	Expected
2068	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	drymariae	Timberlake		Mining Bee	Expected
2069	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	exclamans	Cockerell		Mining Bee	Expected

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2070	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	fallax	Cockerell		Mining Bee	Expected
2071	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	geminata	Timberlake		Mining Bee	Expected
2072	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	grandiceps	Cockerell		Mining Bee	Expected
2073	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	gratiosa	Timberlake		Mining Bee	Expected
2074	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	gutierreziae	Cockerell		Mining Bee	Expected
2075	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	heliotropii	Cockerell		Mining Bee	Expected
2076	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	hirsuta	Cockerell		Mining Bee	Expected
2077	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	humilis	Timberlake		Mining Bee	Expected
2078	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	ignota	Cockerell		Mining Bee	Expected
2079	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	larreae	Cockerell		Mining Bee	Expected
2080	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	latior	Cockerell		Mining Bee	Expected
2081	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	lingualis	Cockerell		Mining Bee	Expected
2082	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	luciae	Cockerell		Mining Bee	Expected
2083	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	luteola	Cockerell		Mining Bee	Expected
2084	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	maculigera	Cockerell		Mining Bee	Expected
2085	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	maculipes	Cockerell		Mining Bee	Expected
2086	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	marcialis	Cockerell		Mining Bee	Expected
2087	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	martini	Cockerell		Mining Bee	Expected
2088	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	mentzeliae	Cockerell		Mining Bee	Expected
2089	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	mentzeliarum	Cockerell		Mining Bee	Expected
2090	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	mesillensis	Timberlake		Mining Bee	Expected
2091	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	nasuta	Timberlake	obscurescens	Mining Bee	Expected
2092	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	numerata	Cockerell		Mining Bee	Expected
2093	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	pectidis	Cockerell		Mining Bee	Expected
2094	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	perpulchra	Cockerell		Mining Bee	Expected
2095	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	phymatae	Cockerell		Mining Bee	Expected
2096	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	punctosignata	Cockerell		Mining Bee	Expected
2097	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	salicis	Cockerell		Mining Bee	Expected
2098	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	sejuncta	Timberlake		Mining Bee	Expected
2099	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	semicaerulea	Cockerell		Mining Bee	Expected
2100	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	semicrocea	Cockerell		Mining Bee	Expected
2101	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	senecionis	Cockerell		Mining Bee	Expected
2102	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	sidae	Cockerell		Mining Bee	Expected
2103	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	solitaria	Cockerell		Mining Bee	Expected
2104	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	sphaeralceae	Cockerell		Mining Bee	Expected
2105	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	stathamae	Timberlake		Mining Bee	Expected
2106	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	tarda	Cockerell		Mining Bee	Expected
2107	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	townsendi	Cockerell		Mining Bee	Expected
2108	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	triangulifera	Timberlake		Mining Bee	Expected
2109	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	trifasciata	Timberlake		Mining Bee	Expected
2110	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	valida	Timberlake		Mining Bee	Expected
2111	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	verbesinae	Cockerell		Mining Bee	Expected
2112	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	vidua	Timberlake		Mining Bee	Expected
2113	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	viridinotata	Timberlake		Mining Bee	Expected
2114	Arthropoda	Insecta	Hymenoptera	Andrenidae	Perdita	wootonae	Cockerell		Mining Bee	Expected
2115	Arthropoda	Insecta	Hymenoptera	Andrenidae	Protandrena	bancrofti	Dunning		Mining Bee	Expected

2116	Arthropoda	Insecta	Hymenoptera	Andrenidae	Protandrena	bicolor	(Timberlake)		Mining Bee	Expected
2117	Arthropoda	Insecta	Hymenoptera	Andrenidae	Protandrena	heteromorpha	(Cockerell)		Mining Bee	Expected
2118	Arthropoda	Insecta	Hymenoptera	Andrenidae	Protandrena	mexicanorum	(Cockerell)		Mining Bee	Expected
2119	Arthropoda	Insecta	Hymenoptera	Andrenidae	Pseudopanurgus	aethiops	(Cresson)		Mining Bee	Expected
2120	Arthropoda	Insecta	Hymenoptera	Andrenidae	Pseudopanurgus	fraterculus	Cockerell		Mining Bee	Expected
2121	Arthropoda	Insecta	Hymenoptera	Andrenidae	Pseudopanurgus	pectidellus	Cockerell		Mining Bee	Expected
2122	Arthropoda	Insecta	Hymenoptera	Andrenidae	Pseudopanurgus	pectiphilus	(Cockerell)		Mining Bee	Expected
2123	Arthropoda	Insecta	Hymenoptera	Andrenidae	Pterosarus	perlaevis	Cockerell		Mining Bee	Expected
2124	Arthropoda	Insecta	Hymenoptera	Andrenidae	Pterosarus	renimiculatus	(Cockerell)		Mining Bee	Expected
2125	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	affabilis	Cresson		Anthophorine Bee	Expected
2126	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	californica	Cresson	texana	Anthophorine Bee	Expected
2127	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	centriformis	Cresson	vierecki	Anthophorine Bee	Expected
2128	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	lesquerellae	(Cockerell)		Anthophorine Bee	Expected
2129	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	montana	Cresson		Anthophorine Bee	Expected
2130	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	occidentalis	Cresson		Anthophorine Bee	Expected
2131	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	phenax	(Cockerell)		Anthophorine Bee	Expected
2132	Arthropoda	Insecta	Hymenoptera	Apidae	Anthophora	vallorum	(Cockerell)		Anthophorine Bee	Expected
2133	Arthropoda	Insecta	Hymenoptera	Apidae	Centris	caesalspinae	Cockerell		Centridine Bee	Expected
2134	Arthropoda	Insecta	Hymenoptera	Apidae	Centris	hoffmanseggiae	Cockerell		Centridine Bee	Expected
2135	Arthropoda	Insecta	Hymenoptera	Apidae	Centris	lanosa	Cresson		Centridine Bee	Expected
2136	Arthropoda	Insecta	Hymenoptera	Apidae	Centris	rhodopus	Cockerell		Centridine Bee	Expected
2137	Arthropoda	Insecta	Hymenoptera	Apidae	Ceratina	melanoptera	Cockerell		Carpenter Bee	Expected
2138	Arthropoda	Insecta	Hymenoptera	Apidae	Ceratina	nanula	Cockerell		Carpenter Bee	Expected
2139	Arthropoda	Insecta	Hymenoptera	Apidae	Diadasia	ochracea	(Cockerell)		Centridine Bee	Expected
2140	Arthropoda	Insecta	Hymenoptera	Apidae	Diadasia	rinconis	Cockerell		Centridine Bee	Expected
2141	Arthropoda	Insecta	Hymenoptera	Apidae	Diadasia	sphaeralcearum	Cockerell		Centridine Bee	Expected
2142	Arthropoda	Insecta	Hymenoptera	Apidae	Habropoda	salivarum	(Cockerell)		Anthophorine Bee	Expected
2143	Arthropoda	Insecta	Hymenoptera	Apidae	Epeolus	crucis	Cockerell		Cuckoo Bee	Expected
2144	Arthropoda	Insecta	Hymenoptera	Apidae	Epeolus	mesillae	(Cockerell)		Cuckoo Bee	Expected
2145	Arthropoda	Insecta	Hymenoptera	Apidae	Ericrocis	lata	Cresson		Ericrocidine Bee	Expected
2146	Arthropoda	Insecta	Hymenoptera	Apidae	Exomalopsis	chlorina	Cockerell		Bee	Expected
2147	Arthropoda	Insecta	Hymenoptera	Apidae	Exomalopsis	compactula	(Cockerell)		Bee	Expected
2148	Arthropoda	Insecta	Hymenoptera	Apidae	Exomalopsis	sidae	Cockerell		Bee	Expected
2149	Arthropoda	Insecta	Hymenoptera	Apidae	Exomalopsis	solani	Cockerell		Bee	Expected
2150	Arthropoda	Insecta	Hymenoptera	Apidae	Exomalopsis	solidaginis	Cockerell		Bee	Expected
2151	Arthropoda	Insecta	Hymenoptera	Apidae	Holcopasites	stevensi	Crawford		Cuckoo Bee	Expected
2152	Arthropoda	Insecta	Hymenoptera	Apidae	Martinapis	luteicornis	(Cockerell)		Long-horned Bee	Expected
2153	Arthropoda	Insecta	Hymenoptera	Apidae	Melanomada	sidaefloris	(Cockerell)		Cleptoparasitic Bee	Expected
2154	Arthropoda	Insecta	Hymenoptera	Apidae	Melecta	alfredi	(Cockerell)		Bee	Expected
2155	Arthropoda	Insecta	Hymenoptera	Apidae	Melecta	pacifica	Cresson	fulvida	Bee	Expected
2156	Arthropoda	Insecta	Hymenoptera	Apidae	Melecta	separata	Cresson	alfredi	Bee	Expected
2157	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	agilis	Cresson		Long-horned Bee	Expected
2158	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	gilensis	Cockerell		Long-horned Bee	Expected
2159	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	humilior	Cockerell		Long-horned Bee	Expected
2160	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	montana	Cresson		Long-horned Bee	Expected
2161	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	paroselae	Cockerell		Long-horned Bee	Expected

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2162	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	petulca	(Cresson)	suffusa	Long-horned Bee	Expected
2163	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	subagilis	Cockerell		Long-horned Bee	Expected
2164	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	thelypodii	Cockerell		Long-horned Bee	Expected
2165	Arthropoda	Insecta	Hymenoptera	Apidae	Melissoides	tristis	Cockerell		Long-horned Bee	Expected
2166	Arthropoda	Insecta	Hymenoptera	Apidae	Neolarra	pruinosa	Ashmead		Cuckoo Bee	Expected
2167	Arthropoda	Insecta	Hymenoptera	Apidae	Neolarra	verbesinae	(Cockerell)		Cuckoo Bee	Expected
2168	Arthropoda	Insecta	Hymenoptera	Apidae	Neolarra	vigilans	(Cockerell)		Cuckoo Bee	Expected
2169	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	crucis	Cockerell		Cuckoo Bee	Expected
2170	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	gutierreziae	Cockerell		Cuckoo Bee	Expected
2171	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	lippiae	Cockerell		Cuckoo Bee	Expected
2172	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	lippiae	Cockerell	sublippiae	Cuckoo Bee	Expected
2173	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	martinella	Cockerell		Cuckoo Bee	Expected
2174	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	neomexicana	Cockerell		Cuckoo Bee	Expected
2175	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	sophiarum	Cockerell		Cuckoo Bee	Expected
2176	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	texana	Cresson		Cuckoo Bee	Expected
2177	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	vierecki	Cockerell		Cuckoo Bee	Expected
2178	Arthropoda	Insecta	Hymenoptera	Apidae	Nomada	wootonella	Cockerell		Cuckoo Bee	Expected
2179	Arthropoda	Insecta	Hymenoptera	Apidae	Peponapis	pruinosa	(Say)		Squash Bee	Expected
2180	Arthropoda	Insecta	Hymenoptera	Apidae	Svastra	comanche	(Cresson)		Long-horned Bee	Expected
2181	Arthropoda	Insecta	Hymenoptera	Apidae	Svastra	helianthelli	(Cockerell)		Long-horned Bee	Expected
2182	Arthropoda	Insecta	Hymenoptera	Apidae	Svastra	machaerantherae	(Cockerell)		Long-horned Bee	Expected
2183	Arthropoda	Insecta	Hymenoptera	Apidae	Svastra	obliqua	(Say)		Long-horned Bee	Expected
2184	Arthropoda	Insecta	Hymenoptera	Apidae	Synhalonia	lycii	Cockerell		Long-horned Bee	Expected
2185	Arthropoda	Insecta	Hymenoptera	Apidae	Triepiolus	helianthi	(Robertson)		Cuckoo Bee	Expected
2186	Arthropoda	Insecta	Hymenoptera	Apidae	Triepiolus	lunatus	(Say)		Cuckoo Bee	Expected
2187	Arthropoda	Insecta	Hymenoptera	Apidae	Triepiolus	mesillae	Cockerell		Cuckoo Bee	Expected
2188	Arthropoda	Insecta	Hymenoptera	Apidae	Triepiolus	norae	Cockerell		Cuckoo Bee	Expected
2189	Arthropoda	Insecta	Hymenoptera	Apidae	Triepiolus	texanus	(Cresson)	nigripes	Cuckoo Bee	Expected
2190	Arthropoda	Insecta	Hymenoptera	Apidae	Triepiolus	townsendi	Cockerell		Cuckoo Bee	Expected
2191	Arthropoda	Insecta	Hymenoptera	Apidae	Triopasites	penniger	Cockerell		Bee	Expected
2192	Arthropoda	Insecta	Hymenoptera	Apidae	Xenoglossa	patricia	Cockerell		Large Squash Bee	Expected
2193	Arthropoda	Insecta	Hymenoptera	Apidae	Xenoglossa	strenua	Cresson		Large Squash Bee	Expected
2194	Arthropoda	Insecta	Hymenoptera	Apidae	Xenoglossodes	eriocarpi	(Cockerell)		Bee	Expected
2195	Arthropoda	Insecta	Hymenoptera	Apidae	Xenoglossodes	gutierreziae	Cockerell		Bee	Expected
2196	Arthropoda	Insecta	Hymenoptera	Apidae	Xenoglossodes	lippiae	(Cockerell)		Bee	Expected
2197	Arthropoda	Insecta	Hymenoptera	Apidae	Xeromelecta	larreae	(Cockerell)		Bee	Expected
2198	Arthropoda	Insecta	Hymenoptera	Apidae	Xylocopa	californica	Cresson	arizonensis	Large Carpenter Bee	Expected
2199	Arthropoda	Insecta	Hymenoptera	Apidae	Xylocopa	varipuncta	Patton		Large Carpenter Bee	Expected
2200	Arthropoda	Insecta	Hymenoptera	Apidae	Zacosmia	maculata	(Cresson)		Bee	Expected
2201	Arthropoda	Insecta	Hymenoptera	Braconidae	Aphidius	ervi	Haliday		Braconid Wasp	Expected
2202	Arthropoda	Insecta	Hymenoptera	Braconidae	Trioxys	complanatus	Quilis		Wasp	Expected
2203	Arthropoda	Insecta	Hymenoptera	Braconidae	Trioxys	gahani	Smith		Wasp	Expected
2204	Arthropoda	Insecta	Hymenoptera	Apidae	Apis	mellifera	Linneaus		Honey bee	Expected
2205	Arthropoda	Insecta	Hymenoptera	Apidae	Bombus	fraternus	Smith		Southern Plains Bumble Bee	Expected
2206	Arthropoda	Insecta	Hymenoptera	Apidae	Bombus	morrisoni	Cresson		Morrison's Bubble Bee	Expected
2207	Arthropoda	Insecta	Hymenoptera	Apidae	Bombus	pennsylvanicus	(Degeer)	sonorus	American Bumble Bee	Expected

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2208	Arthropoda	Insecta	Hymenoptera	Argidae	Ptenus	magnus	Smith	Argid Sawflies	Expected
2209	Arthropoda	Insecta	Hymenoptera	Argidae	Sphacophilus	argutus	D. R. Smith	Argid Sawflies	Expected
2210	Arthropoda	Insecta	Hymenoptera	Argidae	Sphacophilus	quixus	D. R. Smith	Argid Sawflies	Expected
2211	Arthropoda	Insecta	Hymenoptera	Cabronidae	Astata	bakeri	Parker	Mud Daubers	Expected
2212	Arthropoda	Insecta	Hymenoptera	Cabronidae	Astata	bechteli	Parker	Mud Daubers	Expected
2213	Arthropoda	Insecta	Hymenoptera	Cabronidae	Astata	leuthstromi	Ashmead	Mud Daubers	Expected
2214	Arthropoda	Insecta	Hymenoptera	Cabronidae	Diploplectron	ferrugineum	Ashmead	Mud Daubers	Expected
2215	Arthropoda	Insecta	Hymenoptera	Cabronidae	Diploplectron	kantsi	Pate	Mud Daubers	Expected
2216	Arthropoda	Insecta	Hymenoptera	Cabronidae	Diploplectron	vierecki	Pate	Mud Daubers	Expected
2217	Arthropoda	Insecta	Hymenoptera	Cabronidae	Dryudella	caerula	(Cresson)	Mud Daubers	Expected
2218	Arthropoda	Insecta	Hymenoptera	Cabronidae	Dryudella	immigrans	(Williams)	Mud Daubers	Expected
2219	Arthropoda	Insecta	Hymenoptera	Bethylidae	Epyris	carniceps	Evans	Bethylid Wasp	Expected
2220	Arthropoda	Insecta	Hymenoptera	Bethylidae	Epyris	clarimontis	Kieffer	Bethylid Wasp	Expected
2221	Arthropoda	Insecta	Hymenoptera	Bethylidae	Epyris	cochise	Evans	Bethylid Wasp	Expected
2222	Arthropoda	Insecta	Hymenoptera	Bethylidae	Epyris	erigoni	Kieffer	Bethylid Wasp	Expected
2223	Arthropoda	Insecta	Hymenoptera	Bethylidae	Epyris	rufipes	(Say)	Bethylid Wasp	Expected
2224	Arthropoda	Insecta	Hymenoptera	Bethylidae	Epyris	sculleni	Evans	Bethylid Wasp	Expected
2225	Arthropoda	Insecta	Hymenoptera	Bethylidae	Goniozus	fratellus	Evans	Bethylid Wasp	Expected
2226	Arthropoda	Insecta	Hymenoptera	Bethylidae	Goniozus	gracilicornis	(Kieffer)	Bethylid Wasp	Expected
2227	Arthropoda	Insecta	Hymenoptera	Bethylidae	Goniozus	orbitalis	Evans	Bethylid Wasp	Expected
2228	Arthropoda	Insecta	Hymenoptera	Bethylidae	Parasierola	breviceps	(Krombein)	Bethylid Wasp	Expected
2229	Arthropoda	Insecta	Hymenoptera	Bethylidae	Parasierola	punctaticeps	Kieffer	Bethylid Wasp	Expected
2230	Arthropoda	Insecta	Hymenoptera	Bethylidae	Pristocera	cockerelli	Evans	Bethylid Wasp	Expected
2231	Arthropoda	Insecta	Hymenoptera	Bethylidae	Pseudisobrachus	matthewsi	Evans	Bethylid Wasp	Expected
2232	Arthropoda	Insecta	Hymenoptera	Braconidae	Agathis	acrobasidis	(Cushman)	Braconid Wasp	Expected
2233	Arthropoda	Insecta	Hymenoptera	Braconidae	Aleiodes	graphicus	(Cresson)	Braconid Wasp	Expected
2234	Arthropoda	Insecta	Hymenoptera	Braconidae	Aleiodes	laphygmae	(Viereck)	Braconid Wasp	Expected
2235	Arthropoda	Insecta	Hymenoptera	Braconidae	Aleiodes	perplexa	(Gahan)	Braconid Wasp	Expected
2236	Arthropoda	Insecta	Hymenoptera	Braconidae	Alysiasta	caltageronei	Wharton	Braconid Wasp	Expected
2237	Arthropoda	Insecta	Hymenoptera	Braconidae	Apantales	flaviconchae	Riley	Braconid Wasp	Expected
2238	Arthropoda	Insecta	Hymenoptera	Braconidae	Apantales	glomeratus	(Linnaeus)	Braconid Wasp	Expected
2239	Arthropoda	Insecta	Hymenoptera	Braconidae	Apantales	hyphantriae	Riley	Braconid Wasp	Expected
2240	Arthropoda	Insecta	Hymenoptera	Braconidae	Apantales	marginiventris	(Cresson)	Braconid Wasp	Expected
2241	Arthropoda	Insecta	Hymenoptera	Braconidae	Apantales	militaris	(Walsh)	Braconid Wasp	Expected
2242	Arthropoda	Insecta	Hymenoptera	Braconidae	Bracon	gelechiae	Ashmead	Braconid Wasp	Expected
2243	Arthropoda	Insecta	Hymenoptera	Braconidae	Bracon	mellitor	Say	Braconid Wasp	Expected
2244	Arthropoda	Insecta	Hymenoptera	Braconidae	Bracon	nuperus	(Cresson)	Braconid Wasp	Expected
2245	Arthropoda	Insecta	Hymenoptera	Braconidae	Bracon	platynotae	Cushman	Braconid Wasp	Expected
2246	Arthropoda	Insecta	Hymenoptera	Braconidae	Chelonus	cautus	Cresson	Braconid Wasp	Expected
2247	Arthropoda	Insecta	Hymenoptera	Braconidae	Chelonus	insularis	Cresson	Braconid Wasp	Expected
2248	Arthropoda	Insecta	Hymenoptera	Braconidae	Chelonus	minimus	Cresson	Braconid Wasp	Expected
2249	Arthropoda	Insecta	Hymenoptera	Braconidae	Crassomicrodus	fulvescens	(Cresson)	Braconid Wasp	Expected
2250	Arthropoda	Insecta	Hymenoptera	Braconidae	Cremnops	haematodes	(Brulle)	Braconid Wasp	Expected
2251	Arthropoda	Insecta	Hymenoptera	Braconidae	Meteorus	autographae	Muesebeck	Braconid Wasp	Expected
2252	Arthropoda	Insecta	Hymenoptera	Braconidae	Meteorus	campestris	Viereck	Braconid Wasp	Expected
2253	Arthropoda	Insecta	Hymenoptera	Braconidae	Meteorus	hyphantriae	Rileu	Braconid Wasp	Expected

2254	Arthropoda	Insecta	Hymenoptera	Braconidae	Meteorus	leviventris	(Wasmael)	Braconid Wasp	Expected
2255	Arthropoda	Insecta	Hymenoptera	Braconidae	Meteorus	rubens	(Nees)	Braconid Wasp	Expected
2256	Arthropoda	Insecta	Hymenoptera	Braconidae	Microplitis	autographae	Meusebeck	Braconid Wasp	Expected
2257	Arthropoda	Insecta	Hymenoptera	Braconidae	Microplitis	brassicae	Muesebeck	Braconid Wasp	Expected
2258	Arthropoda	Insecta	Hymenoptera	Braconidae	Microplitis	croceipes	(Cresson)	Braconid Wasp	Expected
2259	Arthropoda	Insecta	Hymenoptera	Braconidae	Opius	dimidiatus	(Ashmead)	Braconid Wasp	Expected
2260	Arthropoda	Insecta	Hymenoptera	Braconidae	Orgilus	medicaginis	Muesebeck	Braconid Wasp	Expected
2261	Arthropoda	Insecta	Hymenoptera	Braconidae	Perilitus	coccinellae	(Schrank)	Braconid Wasp	Expected
2262	Arthropoda	Insecta	Hymenoptera	Braconidae	Wesmaelia	pendula	Foerster	Braconid Wasp	Expected
2263	Arthropoda	Insecta	Hymenoptera	Chalcididae	Brachymeria	ovata	(Say)	Chalcid Wasp	Expected
2264	Arthropoda	Insecta	Hymenoptera	Chrysididae	Argochrysis	excelsior	Bohart	Cuckoo Wasp	Expected
2265	Arthropoda	Insecta	Hymenoptera	Chrysididae	Argochrysis	mesillae	(Cockerell)	Cuckoo Wasp	Expected
2266	Arthropoda	Insecta	Hymenoptera	Chrysididae	Argochrysis	trochilius	(Buysson)	Cuckoo Wasp	Expected
2267	Arthropoda	Insecta	Hymenoptera	Chrysididae	Ceratochrysis	crossata	Bohart	Cuckoo Wasp	Expected
2268	Arthropoda	Insecta	Hymenoptera	Chrysididae	Ceratochrysis	enhuyki	(Cooper)	Cuckoo Wasp	Expected
2269	Arthropoda	Insecta	Hymenoptera	Chrysididae	Ceratochrysis	faceta	(Aaron)	Cuckoo Wasp	Expected
2270	Arthropoda	Insecta	Hymenoptera	Chrysididae	Ceratochrysis	nearctica	(Mocsary)	Cuckoo Wasp	Expected
2271	Arthropoda	Insecta	Hymenoptera	Chrysididae	Ceratochrysis	perpulchrea	(Cresson)	Cuckoo Wasp	Expected
2272	Arthropoda	Insecta	Hymenoptera	Chrysididae	Ceratochrysis	trachypleura	Bohart	Cuckoo Wasp	Expected
2273	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	antennalis	Mocsary	Cuckoo Wasp	Expected
2274	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	arizonica	Bohart	Cuckoo Wasp	Expected
2275	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	callosella	Bohart	Cuckoo Wasp	Expected
2276	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	dugesi	Buysson	Cuckoo Wasp	Expected
2277	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	nitidula	Fabricius	Cuckoo Wasp	Expected
2278	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	oraria	Bohart	Cuckoo Wasp	Expected
2279	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	serrata	Taylor	Cuckoo Wasp	Expected
2280	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	tenuicornis	Taylor	Cuckoo Wasp	Expected
2281	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	tripartita	Aaron	Cuckoo Wasp	Expected
2282	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	venusta	Cresson	Cuckoo Wasp	Expected
2283	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysis	wasbaueri	Bohart	Cuckoo Wasp	Expected
2284	Arthropoda	Insecta	Hymenoptera	Chrysididae	Chrysurissa	densa	(Cresson)	Cuckoo Wasp	Expected
2285	Arthropoda	Insecta	Hymenoptera	Chrysididae	Elampus	hyalinus	(Aaron)	Cuckoo Wasp	Expected
2286	Arthropoda	Insecta	Hymenoptera	Chrysididae	Elampus	marginatus	Patton	Cuckoo Wasp	Expected
2287	Arthropoda	Insecta	Hymenoptera	Chrysididae	Elampus	nitidus	(Aaron)	Cuckoo Wasp	Expected
2288	Arthropoda	Insecta	Hymenoptera	Chrysididae	Hedychridium	amabile	Cockerell	Cuckoo Wasp	Expected
2289	Arthropoda	Insecta	Hymenoptera	Chrysididae	Hedychridium	crebrum	Kimsey	Cuckoo Wasp	Expected
2290	Arthropoda	Insecta	Hymenoptera	Chrysididae	Hedychridium	dimidiatum	(Say)	Cuckoo Wasp	Expected
2291	Arthropoda	Insecta	Hymenoptera	Chrysididae	Hedychridium	semirufum	(Cockerell)	Cuckoo Wasp	Expected
2292	Arthropoda	Insecta	Hymenoptera	Chrysididae	Hedychridium	solierellae	Bohart and Brumley	Cuckoo Wasp	Expected
2293	Arthropoda	Insecta	Hymenoptera	Chrysididae	Holopyga	hora	Aaron	Cuckoo Wasp	Expected
2294	Arthropoda	Insecta	Hymenoptera	Chrysididae	Holopyga	rudis	Kimsey	Cuckoo Wasp	Expected
2295	Arthropoda	Insecta	Hymenoptera	Chrysididae	Holopyga	saphirina	Buysson	Cuckoo Wasp	Expected
2296	Arthropoda	Insecta	Hymenoptera	Chrysididae	Holopyga	ventralis	(Say)	Cuckoo Wasp	Expected
2297	Arthropoda	Insecta	Hymenoptera	Chrysididae	Meusbeckidium	occidentale	Krombein	Cuckoo Wasp	Expected
2298	Arthropoda	Insecta	Hymenoptera	Chrysididae	Omalus	butleri	Bohart and Campos	Cuckoo Wasp	Expected
2299	Arthropoda	Insecta	Hymenoptera	Chrysididae	Omalus	telfordi	Bohart and Campos	Cuckoo Wasp	Expected

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2300	Arthropoda	Insecta	Hymenoptera	Chrysididae	Parnopes	desertorum	Kimsey		Cuckoo Wasp	Expected
2301	Arthropoda	Insecta	Hymenoptera	Chrysididae	Parnopes	festivus	Cockerell		Cuckoo Wasp	Expected
2302	Arthropoda	Insecta	Hymenoptera	Chrysididae	Parnopes	fulvicornis	Cameron		Cuckoo Wasp	Expected
2303	Arthropoda	Insecta	Hymenoptera	Chrysididae	Trichrysis	tridens	(Lepeletier)		Cuckoo Wasp	Expected
2304	Arthropoda	Insecta	Hymenoptera	Colletidae	Caupolicana	yarrowi	(Cresson)		Masked Bee	Expected
2305	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	algarobiae	Cockerell		Masked Bee	Expected
2306	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	annae	Cockerell		Masked Bee	Expected
2307	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	daleae	Cockerell		Masked Bee	Expected
2308	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	gypsicolens	Cockerell		Masked Bee	Expected
2309	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	louisae	Cockerell		Masked Bee	Expected
2310	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	prosopidis	Cockerell		Masked Bee	Expected
2311	Arthropoda	Insecta	Hymenoptera	Colletidae	Colletes	salicicola	Cockerell		Masked Bee	Expected
2312	Arthropoda	Insecta	Hymenoptera	Colletidae	Hylaeus	asininus	(Cockerell and Casad)		Masked Bee	Expected
2313	Arthropoda	Insecta	Hymenoptera	Colletidae	Hylaeus	cookii	(Metz)		Masked Bee	Expected
2314	Arthropoda	Insecta	Hymenoptera	Colletidae	Hylaeus	mesillae	(Cockerell)		Masked Bee	Expected
2315	Arthropoda	Insecta	Hymenoptera	Colletidae	Hylaeus	modestus	Say	citrinifrons	Masked Bee	Expected
2316	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Belomicrus	apache	Pate		Mud Daubers	Expected
2317	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Belomicrus	cladothricis	(Cockerell)		Mud Daubers	Expected
2318	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Belomicrus	maricopa	Pate		Mud Daubers	Expected
2319	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Belomicrus	mescalero	Pate		Mud Daubers	Expected
2320	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Belomicrus	querecho	Pate		Mud Daubers	Expected
2321	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Belomicrus	vierecki	Pate		Mud Daubers	Expected
2322	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Oxybelus	abdominalis	Baker		Mud Daubers	Expected
2323	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Oxybelus	coloradensis	Baker		Mud Daubers	Expected
2324	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Oxybelus	cornutus	Robertson		Mud Daubers	Expected
2325	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Oxybelus	pitanta	Pate		Mud Daubers	Expected
2326	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Oxybelus	sparideus	Cockerell		Mud Daubers	Expected
2327	Arthropoda	Insecta	Hymenoptera	Crabrionidae	Oxybelus	subcornutus	Cockerell		Mud Daubers	Expected
2328	Arthropoda	Insecta	Hymenoptera	Cynipidae	Andricus	flocculentus	Lyon		Cynipid Gall Wasp	Expected
2329	Arthropoda	Insecta	Hymenoptera	Cynipidae	Antron	daileyi	Lyon		Cynipid Gall Wasp	Expected
2330	Arthropoda	Insecta	Hymenoptera	Cynipidae	Antron	franklinensis	Lyon		Cynipid Gall Wasp	Expected
2331	Arthropoda	Insecta	Hymenoptera	Cynipidae	Ceropterus	snellingi	Lyon		Cynipid Gall Wasp	Expected
2332	Arthropoda	Insecta	Hymenoptera	Cynipidae	Euxystotera	campanulatum	Lyon		Cynipid Gall Wasp	Expected
2333	Arthropoda	Insecta	Hymenoptera	Cynipidae	Xanthopteras	pungens	Lyon		Cynipid Gall Wasp	Expected
2334	Arthropoda	Insecta	Hymenoptera	Cynipidae	Xanthopteras	tuckeri	Lyon		Cynipid Gall Wasp	Expected
2335	Arthropoda	Insecta	Hymenoptera	Encyrtidae	Aphelinus	perpallidus	Gahan		Encyrtids	Expected
2336	Arthropoda	Insecta	Hymenoptera	Encyrtidae	Bothriothorax	nigripes	(Howard)		Encyrtids	Expected
2337	Arthropoda	Insecta	Hymenoptera	Encyrtidae	Isodromus	niger	Ashmead		Encyrtids	Expected
2338	Arthropoda	Insecta	Hymenoptera	Eucharitidae	Pseudochalcura	gibbosa	(Provancher)		Eucharitids	Expected
2339	Arthropoda	Insecta	Hymenoptera	Eulophidae	Chrysonotomyia	formosa	(Westwood)		Eulophid Wasp	Expected
2340	Arthropoda	Insecta	Hymenoptera	Eulophidae	Diaulinopsis	callichroma	(Crawford)		Eulophid Wasp	Expected
2341	Arthropoda	Insecta	Hymenoptera	Eulophidae	Diglyphus	begini	(Ashmead)		Eulophid Wasp	Expected
2342	Arthropoda	Insecta	Hymenoptera	Eulophidae	Diglyphus	websteri	(Crawford)		Eulophid Wasp	Expected
2343	Arthropoda	Insecta	Hymenoptera	Eulophidae	Elasmus	polistis	Burks		Eulophid Wasp	Expected
2344	Arthropoda	Insecta	Hymenoptera	Eulophidae	Euplectrus	comstocki	Howard		Eulophid Wasp	Expected
2345	Arthropoda	Insecta	Hymenoptera	Eulophidae	Tetrastictus	incertus	(Ratzeburg)		Eulophid Wasp	Expected

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2346	Arthropoda	Insecta	Hymenoptera	Eumenidae	Ancistrocerus	bustamente	(Saussure)		Potter wasp	Expected
2347	Arthropoda	Insecta	Hymenoptera	Eumenidae	Ancistrocerus	tuberculocephalus	(Saussure)		Potter wasp	Expected
2348	Arthropoda	Insecta	Hymenoptera	Eumenidae	Dolichodynerus	tanynotus	(Cameron)		Potter wasp	Expected
2349	Arthropoda	Insecta	Hymenoptera	Eumenidae	Eumenes	aureus	Isely		Potter wasp	Expected
2350	Arthropoda	Insecta	Hymenoptera	Eumenidae	Eumenes	bollii	Cresson		Potter wasp	Expected
2351	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	alvarado	(Saussure)	safranus	Potter wasp	Expected
2352	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	annulatus	(Say)	evectus	Potter wasp	Expected
2353	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	auranus	(Cameron)		Potter wasp	Expected
2354	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	congressus	(Viereck)		Potter wasp	Expected
2355	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	hidalgo	(Saussure)		Potter wasp	Expected
2356	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	martini	(Bohart)		Potter wasp	Expected
2357	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	megaera	(Lepeletier)		Potter wasp	Expected
2358	Arthropoda	Insecta	Hymenoptera	Eumenidae	Euodynerus	pratensis	(Saussure)		Potter wasp	Expected
2359	Arthropoda	Insecta	Hymenoptera	Eumenidae	Leucodynerus	congressus	(Viereck)		Potter wasp	Expected
2360	Arthropoda	Insecta	Hymenoptera	Eumenidae	Leucodynerus	martini	Bohart		Potter wasp	Expected
2361	Arthropoda	Insecta	Hymenoptera	Eumenidae	Maricopodynerus	lissoides	Bohart		Potter wasp	Expected
2362	Arthropoda	Insecta	Hymenoptera	Eumenidae	Maricopodynerus	lissus	Bohart		Potter wasp	Expected
2363	Arthropoda	Insecta	Hymenoptera	Eumenidae	Maricopodynerus	optimus	Bohart		Potter wasp	Expected
2364	Arthropoda	Insecta	Hymenoptera	Eumenidae	Microdynerus	bakerianus	(Cameron)		Potter wasp	Expected
2365	Arthropoda	Insecta	Hymenoptera	Eumenidae	Parancistrocerus	minimoferus	(Bohart)		Potter wasp	Expected
2366	Arthropoda	Insecta	Hymenoptera	Eumenidae	Parancistrocerus	toltecus	(Saussure)		Potter wasp	Expected
2367	Arthropoda	Insecta	Hymenoptera	Eumenidae	Pterocheilus	quinquefasciatus	Say		Potter wasp	Expected
2368	Arthropoda	Insecta	Hymenoptera	Eumenidae	Stenodynerus	apache	Bohart		Potter wasp	Expected
2369	Arthropoda	Insecta	Hymenoptera	Eumenidae	Stenodynerus	congressus	(Viereck)		Potter wasp	Expected
2370	Arthropoda	Insecta	Hymenoptera	Eumenidae	Stenodynerus	lixovestis (nr.)	Bohart		Potter wasp	Expected
2371	Arthropoda	Insecta	Hymenoptera	Eumenidae	Stenodynerus	ochrogonius	Bohart		Potter wasp	Expected
2372	Arthropoda	Insecta	Hymenoptera	Eumenidae	Stenodynerus	pulvivestis	Bohart		Potter wasp	Expected
2373	Arthropoda	Insecta	Hymenoptera	Eumenidae	Stenodynerus	taos	(Cresson)		Potter wasp	Expected
2374	Arthropoda	Insecta	Hymenoptera	Eurytomidae	Bruchophagus	roddi	(Gussakovsky)		Seed Chalcids	Expected
2375	Arthropoda	Insecta	Hymenoptera	Eurytomidae	Eurytoma	bicolor (nr.)	Walsh		Seed Chalcids	Expected
2376	Arthropoda	Insecta	Hymenoptera	Eurytomidae	Eurytoma	diastrophi	Walsh		Seed Chalcids	Expected
2377	Arthropoda	Insecta	Hymenoptera	Eurytomidae	Eurytoma	neomexicana	Girault		Seed Chalcids	Expected
2378	Arthropoda	Insecta	Hymenoptera	Eurytomidae	Heimbra	opaca	(Ashmead)		Seed Chalcids	Expected
2379	Arthropoda	Insecta	Hymenoptera	Eurytomidae	Tenuipetiolus	mentha	Bugbee		Seed Chalcids	Expected
2380	Arthropoda	Insecta	Hymenoptera	Evaniidae	Evania	appendigaster	(Linnaeus)		Ensign wasp	Expected
2381	Arthropoda	Insecta	Hymenoptera	Evaniidae	Evaniella	neomexicana	(Ashmead)		Ensign wasp	Expected
2382	Arthropoda	Insecta	Hymenoptera	Formicidae	Acanthostichus	punctiscapus	MacKay		Ant	Expected
2383	Arthropoda	Insecta	Hymenoptera	Formicidae	Aphaenogaster	albisetosa	Mayr		Ant	Expected
2384	Arthropoda	Insecta	Hymenoptera	Formicidae	Aphaenogaster	cockerelli	Andre		Ant	Expected
2385	Arthropoda	Insecta	Hymenoptera	Formicidae	Aphaenogaster	punctaticeps	MacKay		Ant	Expected
2386	Arthropoda	Insecta	Hymenoptera	Formicidae	Aphaenogaster	texana	(Emery)		Ant	Expected
2387	Arthropoda	Insecta	Hymenoptera	Formicidae	Brachymyrmex	depilis	Emery		Ant	Expected
2388	Arthropoda	Insecta	Hymenoptera	Formicidae	Camponotus	festinatus	(Buckley)		Ant	Expected
2389	Arthropoda	Insecta	Hymenoptera	Formicidae	Camponotus	ochreatus	Emery		Ant	Expected
2390	Arthropoda	Insecta	Hymenoptera	Formicidae	Camponotus	sansabeanus	(Buckley)		Ant	Expected
2391	Arthropoda	Insecta	Hymenoptera	Formicidae	Camponotus	sayi	Emery		Ant	Expected

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2392	Arthropoda	Insecta	Hymenoptera	Formicidae	Camponotus	ulcerosus	Wheeler		Ant	Expected
2393	Arthropoda	Insecta	Hymenoptera	Formicidae	Cerapachys	davisi	Smith		Ant	Expected
2394	Arthropoda	Insecta	Hymenoptera	Formicidae	Crematogaster	cerasi	(Fitch)		Ant	Expected
2395	Arthropoda	Insecta	Hymenoptera	Formicidae	Crematogaster	depilis	Wheeler		Ant	Expected
2396	Arthropoda	Insecta	Hymenoptera	Formicidae	Crematogaster	hespera	Buren		Ant	Expected
2397	Arthropoda	Insecta	Hymenoptera	Formicidae	Crematogaster	larreae	Buren		Ant	Expected
2398	Arthropoda	Insecta	Hymenoptera	Formicidae	Crematogaster	punctulata	Emery		Ant	Expected
2399	Arthropoda	Insecta	Hymenoptera	Formicidae	Cyphomyrmex	wheeleri	Forel		Ant	Expected
2400	Arthropoda	Insecta	Hymenoptera	Formicidae	Dorymyrmex	bicolor	(Wheeler)		Ant	Expected
2401	Arthropoda	Insecta	Hymenoptera	Formicidae	Dorymyrmex	flavus	(McCook)		Ant	Expected
2402	Arthropoda	Insecta	Hymenoptera	Formicidae	Dorymyrmex	insanus	(Buckley)		Ant	Expected
2403	Arthropoda	Insecta	Hymenoptera	Formicidae	Forelius	analis	(Andre)		Ant	Expected
2404	Arthropoda	Insecta	Hymenoptera	Formicidae	Forelius	foetidus	(Buckley)		Ant	Expected
2405	Arthropoda	Insecta	Hymenoptera	Formicidae	Formica	neogagates	Viereck		Ant	Expected
2406	Arthropoda	Insecta	Hymenoptera	Formicidae	Formica	perpilosa	Wheeler		Ant	Expected
2407	Arthropoda	Insecta	Hymenoptera	Formicidae	Hyponeura	opacior	Ford		Ant	Expected
2408	Arthropoda	Insecta	Hymenoptera	Formicidae	Lasius	xerophilus	MacKay		Ant	Expected
2409	Arthropoda	Insecta	Hymenoptera	Formicidae	Leptothorax	bestelmeyeri	MacKay		Ant	Expected
2410	Arthropoda	Insecta	Hymenoptera	Formicidae	Leptothorax	coleenae	MacKay		Ant	Expected
2411	Arthropoda	Insecta	Hymenoptera	Formicidae	Leptothorax	nitens	Emery		Ant	Expected
2412	Arthropoda	Insecta	Hymenoptera	Formicidae	Leptothorax	obliquicanthus	Cole		Ant	Expected
2413	Arthropoda	Insecta	Hymenoptera	Formicidae	Leptothorax	pergandei	Emery		Ant	Expected
2414	Arthropoda	Insecta	Hymenoptera	Formicidae	Leptothorax	whitfordi	MacKay		Ant	Expected
2415	Arthropoda	Insecta	Hymenoptera	Formicidae	Liometopium	apiculatum	Mayr		Ant	Expected
2416	Arthropoda	Insecta	Hymenoptera	Formicidae	Monomorium	minimum	(Buckley)		Litte black ant	Expected
2417	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	depilis	Forel		Ant	Expected
2418	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	mendax	Wheeler		Ant	Expected
2419	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	mexicanus	Wesmael		Ant	Expected
2420	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	mimicus	Wheeler		Ant	Expected
2421	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	navajo	Wheeler		Ant	Expected
2422	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	placodops	Forel		Ant	Expected
2423	Arthropoda	Insecta	Hymenoptera	Formicidae	Myrmecocystus	romanei	Cole		Ant	Expected
2424	Arthropoda	Insecta	Hymenoptera	Formicidae	Neivamyrmex	harrisi	(Haldeman)		Ant	Expected
2425	Arthropoda	Insecta	Hymenoptera	Formicidae	Neivamyrmex	macropterus	Borgmeir		Ant	Expected
2426	Arthropoda	Insecta	Hymenoptera	Formicidae	Neivamyrmex	minor	(Cresson)		Ant	Expected
2427	Arthropoda	Insecta	Hymenoptera	Formicidae	Neivamyrmex	nigrescens	(Cresson)		Legionary ant	Expected
2428	Arthropoda	Insecta	Hymenoptera	Formicidae	Neivamyrmex	pilosus	Smith	mexicanus	Ant	Expected
2429	Arthropoda	Insecta	Hymenoptera	Formicidae	Paratrechina	terricola	(Buckley)		Ant	Expected
2430	Arthropoda	Insecta	Hymenoptera	Formicidae	Paratrechina	vividula	(Nylander)		Ant	Expected
2431	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	cerebrosior	Wheeler		Ant	Expected
2432	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	crassicornis	Emery		Ant	Expected
2433	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	dentata	Mayr		Ant	Expected
2434	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	desertorum	Wheeler		Ant	Expected
2435	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	hyatti	Emery		Ant	Expected
2436	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	militicida	Wheeler		Ant	Expected
2437	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	pinealis	Wheeler		Ant	Expected

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2438	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	rugulosa	Wheeler		Ant	Expected
2439	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	sciophila	Wheeler		Ant	Expected
2440	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	sitarches	Wheeler	soritis	Ant	Expected
2441	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	subdentata	Pergande		Ant	Expected
2442	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	tucsonica	Wheeler		Ant	Expected
2443	Arthropoda	Insecta	Hymenoptera	Formicidae	Pheidole	xerophila	Wheeler		Ant	Expected
2444	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	apache	Wheeler		Ant	Expected
2445	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	barbatus	(F. Smith)		Ant	Expected
2446	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	californicus	(Buckley)		California harvester ant	Expected
2447	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	desertorum	Wheeler		Ant	Expected
2448	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	imberbiculus	Wheeler		Ant	Expected
2449	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	maricopa	Wheeler		Ant	Expected
2450	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	rugosus	Emery		Ant	Expected
2451	Arthropoda	Insecta	Hymenoptera	Formicidae	Pogonomyrmex	texanus	Franke and Merickel		Ant	Expected
2452	Arthropoda	Insecta	Hymenoptera	Formicidae	Rogeria	huachucanus	Snelling		Ant	Expected
2453	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	amblychila	Wheeler		Ant	Expected
2454	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	aurea	Wheeler		Golden fire ant	Expected
2455	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	invicta	Buren		Red imported fire ant	Expected
2456	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	krockowi	Wheeler		Ant	Expected
2457	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	molesta	(Say)		Ant	Expected
2458	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	salina	Wheeler		Ant	Expected
2459	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	tennesseensis	Smith		Ant	Expected
2460	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	texana	Emery		Ant	Expected
2461	Arthropoda	Insecta	Hymenoptera	Formicidae	Solenopsis	xyloni	McCook		Southern fire ant	Expected
2462	Arthropoda	Insecta	Hymenoptera	Formicidae	Tetramorium	spinosum	Pergande		Ant	Expected
2463	Arthropoda	Insecta	Hymenoptera	Formicidae	Trachymyrmex	smithi	Buren		Ant	Expected
2464	Arthropoda	Insecta	Hymenoptera	Gasteruptiidae	Gasteruption	nevadae	(Bradley)		Gasteruptiid Wasp	Expected
2465	Arthropoda	Insecta	Hymenoptera	Halictidae	Agapostemon	angelicus	Cockerell		Sweat Bee	Expected
2466	Arthropoda	Insecta	Hymenoptera	Halictidae	Agapostemon	cockerelli	Crawford		Sweat Bee	Expected
2467	Arthropoda	Insecta	Hymenoptera	Halictidae	Agapostemon	sericeus	(Forster)		Sweat Bee	Expected
2468	Arthropoda	Insecta	Hymenoptera	Halictidae	Anthidium	porterae	Cockerell		Sweat Bee	Expected
2469	Arthropoda	Insecta	Hymenoptera	Halictidae	Augochlorella	melliventris	(Cresson)		Sweat Bee	Expected
2470	Arthropoda	Insecta	Hymenoptera	Halictidae	Augochlorella	neglectula	(Cockerell)		Sweat Bee	Expected
2471	Arthropoda	Insecta	Hymenoptera	Halictidae	Augochlorella	striata	(Provancher)		Sweat Bee	Expected
2472	Arthropoda	Insecta	Hymenoptera	Halictidae	Augochloropsis	metallica	(Fabricius)		Sweat Bee	Expected
2473	Arthropoda	Insecta	Hymenoptera	Halictidae	Conanthalictus	conanthi	(Cockerell)		Sweat Bee	Expected
2474	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	alius	(Sandhouse)		Sweat Bee	Expected
2475	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	eophilus	(Ellis)		Sweat Bee	Expected
2476	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	microlepoides	(Ellis)		Sweat Bee	Expected
2477	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	oleosus	(Cockerell)		Sweat Bee	Expected
2478	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	perixiguus	(Sandhouse)		Sweat Bee	Expected
2479	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	pruinosiformis	(Crawford)		Sweat Bee	Expected
2480	Arthropoda	Insecta	Hymenoptera	Halictidae	Dialictus	pseudotegularis	(Cockerell)		Sweat Bee	Expected
2481	Arthropoda	Insecta	Hymenoptera	Halictidae	Dufourea	fallugiae	(Cockerell)		Sweat Bee	Expected
2482	Arthropoda	Insecta	Hymenoptera	Halictidae	Dufourea	marginata	(Cresson)		Sweat Bee	Expected
2483	Arthropoda	Insecta	Hymenoptera	Halictidae	Dufourea	pulchricornis	(Cockerell)		Sweat Bee	Expected

2484	Arthropoda	Insecta	Hymenoptera	Halictidae	Dufourea	tinsleyi	(Cockerell)		Sweat Bee	Expected
2485	Arthropoda	Insecta	Hymenoptera	Halictidae	Evylaeus	amicus	(Cockerell)		Sweat Bee	Expected
2486	Arthropoda	Insecta	Hymenoptera	Halictidae	Evylaeus	angustior	(Cockerell)		Sweat Bee	Expected
2487	Arthropoda	Insecta	Hymenoptera	Halictidae	Evylaeus	pectoraloides	(Cockerell)		Sweat Bee	Expected
2488	Arthropoda	Insecta	Hymenoptera	Halictidae	Evylaeus	subobscurus	(Cockerell)		Sweat Bee	Expected
2489	Arthropoda	Insecta	Hymenoptera	Halictidae	Halictus	ligatus	Say		Sweat Bee	Expected
2490	Arthropoda	Insecta	Hymenoptera	Halictidae	Halictus	tripartitus	Cockerell		Sweat Bee	Expected
2491	Arthropoda	Insecta	Hymenoptera	Halictidae	Lasioglossum	bardum	(Cresson)		Sweat Bee	Expected
2492	Arthropoda	Insecta	Hymenoptera	Halictidae	Lasioglossum	sisymbrii	(Cockerell)		Sweat Bee	Expected
2493	Arthropoda	Insecta	Hymenoptera	Halictidae	Nomia	foxii	Dalla Torre		Sweat Bee	Expected
2494	Arthropoda	Insecta	Hymenoptera	Halictidae	Nomia	mesillae	(Cockerell)		Sweat Bee	Expected
2495	Arthropoda	Insecta	Hymenoptera	Halictidae	Nomia	mesillensis	Cockerell		Sweat Bee	Expected
2496	Arthropoda	Insecta	Hymenoptera	Halictidae	Nomia	tetrazonata	Cockerell	uvaldensis	Sweat Bee	Expected
2497	Arthropoda	Insecta	Hymenoptera	Halictidae	Nomia	xerophila	(Cockerell)		Sweat Bee	Expected
2498	Arthropoda	Insecta	Hymenoptera	Halictidae	Sphecodes	fortior	Cockerell		Sweat Bee	Expected
2499	Arthropoda	Insecta	Hymenoptera	Halictidae	Sphecodes	perlustrans	Cockerell		Sweat Bee	Expected
2500	Arthropoda	Insecta	Hymenoptera	Halictidae	Sphecodes	semicoloratus	(Cockerell)		Sweat Bee	Expected
2501	Arthropoda	Insecta	Hymenoptera	Halictidae	Sphecodes	sophiae	Cockerell		Sweat Bee	Expected
2502	Arthropoda	Insecta	Hymenoptera	Halictidae	Sphecodogastra	tegulariformis	(Crawford)		Sweat Bee	Expected
2503	Arthropoda	Insecta	Hymenoptera	Halictidae	Sphecodogastra	texana	(Cresson)		Sweat Bee	Expected
2504	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Bathyplectes	curculionis	(Thomson)		Ichneumon Wasp	Expected
2505	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Conocalama	galbinata	Hopper		Ichneumon Wasp	Expected
2506	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Cremastus	californicus	(Provancher)		Ichneumon Wasp	Expected
2507	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Cremastus	cylindricus	Dasch		Ichneumon Wasp	Expected
2508	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Cremastus	globosus	Dasch		Ichneumon Wasp	Expected
2509	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Cremastus	hyalinipennis	(Cresson)		Ichneumon Wasp	Expected
2510	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Diplazon	laetorius	(Fabricius)		Ichneumon Wasp	Expected
2511	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Hidryta	frater	(Cresson)		Ichneumon Wasp	Expected
2512	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Megarhyssa	macrurus	Linnaeus)		Ichneumon Wasp	Expected
2513	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Pristomerus	baumhoferi	Cushman		Ichneumon Wasp	Expected
2514	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Pristomerus	spinator	(Fabricius)		Ichneumon Wasp	Expected
2515	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Stictopisthus	electilis	(Cresson)		Ichneumon Wasp	Expected
2516	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Syrphoctonus	nigritarsis	(Gravenhorst)	fuscitarsus	Ichneumon Wasp	Expected
2517	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	anomala	(Cushman)		Ichneumon Wasp	Expected
2518	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	connata	Dasch		Ichneumon Wasp	Expected
2519	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	evetriae	(Cushman)		Ichneumon Wasp	Expected
2520	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	facilis	(Cresson)		Ichneumon Wasp	Expected
2521	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	ferruginea	(Davis)		Ichneumon Wasp	Expected
2522	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	flaviceps	(Cushman)		Ichneumon Wasp	Expected
2523	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	neomexicana	Dasch		Ichneumon Wasp	Expected
2524	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	obliqua	Dasch		Ichneumon Wasp	Expected
2525	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	platynotae	(Cushman)		Ichneumon Wasp	Expected
2526	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	snowi	(Viereck)		Ichneumon Wasp	Expected
2527	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Temelucha	vitellana	Dasch		Ichneumon Wasp	Expected
2528	Arthropoda	Insecta	Hymenoptera	Ichneumonidae	Vulgichneumon	subcyaneus	(Cresson)		Ichneumon Wasp	Expected
2529	Arthropoda	Insecta	Hymenoptera	Larridae	Larropsis	chilopsidis	(Cockerell and Fox)		Square-headed Wasp	Expected

2530	Arthropoda	Insecta	Hymenoptera	Larridae	Larropsis	sparsa	G. and R. Bohart		Square-headed Wasp	Expected
2531	Arthropoda	Insecta	Hymenoptera	Larridae	Liris	argentata	(Beauvois)		Square-headed Wasp	Expected
2532	Arthropoda	Insecta	Hymenoptera	Larridae	Liris	beatus	(Cameron)		Square-headed Wasp	Expected
2533	Arthropoda	Insecta	Hymenoptera	Larridae	Lyroda	subita	Say		Square-headed Wasp	Expected
2534	Arthropoda	Insecta	Hymenoptera	Larridae	Tachysphex	apicalis	Fox		Square-headed Wasp	Expected
2535	Arthropoda	Insecta	Hymenoptera	Larridae	Tachysphex	coquilletti	Bohart		Square-headed Wasp	Expected
2536	Arthropoda	Insecta	Hymenoptera	Larridae	Tachysphex	terminatus	(F. Smith)		Square-headed Wasp	Expected
2537	Arthropoda	Insecta	Hymenoptera	Larridae	Tachytes	elongatus	Cresson		Square-headed Wasp	Expected
2538	Arthropoda	Insecta	Hymenoptera	Larridae	Tachytes	ermineus	Banks		Square-headed Wasp	Expected
2539	Arthropoda	Insecta	Hymenoptera	Larridae	Tachytes	fulviventris	Cresson		Square-headed Wasp	Expected
2540	Arthropoda	Insecta	Hymenoptera	Larridae	Tachytes	obscurus	Cresson		Square-headed Wasp	Expected
2541	Arthropoda	Insecta	Hymenoptera	Larridae	Tachytes	sculleni	Bohart		Square-headed Wasp	Expected
2542	Arthropoda	Insecta	Hymenoptera	Larridae	Trypargilum	lactitarse	(Saussure)		Square-headed Wasp	Expected
2543	Arthropoda	Insecta	Hymenoptera	Larridae	Trypoxylon	clavatum	(Say)		Square-headed Wasp	Expected
2544	Arthropoda	Insecta	Hymenoptera	Larridae	Trypoxylon	spinosum	(Cameron)		Square-headed Wasp	Expected
2545	Arthropoda	Insecta	Hymenoptera	Larridae	Trypoxylon	tridentatum	(Packard)		Square-headed Wasp	Expected
2546	Arthropoda	Insecta	Hymenoptera	Masaridae	Pseudomasaris	maculifrons	(Fox)		Pollen Wasp	Expected
2547	Arthropoda	Insecta	Hymenoptera	Masaridae	Pseudomasaris	phaceliae	Rohwer		Pollen Wasp	Expected
2548	Arthropoda	Insecta	Hymenoptera	Megachilidae	Anthidium	maculifrons	Smith		Leafcutter Bee	Expected
2549	Arthropoda	Insecta	Hymenoptera	Megachilidae	Anthidium	maculosum	Cresson		Leafcutter Bee	Expected
2550	Arthropoda	Insecta	Hymenoptera	Megachilidae	Anthidium	paroselae	Cockerell		Leafcutter Bee	Expected
2551	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	bigeloviae	(Cockerell)		Leafcutter Bee	Expected
2552	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	cactorum	(Cockerell)		Leafcutter Bee	Expected
2553	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	gillettei	Titus	rubra	Leafcutter Bee	Expected
2554	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	holtii	Cockerell		Leafcutter Bee	Expected
2555	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	meliloti	(Cockerell)		Leafcutter Bee	Expected
2556	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	opuntiae	(Cockerell)		Leafcutter Bee	Expected
2557	Arthropoda	Insecta	Hymenoptera	Megachilidae	Ashmeadiella	prosopidis	(Cockerell)		Leafcutter Bee	Expected
2558	Arthropoda	Insecta	Hymenoptera	Megachilidae	Chalicodoma	chlopsidis	(Cockerell)		Leafcutter Bee	Expected
2559	Arthropoda	Insecta	Hymenoptera	Megachilidae	Chalicodoma	discorhina	(Cockerell)		Leafcutter Bee	Expected
2560	Arthropoda	Insecta	Hymenoptera	Megachilidae	Chalicodoma	lobatifrons	(Cockerell)		Leafcutter Bee	Expected
2561	Arthropoda	Insecta	Hymenoptera	Megachilidae	Chalicodoma	occidentalis	(Fox)		Leafcutter Bee	Expected
2562	Arthropoda	Insecta	Hymenoptera	Megachilidae	Coelioxys	edita	Cresson		Leafcutter Bee	Expected
2563	Arthropoda	Insecta	Hymenoptera	Megachilidae	Coelioxys	menthae	Cockerell		Leafcutter Bee	Expected
2564	Arthropoda	Insecta	Hymenoptera	Megachilidae	Coelioxys	sayi	Robertson		Leafcutter Bee	Expected
2565	Arthropoda	Insecta	Hymenoptera	Megachilidae	Dianthidium	curvatum	(Smith)	sayi	Leafcutter Bee	Expected
2566	Arthropoda	Insecta	Hymenoptera	Megachilidae	Dianthidium	parvum	(Cresson)		Leafcutter Bee	Expected
2567	Arthropoda	Insecta	Hymenoptera	Megachilidae	Dioxys	productus	(Cresson)	subruber	Leafcutter Bee	Expected
2568	Arthropoda	Insecta	Hymenoptera	Megachilidae	Heriades	carinata	Cresson		Leafcutter Bee	Expected
2569	Arthropoda	Insecta	Hymenoptera	Megachilidae	Heriades	gracilior	Cockerell		Leafcutter Bee	Expected
2570	Arthropoda	Insecta	Hymenoptera	Megachilidae	Heriades	micropthalma	Michener		Leafcutter Bee	Expected
2571	Arthropoda	Insecta	Hymenoptera	Megachilidae	Heriades	variolosa	(Cresson)		Leafcutter Bee	Expected
2572	Arthropoda	Insecta	Hymenoptera	Megachilidae	Heteranthidium	larreae	(Cockerell)		Leafcutter Bee	Expected
2573	Arthropoda	Insecta	Hymenoptera	Megachilidae	Lithurge	apicalis	(Cresson)	opuntiae	Leafcutter Bee	Expected
2574	Arthropoda	Insecta	Hymenoptera	Megachilidae	Lithurge	echinocacti	(Cockerell)		Leafcutter Bee	Expected
2575	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	albitarsis	Cresson		Leafcutter Bee	Expected

2576	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	brevis	Say		Leaf-cutting bee	Expected
2577	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	casadae	Cockerell		Leafcutter Bee	Expected
2578	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	coquilletti	Cockerell		Leafcutter Bee	Expected
2579	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	fucata	Mitchell		Leafcutter Bee	Expected
2580	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	gentilis	Cresson		Leafcutter Bee	Expected
2581	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	inimica	Cresson	sayi	Leafcutter Bee	Expected
2582	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	instita	Mitchell		Leafcutter Bee	Expected
2583	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	mendica	Cresson	snowi	Leafcutter Bee	Expected
2584	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	montivaga	Cresson		Leafcutter Bee	Expected
2585	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	newberryae	Cockerell		Leafcutter Bee	Expected
2586	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	odontostoma	(Cockerell)		Leafcutter Bee	Expected
2587	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	policaris	Say		Leafcutter Bee	Expected
2588	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	sidalceae	Cockerell		Leafcutter Bee	Expected
2589	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	soledadensis	Cockerell		Leafcutter Bee	Expected
2590	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	texana	Cresson		Leafcutter Bee	Expected
2591	Arthropoda	Insecta	Hymenoptera	Megachilidae	Megachile	townsendiana	Cockerell		Leafcutter Bee	Expected
2592	Arthropoda	Insecta	Hymenoptera	Megachilidae	Osmia	lignaria	Say		Leafcutter Bee	Expected
2593	Arthropoda	Insecta	Hymenoptera	Megachilidae	Osmia	phenax	Cockerell		Leafcutter Bee	Expected
2594	Arthropoda	Insecta	Hymenoptera	Megachilidae	Osmia	prunorum	Cockerell		Leafcutter Bee	Expected
2595	Arthropoda	Insecta	Hymenoptera	Melittidae	Hesperapis	elagantula	Cockerell		Melittid Bee	Expected
2596	Arthropoda	Insecta	Hymenoptera	Melittidae	Hesperapis	elegantula	Cockerell		Melittid Bee	Expected
2597	Arthropoda	Insecta	Hymenoptera	Melittidae	Hesperapis	larreae	Cockerell		Melittid Bee	Expected
2598	Arthropoda	Insecta	Hymenoptera	Melittidae	Hesperapis	oliviae	(Cockerell)		Melittid Bee	Expected
2599	Arthropoda	Insecta	Hymenoptera	Melittidae	Hesperapis	rhodocerata	(Cockerell)		Melittid Bee	Expected
2600	Arthropoda	Insecta	Hymenoptera	Melittidae	Hesperapis	rodecki	Cockerell		Melittid Bee	Expected
2601	Arthropoda	Insecta	Hymenoptera	Mellinidae	Mellinus	rufinodus	Cresson		Field Digger Wasp	Expected
2602	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	atriceps	Mickel		Velvet Ants	Expected
2603	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	auripilus	Buzicky		Velvet Ants	Expected
2604	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	belfragei	(Blake)		Velvet Ants	Expected
2605	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	incredulis	Mickel		Velvet Ants	Expected
2606	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	mellipes	(Blake)		Velvet Ants	Expected
2607	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	nebeculus	(Cresson)		Velvet Ants	Expected
2608	Arthropoda	Insecta	Hymenoptera	Mutillidae	Chyphotes	testaceipes	Fox		Velvet Ants	Expected
2609	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	arcana	Mickel		Velvet Ants	Expected
2610	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	bioculata	(Cresson)		Velvet Ants	Expected
2611	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	chiron	(Cresson)		Velvet Ants	Expected
2612	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	creusa	(Cresson)		Velvet Ants	Expected
2613	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	foxi	(Cockerell)		Velvet Ants	Expected
2614	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	gloriosa	(Saussure)		Velvet Ants	Expected
2615	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	gorgon	(Blake)		Velvet Ants	Expected
2616	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	homole	Mickel		Velvet Ants	Expected
2617	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	klugii	(Gray)		Velvet Ants	Expected
2618	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	leda	(Blake)		Velvet Ants	Expected
2619	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	magnifica	Mickel		Velvet Ants	Expected
2620	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	medea	(Cresson)		Velvet Ants	Expected
2621	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	montivagoides	(Viereck)		Velvet Ants	Expected

2622	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	nupera	Mickel		Velvet Ants	Expected
2623	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	phaon	(Fox)		Velvet Ants	Expected
2624	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	pseudopappis	(Cockerell)		Velvet Ants	Expected
2625	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	scaevola	(Blake)		Velvet Ants	Expected
2626	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	snoworum	(Cockerell and Fox)		Velvet Ants	Expected
2627	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	stevensi	Mickel		Velvet Ants	Expected
2628	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	ursula	(Cresson)		Velvet Ants	Expected
2629	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	vesta	(Cresson)		Velvet Ants	Expected
2630	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dasymutilla	vestita	(Lepeletier)		Velvet Ants	Expected
2631	Arthropoda	Insecta	Hymenoptera	Mutillidae	Dilophotopsis	concolor	(Cresson)		Velvet Ants	Expected
2632	Arthropoda	Insecta	Hymenoptera	Mutillidae	Ephuta	cephalotes	Schuster		Velvet Ants	Expected
2633	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	adonis	(Fox)		Velvet Ants	Expected
2634	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	alemon	(Fox)		Velvet Ants	Expected
2635	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	augusta	Viereck		Velvet Ants	Expected
2636	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	bicolor	(Blake)		Velvet Ants	Expected
2637	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	braccata	Schuster		Velvet Ants	Expected
2638	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	erebus	(Melander)		Velvet Ants	Expected
2639	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	eubule	(Cameron)		Velvet Ants	Expected
2640	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	grata	(Melander)		Velvet Ants	Expected
2641	Arthropoda	Insecta	Hymenoptera	Mutillidae	Odontophotopsis	territa	(Cockerell)		Velvet Ants	Expected
2642	Arthropoda	Insecta	Hymenoptera	Mutillidae	Photomorphus	clandestinus	(Viereck)		Velvet Ants	Expected
2643	Arthropoda	Insecta	Hymenoptera	Mutillidae	Photomorphus	hebes	(Melander)		Velvet Ants	Expected
2644	Arthropoda	Insecta	Hymenoptera	Mutillidae	Psuedomethoca	aureovestita	Bradley		Velvet Ants	Expected
2645	Arthropoda	Insecta	Hymenoptera	Mutillidae	Psuedomethoca	contumax	(Cressson)		Velvet Ants	Expected
2646	Arthropoda	Insecta	Hymenoptera	Mutillidae	Psuedomethoca	donaeanae	(Cockerell)		Velvet Ants	Expected
2647	Arthropoda	Insecta	Hymenoptera	Mutillidae	Psuedomethoca	propinqua	(Cresson)		Velvet Ants	Expected
2648	Arthropoda	Insecta	Hymenoptera	Mutillidae	Psuedomethoca	scaevolella	(Cockerell and Casad)		Velvet Ants	Expected
2649	Arthropoda	Insecta	Hymenoptera	Mutillidae	Sphaeropthalma	coaequalis	Cameron		Velvet Ants	Expected
2650	Arthropoda	Insecta	Hymenoptera	Mutillidae	Sphaeropthalma	halcyone	(Fox)		Velvet Ants	Expected
2651	Arthropoda	Insecta	Hymenoptera	Mutillidae	Sphaeropthalma	helicaon	Fox		Velvet Ants	Expected
2652	Arthropoda	Insecta	Hymenoptera	Mutillidae	Sphaeropthalma	mesillensis	(Cockerell)		Velvet Ants	Expected
2653	Arthropoda	Insecta	Hymenoptera	Mutillidae	Sphaeropthalma	pallidipes	Schuster		Velvet Ants	Expected
2654	Arthropoda	Insecta	Hymenoptera	Mutillidae	Timulla	dubitata	(Smith)		Velvet Ants	Expected
2655	Arthropoda	Insecta	Hymenoptera	Mutillidae	Timulla	grotei	(Blake)		Velvet Ants	Expected
2656	Arthropoda	Insecta	Hymenoptera	Mutillidae	Timulla	oajaca	(Blake)		Velvet Ants	Expected
2657	Arthropoda	Insecta	Hymenoptera	Mutillidae	Timulla	suspensa	(Gertstaecker)	sonora	Velvet Ants	Expected
2658	Arthropoda	Insecta	Hymenoptera	Mutillidae	Timulla	vagans	(Fabricius)		Velvet Ants	Expected
2659	Arthropoda	Insecta	Hymenoptera	Mutillidae	Typhoctes	peculiaris	(Cresson)	mirabilis	Velvet Ants	Expected
2660	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Bembix	gillaspyi	Evans and Matthews		Wasp	Expected
2661	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Bembix	sayi	(Cresson)		Wasp	Expected
2662	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Bembix	troglodytes	Handlirsch		Wasp	Expected
2663	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Bembix	uscripta	Fox		Wasp	Expected
2664	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Bicyrtes	capnoptera	(Handlirsch)		Wasp	Expected
2665	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Foxia	navajo	Pate		Wasp	Expected
2666	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Glenostictia	clypeata	(Gillaspy)		Wasp	Expected
2667	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Hoplisoides	confertus	(Fox)		Wasp	Expected

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2668	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Hoplisoides	spilopterus	(Handlirsch)		Wasp	Expected
2669	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Metanysson	lipan	Pate		Wasp	Expected
2670	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Metanysson	solani	(Cockerell)		Wasp	Expected
2671	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Microbembex	hirsuta	Parker		Wasp	Expected
2672	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Microbembex	nigrifrons	(Provancher)		Wasp	Expected
2673	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Nysson	euphorbiae	R. M.Bohart		Wasp	Expected
2674	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Nysson	intermedius	Viereck		Wasp	Expected
2675	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Nysson	timberlakei	R. M. Bohart		Wasp	Expected
2676	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Oryttus	gracilis	(Patton)	arapaho	Wasp	Expected
2677	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Pseudoplisus	phalaratus	Say		Wasp	Expected
2678	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Sphecius	convallis	Patton		Wasp	Expected
2679	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Sphecius	grandis	(Say)		Wasp	Expected
2680	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Sphecius	speciosus	(Drury)		Cicada killer	Expected
2681	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Steniola	duplicata	Provancher		Wasp	Expected
2682	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Steniola	elegans	Parker		Wasp	Expected
2683	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Stictiella	pulchella	(Cresson)		Wasp	Expected
2684	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Stictiella	rufescens	(Gillaspy)		Wasp	Expected
2685	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Stizoides	renicinctus	(Say)		Wasp	Expected
2686	Arthropoda	Insecta	Hymenoptera	Nyssonidae	Trichogorytes	cockerelli	(Ashmead)		Wasp	Expected
2687	Arthropoda	Insecta	Hymenoptera	Oxaeidae	Protoxaea	gloriosa	(Fox)		Mining Bee	Expected
2688	Arthropoda	Insecta	Hymenoptera	Pelecinidae	Pelecinus	polyturator	(Drury)		Pelecinid Wasp	Expected
2689	Arthropoda	Insecta	Hymenoptera	Pemphredonidae	Ammoplanops	cockerelli	(Ashmead)		Wasp	Expected
2690	Arthropoda	Insecta	Hymenoptera	Pemphredonidae	Ammoplanops	cressoni	Pate		Wasp	Expected
2691	Arthropoda	Insecta	Hymenoptera	Pemphredonidae	Ammoplanops	vierecki	Pate		Wasp	Expected
2692	Arthropoda	Insecta	Hymenoptera	Pemphredonidae	Pluto	suffusus	(Fox)		Wasp	Expected
2693	Arthropoda	Insecta	Hymenoptera	Pemphredonidae	Pulverro	mescalero	Pate		Wasp	Expected
2694	Arthropoda	Insecta	Hymenoptera	Philanthidae	Aphilanthops	frigidus	(Smith)		Wasp	Expected
2695	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	acanthophila	Cockerell		Wasp	Expected
2696	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	argia	Mickel		Wasp	Expected
2697	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	azteca	Saussure		Wasp	Expected
2698	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	bicornuta	Guerin		Wasp	Expected
2699	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	californica	Cresson		Wasp	Expected
2700	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	cochisi	Scullen		Wasp	Expected
2701	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	compacta	Cresson		Wasp	Expected
2702	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	conifrons	Mick		Wasp	Expected
2703	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	convergens	Viereck and Cockerell		Wasp	Expected
2704	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	crandalli	Scullen		Wasp	Expected
2705	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	crotonella	Viereck		Wasp	Expected
2706	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	crucis	Viereck and Cockerell		Wasp	Expected
2707	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	dilatata	Spinola	chisosensis	Wasp	Expected
2708	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	echo	Mickel	echo	Wasp	Expected
2709	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	femurrubrum	Viereck and Cockerell		Wasp	Expected
2710	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	finitima	Cresson	vierecki	Wasp	Expected
2711	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	frontata	Say		Wasp	Expected
2712	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	graphica	Smith		Wasp	Expected
2713	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	halone	Banks		Wasp	Expected

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2714	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	insolita	Cresson	albida	Wasp	Expected
2715	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	kenicotti	Cresson	beali	Wasp	Expected
2716	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	morata	Cresson		Wasp	Expected
2717	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	neominax	Scullen		Wasp	Expected
2718	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	nigrescens	Smith		Wasp	Expected
2719	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	rufinoda	Cresson		Wasp	Expected
2720	Arthropoda	Insecta	Hymenoptera	Philanthidae	Cerceris	townsendi	Viereck and Cockerell		Wasp	Expected
2721	Arthropoda	Insecta	Hymenoptera	Philanthidae	Clypeadon	evansi	Bohart		Wasp	Expected
2722	Arthropoda	Insecta	Hymenoptera	Philanthidae	Clypeadon	laticinctus	(Cresson)		Wasp	Expected
2723	Arthropoda	Insecta	Hymenoptera	Philanthidae	Clypeadon	taurulus	(Cockerell)		Wasp	Expected
2724	Arthropoda	Insecta	Hymenoptera	Philanthidae	Clypeadon	utahensis	(Baker)		Wasp	Expected
2725	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	arenaria	Scullen		Wasp	Expected
2726	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	bitruncata	Scullen		Wasp	Expected
2727	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	canaliculata	(Say)		Beetle wasp	Expected
2728	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	conata	Scullen		Wasp	Expected
2729	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	ferruginosa	Scullen		Wasp	Expected
2730	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	melanovittata	Scullen		Wasp	Expected
2731	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	montana	Cresson		Wasp	Expected
2732	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	morula	Scullen		Wasp	Expected
2733	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	rubripes	Cresson		Wasp	Expected
2734	Arthropoda	Insecta	Hymenoptera	Philanthidae	Eucerceris	tricolor	Cockerell		Wasp	Expected
2735	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	albopilosus	Cresson		Wasp	Expected
2736	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	crabroniformis	Smith		Wasp	Expected
2737	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	crotoniphilus	Viereck and Cockerell		Wasp	Expected
2738	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	gibbosus	(Fabricius)		Wasp	Expected
2739	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	gloriosus	Cresson		Wasp	Expected
2740	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	multimaculatus	Cameron		Wasp	Expected
2741	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	pacificus	Cresson		Wasp	Expected
2742	Arthropoda	Insecta	Hymenoptera	Philanthidae	Philanthus	psyche	Dunning		Wasp	Expected
2743	Arthropoda	Insecta	Hymenoptera	Pompilidae	Ageniella	accepta	(Cresson)		Spider Wasp	Expected
2744	Arthropoda	Insecta	Hymenoptera	Pompilidae	Ageniella	conflicta	Banks		Spider Wasp	Expected
2745	Arthropoda	Insecta	Hymenoptera	Pompilidae	Ageniella	ephorbiae	(Viereck)		Spider Wasp	Expected
2746	Arthropoda	Insecta	Hymenoptera	Pompilidae	Agenioides	biedermani	(Banks)		Spider Wasp	Expected
2747	Arthropoda	Insecta	Hymenoptera	Pompilidae	Allaporus	smithianus	(Cameron)		Spider Wasp	Expected
2748	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	acapulcoensis	(Cameron)		Spider Wasp	Expected
2749	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	aethiops	(Cresson)		Spider Wasp	Expected
2750	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	americanus	(Beauvois)	ambiguus	Spider Wasp	Expected
2751	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	californiae	Evans		Spider Wasp	Expected
2752	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	clystera	(Banks)		Spider Wasp	Expected
2753	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	cylindricus	(Cresson)		Spider Wasp	Expected
2754	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	insolens	(Banks)		Spider Wasp	Expected
2755	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	marginalis	(Banks)		Spider Wasp	Expected
2756	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	marginatus	(Say)		Spider Wasp	Expected
2757	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	nigritis	(Dahlbom)		Spider Wasp	Expected
2758	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	noestus	(Banks)		Spider Wasp	Expected
2759	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	relativus	(Fox)		Spider Wasp	Expected

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2760	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	splendens	(Dreisbach)		Spider Wasp	Expected
2761	Arthropoda	Insecta	Hymenoptera	Pompilidae	Anoplius	toluca	(Cam)		Spider Wasp	Expected
2762	Arthropoda	Insecta	Hymenoptera	Pompilidae	Aporinellus	basalis	Banks		Spider Wasp	Expected
2763	Arthropoda	Insecta	Hymenoptera	Pompilidae	Aporinellus	fasciatus	(Sm.)		Spider Wasp	Expected
2764	Arthropoda	Insecta	Hymenoptera	Pompilidae	Aporinellus	medianus	Banks		Spider Wasp	Expected
2765	Arthropoda	Insecta	Hymenoptera	Pompilidae	Aporinellus	taeniatus	(Kohl)		Spider Wasp	Expected
2766	Arthropoda	Insecta	Hymenoptera	Pompilidae	Aporus	concolor	(Smith)		Spider Wasp	Expected
2767	Arthropoda	Insecta	Hymenoptera	Pompilidae	Arachnospila	parvula	(Banks)		Spider Wasp	Expected
2768	Arthropoda	Insecta	Hymenoptera	Pompilidae	Auplopus	nigrellus	(Banks)		Spider Wasp	Expected
2769	Arthropoda	Insecta	Hymenoptera	Pompilidae	Ceropales	fulvipes	Cresson		Spider Wasp	Expected
2770	Arthropoda	Insecta	Hymenoptera	Pompilidae	Chalcochares	hirsutifemur	(Banks)		Spider Wasp	Expected
2771	Arthropoda	Insecta	Hymenoptera	Pompilidae	Cryptocheilus	attenuatum	Banks		Spider Wasp	Expected
2772	Arthropoda	Insecta	Hymenoptera	Pompilidae	Cryptocheilus	idoneum	Banks	birkmanni	Spider Wasp	Expected
2773	Arthropoda	Insecta	Hymenoptera	Pompilidae	Cryptocheilus	pallidipenne	(Banks)		Spider Wasp	Expected
2774	Arthropoda	Insecta	Hymenoptera	Pompilidae	Cryptocheilus	severini	Banks		Spider Wasp	Expected
2775	Arthropoda	Insecta	Hymenoptera	Pompilidae	Cryptocheilus	terminatum	(Say)		Spider Wasp	Expected
2776	Arthropoda	Insecta	Hymenoptera	Pompilidae	Entypus	unifasciatus	(Say)	cressoni	Spider Wasp	Expected
2777	Arthropoda	Insecta	Hymenoptera	Pompilidae	Episyron	biguttatuus	(Fabricius)	californicus	Tornado wasp	Expected
2778	Arthropoda	Insecta	Hymenoptera	Pompilidae	Episyron	conterminus	(Smith)	posterus	Spider Wasp	Expected
2779	Arthropoda	Insecta	Hymenoptera	Pompilidae	Episyron	snowi	(Viereck)		Spider Wasp	Expected
2780	Arthropoda	Insecta	Hymenoptera	Pompilidae	Evagetes	hyacinthinus	(Cresson)		Spider Wasp	Expected
2781	Arthropoda	Insecta	Hymenoptera	Pompilidae	Evagetes	mohave	(Banks)		Spider Wasp	Expected
2782	Arthropoda	Insecta	Hymenoptera	Pompilidae	Hemipepsis	ustulata	Dahlbom		Spider Wasp	Expected
2783	Arthropoda	Insecta	Hymenoptera	Pompilidae	Paracyphononyx	funereus	(Lepeletier)		Spider Wasp	Expected
2784	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pepsis	cerberus	Lucas		Spider Wasp	Expected
2785	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pepsis	formosa	(Say)		Spider Wasp	Expected
2786	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pepsis	mexicanus	Lucas		Spider Wasp	Expected
2787	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pepsis	mildei	Stal		Spider Wasp	Expected
2788	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pepsis	pallidolimbata	Lucas		Spider Wasp	Expected
2789	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pepsis	thisbe	Lucas		Spider Wasp	Expected
2790	Arthropoda	Insecta	Hymenoptera	Pompilidae	Perissopompilus	phoenix	(Evans)		Spider Wasp	Expected
2791	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pompilus	scelestus	Cresson		Spider Wasp	Expected
2792	Arthropoda	Insecta	Hymenoptera	Pompilidae	Pompilus	solonus	(Banks)		Spider Wasp	Expected
2793	Arthropoda	Insecta	Hymenoptera	Pompilidae	Priocnemis	cornica	(Say)		Spider Wasp	Expected
2794	Arthropoda	Insecta	Hymenoptera	Pompilidae	Sericopompilus	angustatus	(Cresson)		Spider Wasp	Expected
2795	Arthropoda	Insecta	Hymenoptera	Pompilidae	Sericopompilus	neotropicalis	(Cam.)		Spider Wasp	Expected
2796	Arthropoda	Insecta	Hymenoptera	Pompilidae	Tachypompilus	unicolor	(Banks)	cerinus	Spider Wasp	Expected
2797	Arthropoda	Insecta	Hymenoptera	Pompilidae	Tastiotenia	festiva	Evans		Spider Wasp	Expected
2798	Arthropoda	Insecta	Hymenoptera	Pompilidae	Trachypompilus	ferrugineus	(Say)	torridus	Spider Wasp	Expected
2799	Arthropoda	Insecta	Hymenoptera	Pteromalidae	Acerocephala	atroviolacea	(Crawford)		Ptermalids	Expected
2800	Arthropoda	Insecta	Hymenoptera	Pteromalidae	Dibrachys	cavus	(Walker)		Ptermalids	Expected
2801	Arthropoda	Insecta	Hymenoptera	Pteromalidae	Pachyneuron	californicum	Girault		Ptermalids	Expected
2802	Arthropoda	Insecta	Hymenoptera	Pteromalidae	Perilampus	chrysopae	Crawford		Ptermalids	Expected
2803	Arthropoda	Insecta	Hymenoptera	Pteromalidae	Pseudocatolaccus	americanus	Gahan		Ptermalids	Expected
2804	Arthropoda	Insecta	Hymenoptera	Scelionidae	Calotelea	marlattii	Ashmead		Digger Wasp	Expected
2805	Arthropoda	Insecta	Hymenoptera	Scelionidae	Duta	policeps	Masuer		Digger Wasp	Expected

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2806	Arthropoda	Insecta	Hymenoptera	Scelionidae	Trissolcus	utahensis	(Ashmead)		Digger Wasp	Expected
2807	Arthropoda	Insecta	Hymenoptera	Scoliidae	Campsomeris	pilipes	(Saussure)		Scoliid Wasp	Expected
2808	Arthropoda	Insecta	Hymenoptera	Scoliidae	Campsomeris	tolteca	(Saussure)		Scoliid Wasp	Expected
2809	Arthropoda	Insecta	Hymenoptera	Scoliidae	Crioscolia	alcione	(Banks)		Scoliid Wasp	Expected
2810	Arthropoda	Insecta	Hymenoptera	Scoliidae	Crioscolia	flammicoma	(Bradley)		Scoliid Wasp	Expected
2811	Arthropoda	Insecta	Hymenoptera	Scoliidae	Scolia	guttata	Burmeister		Scoliid Wasp	Expected
2812	Arthropoda	Insecta	Hymenoptera	Scoliidae	Scolia	mexicana	Saussure		Scoliid Wasp	Expected
2813	Arthropoda	Insecta	Hymenoptera	Scoliidae	Scolia	nobilitata	Fabricius	tricincta	Scoliid Wasp	Expected
2814	Arthropoda	Insecta	Hymenoptera	Scoliidae	Trielis	octomaculata	(Saussure)		Scoliid Wasp	Expected
2815	Arthropoda	Insecta	Hymenoptera	Scoliidae	Triscolia	ardens	(Smith)		Scoliid Wasp	Expected
2816	Arthropoda	Insecta	Hymenoptera	Siricidae	Tremex	columba	(Linnaeus)		Horntail	Expected
2817	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	aberti	Haldeman		Thread-waisted Wasp	Expected
2818	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	azteca	Cameron		Thread-waisted Wasp	Expected
2819	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	breviceps	Smith		Thread-waisted Wasp	Expected
2820	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	californica	Menke		Thread-waisted Wasp	Expected
2821	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	cleopatra	Menke		Thread-waisted Wasp	Expected
2822	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	communis	Cresson		Thread-waisted Wasp	Expected
2823	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	femurrubra	Fox		Thread-waisted Wasp	Expected
2824	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	fernaldi	(Murray)		Thread-waisted Wasp	Expected
2825	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	ferruginosa	Cresson		Thread-waisted Wasp	Expected
2826	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	placida	Smith		Thread-waisted Wasp	Expected
2827	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	procera	Dahlbom		Common thread-waisted wa	Expected
2828	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	pruinosa	Cresson		Thread-waisted Wasp	Expected
2829	Arthropoda	Insecta	Hymenoptera	Sphecidae	Ammophila	wrightii	(Cresson)		Wright's thread-waisted was	Expected
2830	Arthropoda	Insecta	Hymenoptera	Sphecidae	Chalybion	californicum	(Saussure)		Thread-waisted Wasp	Expected
2831	Arthropoda	Insecta	Hymenoptera	Sphecidae	Chalybion	zimmermani	Dahlbom	aztecum	Thread-waisted Wasp	Expected
2832	Arthropoda	Insecta	Hymenoptera	Sphecidae	Chlorion	aerarium	Patton		Blue mud dauber	Expected
2833	Arthropoda	Insecta	Hymenoptera	Sphecidae	Chlorion	cyaneum	Dahlbom		Thread-waisted Wasp	Expected
2834	Arthropoda	Insecta	Hymenoptera	Sphecidae	Isodontia	elegans	Smith		Thread-waisted Wasp	Expected
2835	Arthropoda	Insecta	Hymenoptera	Sphecidae	Palmodes	dimidiatus	(De Geer)		Thread-waisted Wasp	Expected
2836	Arthropoda	Insecta	Hymenoptera	Sphecidae	Palmodes	praestans	(Kohl)		Thread-waisted Wasp	Expected
2837	Arthropoda	Insecta	Hymenoptera	Sphecidae	Podalonia	micklei	Murray		Thread-waisted Wasp	Expected
2838	Arthropoda	Insecta	Hymenoptera	Sphecidae	Podalonia	valida	(Cresson)		Thread-waisted Wasp	Expected
2839	Arthropoda	Insecta	Hymenoptera	Sphecidae	Prionyx	atratus	(Lepeletier)		Thread-waisted Wasp	Expected
2840	Arthropoda	Insecta	Hymenoptera	Sphecidae	Prionyx	bifoveolatum	Tash		Thread-waisted Wasp	Expected
2841	Arthropoda	Insecta	Hymenoptera	Sphecidae	Prionyx	foxi	Bohart and Menke		Thread-waisted Wasp	Expected
2842	Arthropoda	Insecta	Hymenoptera	Sphecidae	Prionyx	parkeri	Bohart and Menke		Thread-waisted Wasp	Expected
2843	Arthropoda	Insecta	Hymenoptera	Sphecidae	Prionyx	subatratus	(Bohart)		Thread-waisted Wasp	Expected
2844	Arthropoda	Insecta	Hymenoptera	Sphecidae	Prionyx	thomae	(Fabricius)		Thread-waisted Wasp	Expected
2845	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sceliphron	cementarium	(Drury)		Black and yellow mud daube	Expected
2846	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sphex	ashmeadi	(Fernald)		Thread-waisted Wasp	Expected
2847	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sphex	ferruginosus	(Cresson)		Thread-waisted Wasp	Expected
2848	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sphex	ichneumonius	(Linnaeus)		Great golden digger wasp	Expected
2849	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sphex	lucae	(Saussure)		Thread-waisted Wasp	Expected
2850	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sphex	pensylvanicus	Linnaeus		Great black wasp	Expected
2851	Arthropoda	Insecta	Hymenoptera	Sphecidae	Sphex	roleamicus	(Cameron)		Thread-waisted Wasp	Expected

2852	Arthropoda	Insecta	Hymenoptera	Tenthredinidae	Messa	populifolium	(Townsend)		Common Sawfly	Expected
2853	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Acanthetropis	idiotes	(Cockerell)		Flower Wasp	Expected
2854	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Acanthetropis	normalis	(Malloch)		Flower Wasp	Expected
2855	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	alcanor	(Blake)		Flower Wasp	Expected
2856	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	elegantula	Cockerell and Casad		Flower Wasp	Expected
2857	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	glabrella	(Cresson)		Flower Wasp	Expected
2858	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	indiscreta	Fox		Flower Wasp	Expected
2859	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	ioachinensis	Bradley		Flower Wasp	Expected
2860	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	linsleyi	Wasbauer		Flower Wasp	Expected
2861	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	timberlakei	Wasbauer		Flower Wasp	Expected
2862	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Brachycistis	triangularis	Fox		Flower Wasp	Expected
2863	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Colocistis	castanea	(Cresson)		Flower Wasp	Expected
2864	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Glyptacros	angustior	Mickel and Krombein		Flower Wasp	Expected
2865	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Myzinum	dubiosum	(Cresson)		Flower Wasp	Expected
2866	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Myzinum	frontale	Cresson		Flower Wasp	Expected
2867	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Myzinum	maculatum	(Fabricius)		Flower Wasp	Expected
2868	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Myzinum	spilonotum	(Cameron)		Flower Wasp	Expected
2869	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Neotiphia	cockerelli	Allen		Flower Wasp	Expected
2870	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Neotiphia	novomexicana	Allen		Flower Wasp	Expected
2871	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Neotiphia	waltoni	Allen		Flower Wasp	Expected
2872	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Quemaya	perpunctata	(Cockerell)		Flower Wasp	Expected
2873	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Tiphia	intermedia	Malloch		Flower Wasp	Expected
2874	Arthropoda	Insecta	Hymenoptera	Tiphiidae	Tiphia	schlingeri	Allen		Flower Wasp	Expected
2875	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	atheatus	Grissell		Chalcid Wasp	Expected
2876	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	capillaceus	(Huber)		Chalcid Wasp	Expected
2877	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	dasyneurae	(Huber)		Chalcid Wasp	Expected
2878	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	ferrugineus	(Huber)		Chalcid Wasp	Expected
2879	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	larreae	Grissell		Chalcid Wasp	Expected
2880	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	umbilicatus	(Gahan)		Chalcid Wasp	Expected
2881	Arthropoda	Insecta	Hymenoptera	Torymidae	Torymus	vesiculi	Moser		Chalcid Wasp	Expected
2882	Arthropoda	Insecta	Hymenoptera	Trichogrammatidae	Ittysella	lagunera	Pinto and Viggiani		Chalcid Wasp	Expected
2883	Arthropoda	Insecta	Hymenoptera	Vespidae	Mischocyttarus	flavitarsus	(Saussure)		Paper wasp	Expected
2884	Arthropoda	Insecta	Hymenoptera	Vespidae	Polistes	apachus	Saussure		Paper wasp	Expected
2885	Arthropoda	Insecta	Hymenoptera	Vespidae	Polistes	dorsalis	(Fabricius)		Paper wasp	Expected
2886	Arthropoda	Insecta	Hymenoptera	Vespidae	Polistes	exclamans	Viereck		Paper wasp	Expected
2887	Arthropoda	Insecta	Hymenoptera	Vespidae	Polistes	flavus	Cresson		Paper wasp	Expected
2888	Arthropoda	Insecta	Hymenoptera	Vespidae	Polistes	fuscatus	(Fabricius)	centralis	Paper wasp	Expected
2889	Arthropoda	Insecta	Hymenoptera	Vespidae	Vespula	maculata	(Linnaeus)		Whitefaced hornet	Expected
2890	Arthropoda	Insecta	Isoptera	Hodotermitidae	Zootermopsis	laticeps	(Banks)		Rottenwood Termite	Expected
2891	Arthropoda	Insecta	Isoptera	Kalotermitidae	Incisitermes	minor	(Banks)		Drywood Termite	Expected
2892	Arthropoda	Insecta	Isoptera	Rhinotermitidae	Reticulitermes	flavipes	Kollar		Subterranean Termite	Expected
2893	Arthropoda	Insecta	Isoptera	Rhinotermitidae	Reticulitermes	tibialis	Banks		Subterranean Termite	Expected
2894	Arthropoda	Insecta	Isoptera	Termitidae	Amitermes	wheeleri	(Desneux)		Higher Termite	Expected
2895	Arthropoda	Insecta	Isoptera	Termitidae	Gnathamitermes	tubiformans	(Buckley)		Higher Termite	Expected
2896	Arthropoda	Insecta	Lepidoptera	Apatalodidae	Olceclostera	angelica	Grote		Moth	Expected
2897	Arthropoda	Insecta	Lepidoptera	Apatalodidae	Olceclostera	seraphica	(Dyar)		Moth	Expected

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2898	Arthropoda	Insecta	Lepidoptera	Arctiidae	Aemelia	ambigua	(Strecker)	Tiger Moth	Expected
2899	Arthropoda	Insecta	Lepidoptera	Arctiidae	Apantesis	figurata	(Drury)	Tiger Moth	Expected
2900	Arthropoda	Insecta	Lepidoptera	Arctiidae	Apantesis	nevadensis	(Grote and Robinson)	Tiger Moth	Expected
2901	Arthropoda	Insecta	Lepidoptera	Arctiidae	Apantesis	proxima	(Guerin-Meneville)	Tiger Moth	Expected
2902	Arthropoda	Insecta	Lepidoptera	Arctiidae	Arachnis	picta	Packard	Tiger Moth	Expected
2903	Arthropoda	Insecta	Lepidoptera	Arctiidae	Arachnis	zuni	Neumoegen	Tiger Moth	Expected
2904	Arthropoda	Insecta	Lepidoptera	Arctiidae	Bertholdia	trigona	(Grote)	Tiger Moth	Expected
2905	Arthropoda	Insecta	Lepidoptera	Arctiidae	Bruceia	pulverina	Neumoegen	Tiger Moth	Expected
2906	Arthropoda	Insecta	Lepidoptera	Arctiidae	Cisthene	angelus	(Dyar)	Tiger Moth	Expected
2907	Arthropoda	Insecta	Lepidoptera	Arctiidae	Cisthene	barnesii	(Dyar)	Tiger Moth	Expected
2908	Arthropoda	Insecta	Lepidoptera	Arctiidae	Crambidia	cephalica	(Grote and Robinson)	Tiger Moth	Expected
2909	Arthropoda	Insecta	Lepidoptera	Arctiidae	Ctenucha	cressonana	Grote	Tiger Moth	Expected
2910	Arthropoda	Insecta	Lepidoptera	Arctiidae	Ctenucha	venosa	Walker	Tiger Moth	Expected
2911	Arthropoda	Insecta	Lepidoptera	Arctiidae	Cycnia	inopinatus	(Hy. Edwards)	Tiger Moth	Expected
2912	Arthropoda	Insecta	Lepidoptera	Arctiidae	Dysschema	howardi	(Hy. Edwards)	Tiger Moth	Expected
2913	Arthropoda	Insecta	Lepidoptera	Arctiidae	Ectypia	bivittata	Clemens	Tiger Moth	Expected
2914	Arthropoda	Insecta	Lepidoptera	Arctiidae	Ectypia	clio	(Packard)	Tiger Moth	Expected
2915	Arthropoda	Insecta	Lepidoptera	Arctiidae	Euchaetes	perlaevis	Grote	Tiger Moth	Expected
2916	Arthropoda	Insecta	Lepidoptera	Arctiidae	Euchaetes	polingi	(Cassino)	Tiger Moth	Expected
2917	Arthropoda	Insecta	Lepidoptera	Arctiidae	Euchaetes	zella	(Dyar)	Tiger Moth	Expected
2918	Arthropoda	Insecta	Lepidoptera	Arctiidae	Eustigmene	acrea	(Drury)	Salt marsh caterpillar moth	Expected
2919	Arthropoda	Insecta	Lepidoptera	Arctiidae	Grammia	nevadensis	(Grote and Robinson)	Tiger Moth	Expected
2920	Arthropoda	Insecta	Lepidoptera	Arctiidae	Halysidota	davisii	Hy. Edwards	Tiger Moth	Expected
2921	Arthropoda	Insecta	Lepidoptera	Arctiidae	Hemihylea	labecula	Grote	Tiger Moth	Expected
2922	Arthropoda	Insecta	Lepidoptera	Arctiidae	Holomelina	costata	(Stretch)	Tiger Moth	Expected
2923	Arthropoda	Insecta	Lepidoptera	Arctiidae	Hyphantria	cunea	(Drury)	Fall webworm moth	Expected
2924	Arthropoda	Insecta	Lepidoptera	Arctiidae	Lophocampa	argentata	(Packard)	Tiger Moth	Expected
2925	Arthropoda	Insecta	Lepidoptera	Arctiidae	Lophocampa	ingens	(Hy. Edwards)	Tiger Moth	Expected
2926	Arthropoda	Insecta	Lepidoptera	Arctiidae	Lycomorpha	fulgens	(Hy. Edwards)	Tiger Moth	Expected
2927	Arthropoda	Insecta	Lepidoptera	Arctiidae	Lycomorpha	grotei	(Packard)	Tiger Moth	Known
2928	Arthropoda	Insecta	Lepidoptera	Arctiidae	Lycomorpha	splendens	Barnes and McDunnough	Tiger Moth	Expected
2929	Arthropoda	Insecta	Lepidoptera	Arctiidae	Opharus	muricolor	(Dyar)	Tiger Moth	Expected
2930	Arthropoda	Insecta	Lepidoptera	Arctiidae	Pagana	fuscipes	(Grote)	Tiger Moth	Expected
2931	Arthropoda	Insecta	Lepidoptera	Arctiidae	Pygarctia	eglenensis	(Clemens)	Tiger Moth	Expected
2932	Arthropoda	Insecta	Lepidoptera	Arctiidae	Pygarctia	murina	(Stretch)	Tiger Moth	Expected
2933	Arthropoda	Insecta	Lepidoptera	Arctiidae	Spilosoma	virginica	Fabricius	Yellow woollybear moth	Expected
2934	Arthropoda	Insecta	Lepidoptera	Arctiidae	Turuptiana	permaculata	(Packard)	Tiger Moth	Expected
2935	Arthropoda	Insecta	Lepidoptera	Blastobasidae	Holocera	gigantella	Chambers	Scavenger Moth	Expected
2936	Arthropoda	Insecta	Lepidoptera	Cochylidae	Hysterosea	perspicuana	Barnes and Busck	Moth	Expected
2937	Arthropoda	Insecta	Lepidoptera	Cochylidae	Nycthia	pimana	(Busck)	Moth	Expected
2938	Arthropoda	Insecta	Lepidoptera	Cochylidae	Nycthia	yuccatana	(Busck)	Moth	Expected
2939	Arthropoda	Insecta	Lepidoptera	Cochylidae	Rudenia	legumiana	(Busck)	Moth	Expected
2940	Arthropoda	Insecta	Lepidoptera	Cochylidae	Saphenista	felix	(Walsingham)	Moth	Expected
2941	Arthropoda	Insecta	Lepidoptera	Cosmopterigidae	Anoncia	callida	Hodges	Cosmet Moth	Expected
2942	Arthropoda	Insecta	Lepidoptera	Cosmopterigidae	Walshia	miscecolorella	(Chambers)	Cosmet Moth	Expected
2943	Arthropoda	Insecta	Lepidoptera	Cossidae	Comadia	albistriga	(Barnes and McDunnough)	Carpenter Moth	Expected

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2944	Arthropoda	Insecta	Lepidoptera	Cossidae	Comadia	bertholdi	(Grote)	polingi	Carpenter Moth	Expected
2945	Arthropoda	Insecta	Lepidoptera	Cossidae	Comadia	henrici	(Grote)		Carpenter Moth	Expected
2946	Arthropoda	Insecta	Lepidoptera	Cossidae	Givira	ethela (nr.)	(Neumoegen and Dyar)		Carpenter Moth	Expected
2947	Arthropoda	Insecta	Lepidoptera	Cossidae	Givira	lucretia	Barnes and McDunnough		Carpenter Moth	Expected
2948	Arthropoda	Insecta	Lepidoptera	Cossidae	Prionoxystus	robiniae	(Peck)		Carpenterworm	Expected
2949	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Anacampsis	paltodoriella	Busck		Twirler Moth	Expected
2950	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Aristotelia	elegantella	(Chambers)		Twirler Moth	Expected
2951	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Aristotelia	ochroxysta	Meyrick		Twirler Moth	Expected
2952	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Aroga	paulella	(Busck)		Twirler Moth	Expected
2953	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Calliprora	sexstrigella	(Chambers)		Twirler Moth	Expected
2954	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Chionodes	fructuarius	(Braun)		Twirler Moth	Expected
2955	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Chionodes	kincaidella	(Busck)		Twirler Moth	Expected
2956	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Compsolechia	crescentifasciella	(Chambers)		Twirler Moth	Expected
2957	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Dichomeris	mica	Hodges		Twirler Moth	Expected
2958	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Faculta	inaequalis	Busck		Twirler Moth	Expected
2959	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Filatima	albilorella	(Zeller)		Twirler Moth	Expected
2960	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Filatima	biforella	(Busck)		Twirler Moth	Expected
2961	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Filatima	depuratella	(Busck)		Twirler Moth	Expected
2962	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Filatima	hemicrossa	(Meyrick)		Twirler Moth	Expected
2963	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Filatima	obidenna	Clarke		Twirler Moth	Expected
2964	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Filatima	obscurosuffusella	(Chambers)		Twirler Moth	Expected
2965	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Friseria	cockerelli	(Busck)		Twirler Moth	Expected
2966	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Frumenta	nephelomicta	(Meyrick)		Twirler Moth	Expected
2967	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Lita	barnesiella	(Busck)		Twirler Moth	Expected
2968	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Lita	rectistrigella	(Barnes and Busck)		Twirler Moth	Expected
2969	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Nealyda	bifidella	Dietz		Twirler Moth	Expected
2970	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Pectinophora	gossypiella	(Saunders)		Pink bollworm	Expected
2971	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Rifseria	fuscotaeniella	(Chambers)		Twirler Moth	Expected
2972	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Sriferia	cockerella	(Busck)		Twirler Moth	Expected
2973	Arthropoda	Insecta	Lepidoptera	Gelechiidae	Stegasta	bosqueella	(Chambers)		Twirler Moth	Expected
2974	Arthropoda	Insecta	Lepidoptera	Geometridae	Anacamptodes	angulata	Rindge		Geometrid Moth	Expected
2975	Arthropoda	Insecta	Lepidoptera	Geometridae	Anacamptodes	dataria	(Grote)		Geometrid Moth	Expected
2976	Arthropoda	Insecta	Lepidoptera	Geometridae	Anacamptodes	obliquaria	(Grote)		Geometrid Moth	Expected
2977	Arthropoda	Insecta	Lepidoptera	Geometridae	Anavitrinelia	pampinaria	(Guenee)		Cranberry spanworm	Expected
2978	Arthropoda	Insecta	Lepidoptera	Geometridae	Animomyia	minuta	Rindge		Geometrid Moth	Expected
2979	Arthropoda	Insecta	Lepidoptera	Geometridae	Animomyia	smithii	(Pearsall)		Geometrid Moth	Expected
2980	Arthropoda	Insecta	Lepidoptera	Geometridae	Archirhoe	neomexicana	(Hulst)		Geometrid Moth	Expected
2981	Arthropoda	Insecta	Lepidoptera	Geometridae	Biston	betularia	(Linnaeus)	cognitaria	Pepper-and-salt moth	Expected
2982	Arthropoda	Insecta	Lepidoptera	Geometridae	Caripeta	hilumaria	(Hulst)		Geometrid Moth	Expected
2983	Arthropoda	Insecta	Lepidoptera	Geometridae	Chesiadodes	polingi	(Cassino)		Geometrid Moth	Expected
2984	Arthropoda	Insecta	Lepidoptera	Geometridae	Cheteoscelis	bistriaria	(Packard)		Geometrid Moth	Expected
2985	Arthropoda	Insecta	Lepidoptera	Geometridae	Chlorochlamys	appellaria	Pearsall		Geometrid Moth	Expected
2986	Arthropoda	Insecta	Lepidoptera	Geometridae	Chlorosea	roseitacta	Prout		Geometrid Moth	Expected
2987	Arthropoda	Insecta	Lepidoptera	Geometridae	Chlorospilates	bicoloraria	Packard		Geometrid Moth	Expected
2988	Arthropoda	Insecta	Lepidoptera	Geometridae	Chlorospilates	minima	(Hulst)		Geometrid Moth	Expected
2989	Arthropoda	Insecta	Lepidoptera	Geometridae	Cochesia	barnesi	Cassino and Swett		Geometrid Moth	Expected

2990	Arthropoda	Insecta	Lepidoptera	Geometridae	Cyclophora	nanaria	(Walker)		Geometrid Moth	Expected
2991	Arthropoda	Insecta	Lepidoptera	Geometridae	Dichorda	rectaria	(Grote)		Geometrid Moth	Expected
2992	Arthropoda	Insecta	Lepidoptera	Geometridae	Dichordophora	phoenix	(Prout)		Geometrid Moth	Expected
2993	Arthropoda	Insecta	Lepidoptera	Geometridae	Drepanulatrix	bifilata	(Hulst)		Geometrid Moth	Expected
2994	Arthropoda	Insecta	Lepidoptera	Geometridae	Drepanulatrix	unicalcaria	(Guenee)		Geometrid Moth	Expected
2995	Arthropoda	Insecta	Lepidoptera	Geometridae	Enconista	dislocaria	(Packard)	malefactaria	Geometrid Moth	Expected
2996	Arthropoda	Insecta	Lepidoptera	Geometridae	Epirrhoe	alternata	(Muller)		Geometrid Moth	Expected
2997	Arthropoda	Insecta	Lepidoptera	Geometridae	Eriplatymetra	grotearia	(Packard)		Geometrid Moth	Expected
2998	Arthropoda	Insecta	Lepidoptera	Geometridae	Ersiphila	indistincta	Hulst		Geometrid Moth	Expected
2999	Arthropoda	Insecta	Lepidoptera	Geometridae	Euacidalia	quakerata	Cassino		Geometrid Moth	Expected
3000	Arthropoda	Insecta	Lepidoptera	Geometridae	Eubaphe	unicolor	(Robinson)		Geometrid Moth	Expected
3001	Arthropoda	Insecta	Lepidoptera	Geometridae	Eubarnesia	ritaria	(Grossbeck)		Geometrid Moth	Expected
3002	Arthropoda	Insecta	Lepidoptera	Geometridae	Eucaterva	bonniwelli	Cassino and Swett		Geometrid Moth	Expected
3003	Arthropoda	Insecta	Lepidoptera	Geometridae	Eucaterva	variaria	Grote		Geometrid Moth	Expected
3004	Arthropoda	Insecta	Lepidoptera	Geometridae	Euchlaena	johnsonaria	(Fitch)		Geometrid Moth	Expected
3005	Arthropoda	Insecta	Lepidoptera	Geometridae	Eulithis	luteolata	(Hulst)		Geometrid Moth	Expected
3006	Arthropoda	Insecta	Lepidoptera	Geometridae	Eupithecia	anticaria	Walker		Geometrid Moth	Expected
3007	Arthropoda	Insecta	Lepidoptera	Geometridae	Eupithecia	maestosa	(Hulst)		Geometrid Moth	Expected
3008	Arthropoda	Insecta	Lepidoptera	Geometridae	Eupithecia	miserulata	Grote		Geometrid Moth	Expected
3009	Arthropoda	Insecta	Lepidoptera	Geometridae	Eusarca	geniculata	(Hulst)		Geometrid Moth	Expected
3010	Arthropoda	Insecta	Lepidoptera	Geometridae	Galbriola	minima	(Hulst)		Geometrid Moth	Expected
3011	Arthropoda	Insecta	Lepidoptera	Geometridae	Galeneria	lixarioides	McDunnough		Geometrid Moth	Expected
3012	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	dispersa	Rindge		Geometrid Moth	Expected
3013	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	elongata	(Hulst)		Geometrid Moth	Expected
3014	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	erroraria	Dyar		Geometrid Moth	Expected
3015	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	escaria	(Grote)		Geometrid Moth	Expected
3016	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	ignavaria	(Pearsall)		Geometrid Moth	Expected
3017	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	imperdata	(Dyar)		Geometrid Moth	Expected
3018	Arthropoda	Insecta	Lepidoptera	Geometridae	Glaucina	interruptaria	(Grote)		Geometrid Moth	Expected
3019	Arthropoda	Insecta	Lepidoptera	Geometridae	Glena	macdunnougharia	Sperry	kirkwoodaria	Geometrid Moth	Expected
3020	Arthropoda	Insecta	Lepidoptera	Geometridae	Glena	nigricaria	(Barnes and McDunnough)		Geometrid Moth	Expected
3021	Arthropoda	Insecta	Lepidoptera	Geometridae	Glena	quinquelinearia	(Packard)		Geometrid Moth	Expected
3022	Arthropoda	Insecta	Lepidoptera	Geometridae	Hemimorina	dissociata	McDunnough		Geometrid Moth	Expected
3023	Arthropoda	Insecta	Lepidoptera	Geometridae	Hydriomena	barnesata	Swett		Geometrid Moth	Expected
3024	Arthropoda	Insecta	Lepidoptera	Geometridae	Idaea	furciferata	(Packard)		Geometrid Moth	Expected
3025	Arthropoda	Insecta	Lepidoptera	Geometridae	Idaea	gemmata	(Packard)		Geometrid Moth	Expected
3026	Arthropoda	Insecta	Lepidoptera	Geometridae	Idaea	obfusaria	(Walker)		Geometrid Moth	Expected
3027	Arthropoda	Insecta	Lepidoptera	Geometridae	Idaea	occidentaria	(Packard)		Geometrid Moth	Expected
3028	Arthropoda	Insecta	Lepidoptera	Geometridae	Iridopsis	emasculata	(Dyar)		Geometrid Moth	Expected
3029	Arthropoda	Insecta	Lepidoptera	Geometridae	Itame	grossbecki	(Barnes and McDunnough)		Geometrid Moth	Expected
3030	Arthropoda	Insecta	Lepidoptera	Geometridae	Itame	minata	Cassino		Geometrid Moth	Expected
3031	Arthropoda	Insecta	Lepidoptera	Geometridae	Itame	pallipennata	(Barnes and McDunnough)		Geometrid Moth	Expected
3032	Arthropoda	Insecta	Lepidoptera	Geometridae	Itame	schatzeata	Cassino		Geometrid Moth	Expected
3033	Arthropoda	Insecta	Lepidoptera	Geometridae	Itame	sobriaria	Barnes and McDunnough		Geometrid Moth	Expected
3034	Arthropoda	Insecta	Lepidoptera	Geometridae	Lithostege	deserticola	Barnes and McDunnough		Geometrid Moth	Expected
3035	Arthropoda	Insecta	Lepidoptera	Geometridae	Lithostege	marcata	Barnes and McDunnough		Geometrid Moth	Expected

3036	Arthropoda	Insecta	Lepidoptera	Geometridae	Lithostege	rotundata	Packard	Geometrid Moth	Expected
3037	Arthropoda	Insecta	Lepidoptera	Geometridae	Lobocleta	griseata	(Cassino)	Geometrid Moth	Expected
3038	Arthropoda	Insecta	Lepidoptera	Geometridae	Lobocleta	plemyraria	(Guenee)	Geometrid Moth	Expected
3039	Arthropoda	Insecta	Lepidoptera	Geometridae	Mericisca	gracea	Hulst	Geometrid Moth	Expected
3040	Arthropoda	Insecta	Lepidoptera	Geometridae	Nacophora	kirkwoodi	(Rindge)	Geometrid Moth	Expected
3041	Arthropoda	Insecta	Lepidoptera	Geometridae	Nacophora	mexicanaria	(Grote)	Geometrid Moth	Expected
3042	Arthropoda	Insecta	Lepidoptera	Geometridae	Narraga	fimetaria	(Grote and Robinson)	Geometrid Moth	Expected
3043	Arthropoda	Insecta	Lepidoptera	Geometridae	Narraga	stalachtaria	(Strecker)	Geometrid Moth	Expected
3044	Arthropoda	Insecta	Lepidoptera	Geometridae	Nemeris	speciosa	(Hulst)	Geometrid Moth	Expected
3045	Arthropoda	Insecta	Lepidoptera	Geometridae	Nemoria	caerulescens	Prout	Geometrid Moth	Expected
3046	Arthropoda	Insecta	Lepidoptera	Geometridae	Nemoria	intensaria	(Pearsall)	Geometrid Moth	Expected
3047	Arthropoda	Insecta	Lepidoptera	Geometridae	Nemoria	obliqua	(Hulst)	Geometrid Moth	Expected
3048	Arthropoda	Insecta	Lepidoptera	Geometridae	Nemoria	rindgei	Ferguson	Geometrid Moth	Expected
3049	Arthropoda	Insecta	Lepidoptera	Geometridae	Nepterotaea	diagonalis	Cassino	Geometrid Moth	Expected
3050	Arthropoda	Insecta	Lepidoptera	Geometridae	Nepterotaea	furva	Rindge	Geometrid Moth	Expected
3051	Arthropoda	Insecta	Lepidoptera	Geometridae	Orthonamma	centrostrigaria	(Wollaston)	Geometrid Moth	Expected
3052	Arthropoda	Insecta	Lepidoptera	Geometridae	Parapheromia	lichenaria	(Pearsall)	Geometrid Moth	Expected
3053	Arthropoda	Insecta	Lepidoptera	Geometridae	Perizoma	custodiata	(Guenee)	Geometrid Moth	Expected
3054	Arthropoda	Insecta	Lepidoptera	Geometridae	Pero	meskaria	(Packard)	Geometrid Moth	Expected
3055	Arthropoda	Insecta	Lepidoptera	Geometridae	Pero	modesta	(Grossbeck)	Geometrid Moth	Expected
3056	Arthropoda	Insecta	Lepidoptera	Geometridae	Pero	radiosaria	(Hulst)	Geometrid Moth	Expected
3057	Arthropoda	Insecta	Lepidoptera	Geometridae	Pigia	multilineata	Hulst	Geometrid Moth	Expected
3058	Arthropoda	Insecta	Lepidoptera	Geometridae	Plataea	blanchardaria	Knudson	Geometrid Moth	Expected
3059	Arthropoda	Insecta	Lepidoptera	Geometridae	Plataea	pausaniasi	Rindge	Geometrid Moth	Expected
3060	Arthropoda	Insecta	Lepidoptera	Geometridae	Plataea	trilinearia	(Packard)	Geometrid Moth	Expected
3061	Arthropoda	Insecta	Lepidoptera	Geometridae	Prorella	albida	(Cassino and Swett)	Geometrid Moth	Expected
3062	Arthropoda	Insecta	Lepidoptera	Geometridae	Prorella	gypsata	(Grote)	Geometrid Moth	Expected
3063	Arthropoda	Insecta	Lepidoptera	Geometridae	Prorella	protoptata	(McDunnough)	Geometrid Moth	Expected
3064	Arthropoda	Insecta	Lepidoptera	Geometridae	Protoproutea	laredoata	(Cassino)	Geometrid Moth	Expected
3065	Arthropoda	Insecta	Lepidoptera	Geometridae	Protoproutea	rusticaria	McDunnough	Geometrid Moth	Expected
3066	Arthropoda	Insecta	Lepidoptera	Geometridae	Pterospoda	nigrescens	(Hulst)	Geometrid Moth	Expected
3067	Arthropoda	Insecta	Lepidoptera	Geometridae	Scopula	limboundata	(Haworth)	Geometrid Moth	Expected
3068	Arthropoda	Insecta	Lepidoptera	Geometridae	Scopula	plantagenaria	(Hulst)	Geometrid Moth	Expected
3069	Arthropoda	Insecta	Lepidoptera	Geometridae	Semaeopus	gracilata	(Grossbeck)	Geometrid Moth	Expected
3070	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	californiaria (nr.)	(Packard)	Geometrid Moth	Expected
3071	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	colorata	Grote	Geometrid Moth	Expected
3072	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	cyda	(Druce)	Geometrid Moth	Expected
3073	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	delectata	Hulst	Geometrid Moth	Expected
3074	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	denticulata	Grote	Geometrid Moth	Expected
3075	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	excurvata	(Packard)	Geometrid Moth	Expected
3076	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	irrorata	(Packard)	Geometrid Moth	Expected
3077	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	neptaria	(Guenee)	Geometrid Moth	Expected
3078	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	nigroalbana	(Cassino)	Geometrid Moth	Expected
3079	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	parcata	(Grossbeck)	Geometrid Moth	Expected
3080	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	pervolata	(Hulst)	Geometrid Moth	Expected
3081	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	pictipennata	(Hulst)	Geometrid Moth	Expected

3082	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	respersata	(Hulst)		Geometrid Moth	Expected
3083	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	s-signata	(Packard)		Geometrid Moth	Expected
3084	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	triviata	(Barnes and McDunnough)		Geometrid Moth	Expected
3085	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	unipunctata	(W. S. Wright)		Geometrid Moth	Expected
3086	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	versitata	(Pearsall)		Geometrid Moth	Expected
3087	Arthropoda	Insecta	Lepidoptera	Geometridae	Semiothisa	yavapai	(Grossbeck)		Geometrid Moth	Expected
3088	Arthropoda	Insecta	Lepidoptera	Geometridae	Sicya	morsicaria	(Hulst)		Geometrid Moth	Expected
3089	Arthropoda	Insecta	Lepidoptera	Geometridae	Somatolophia	haydenata	(Packard)		Geometrid Moth	Expected
3090	Arthropoda	Insecta	Lepidoptera	Geometridae	Stamnoctenis	morrisata	(Hulst)		Geometrid Moth	Expected
3091	Arthropoda	Insecta	Lepidoptera	Geometridae	Stamnodes	fervefactaria	(Grote)		Geometrid Moth	Expected
3092	Arthropoda	Insecta	Lepidoptera	Geometridae	Stamnodes	formostata	(Strecker)		Geometrid Moth	Expected
3093	Arthropoda	Insecta	Lepidoptera	Geometridae	Stamnodes	nr. deceptiva	Barnes and McDunnough		Geometrid Moth	Expected
3094	Arthropoda	Insecta	Lepidoptera	Geometridae	Stamnodes	seiferti	(Neumogen)		Geometrid Moth	Expected
3095	Arthropoda	Insecta	Lepidoptera	Geometridae	Stenoporpia	anastomosaria	(Grossbeck)		Geometrid Moth	Expected
3096	Arthropoda	Insecta	Lepidoptera	Geometridae	Stenoporpia	anellula	(Barnes and McDunnough)		Geometrid Moth	Expected
3097	Arthropoda	Insecta	Lepidoptera	Geometridae	Stenoporpia	glaucomarginata	McDunnough		Geometrid Moth	Expected
3098	Arthropoda	Insecta	Lepidoptera	Geometridae	Stenoporpia	macdunnoughi	Sperry		Geometrid Moth	Expected
3099	Arthropoda	Insecta	Lepidoptera	Geometridae	Stenoporpia	pulchella	(Grossbeck)		Geometrid Moth	Expected
3100	Arthropoda	Insecta	Lepidoptera	Geometridae	Stergamataea	delicata	(Hulst)	dolliata	Geometrid Moth	Expected
3101	Arthropoda	Insecta	Lepidoptera	Geometridae	Stergamataea	inornata	Hulst		Geometrid Moth	Expected
3102	Arthropoda	Insecta	Lepidoptera	Geometridae	Synchlora	aerata	(Fabricius)		Geometrid Moth	Expected
3103	Arthropoda	Insecta	Lepidoptera	Geometridae	Synglochis	perumbraria	Hulst		Geometrid Moth	Expected
3104	Arthropoda	Insecta	Lepidoptera	Geometridae	Vinemina	opicaria	(Hulst)		Geometrid Moth	Expected
3105	Arthropoda	Insecta	Lepidoptera	Geometridae	Xerochlora	inveterascaria	(Swett)		Geometrid Moth	Expected
3106	Arthropoda	Insecta	Lepidoptera	Geometridae	Xerochlora	masonaria	(Schaus)		Geometrid Moth	Expected
3107	Arthropoda	Insecta	Lepidoptera	Geometridae	Xerochlora	mesotheides	Ferguson		Geometrid Moth	Expected
3108	Arthropoda	Insecta	Lepidoptera	Geometridae	Zenophleps	lignicolorata	(Packard)		Geometrid Moth	Expected
3109	Arthropoda	Insecta	Lepidoptera	Geometridae	Zenophleps	obscurata	Hulst	infumata	Geometrid Moth	Expected
3110	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Amblyscirtes	aenus	W. H. Edwards		Bronze little skipper	Expected
3111	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Amblyscirtes	nysa	W. H. Edwards		Mottled litte skipper	Expected
3112	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Amblyscirtes	oslari	(Skinner)		Prairie little skipper	Expected
3113	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Amblyscirtes	texanae	Bell		Southwest little skipper	Known
3114	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Ancyloxypha	arene	(W. H. Edwards)		Tropical least skipperling	Known
3115	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Atrytonopsis	python	(W. H. Edwards)		Yellow-spot dusted skipper	Known
3116	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Atrytonopsis	vierecki	(Skinner)		Viereck's dusted skipper	Known
3117	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Celotes	nessus	(W. H. Edwards)		Streaky skipper	Expected
3118	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Cogia	hippalus	(W. H. Edwards)		White-edged skipper	Expected
3119	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Copaeodes	aurantiacus	(Hewitson)		Orange skipperling	Expected
3120	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Epargyreus	clarus	(Cramer)		Silver-spotted skipper	Known
3121	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Erynnis	brizo	(Boisduval and LeConte)		Aspen duskywing	Expected
3122	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Erynnis	funeralis	(Scudder and Burgess)		Streamlined duskywing	Known
3123	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Erynnis	meridianus	Bell		Southwestern oak duskywing	Known
3124	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Erynnis	telemachus	Burns		Gambel oak duskywing	Known
3125	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Erynnis	tristis	(Boisduval)	tatius	White-edged duskywing	Known
3126	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Hesperia	pahaska	(Leussler)		Yellow-dust skipper	Known
3127	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Hesperopsis	alpheus	W. H. Edwards		Saltbush sootywing	Expected

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3128	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Hylephila	phyleus	(Drury)		Fiery skipper	Expected
3129	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Pholisora	catullus	(Fabricius)		Common sootywing	Expected
3130	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Poanes	taxiles	(W. H. Edwards)		Golden skipper	Known
3131	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Pyrgus	albescens	Plotz		Skipper	Expected
3132	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Pyrgus	communis	(Grote)	communis	Checkered skipper	Known
3133	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Pyrgus	scriptura	(Boisduval)		Small checkered skipper	Known
3134	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Staphylos	ceos	(W. H. Edwards)		Redhead sootywing	Expected
3135	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Systasea	zampa	(W.H. Edwards)		Arizona powdered skipper	Expected
3136	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Thorybes	pylades	(Scudder)		Northern cloudywing	Known
3137	Arthropoda	Insecta	Lepidoptera	Hesperiidae	Yvretta	carus	(W. H. Edwards)		Mexican cobweb skipper	Expected
3138	Arthropoda	Insecta	Lepidoptera	Incurvariidae	Agavenema	barberella	(Busck)		Leafcutter Moth	Expected
3139	Arthropoda	Insecta	Lepidoptera	Incurvariidae	Mesepiola	specca	Davis		Leafcutter Moth	Expected
3140	Arthropoda	Insecta	Lepidoptera	Lasiocampidae	Apotolype	brevicrista	(Dyar)		Lappet Moth	Expected
3141	Arthropoda	Insecta	Lepidoptera	Lasiocampidae	Gloveria	arizonensis	Packard		Lappet Moth	Expected
3142	Arthropoda	Insecta	Lepidoptera	Lasiocampidae	Malacosoma	californicum	(Packard)		Western tent caterpillar	Expected
3143	Arthropoda	Insecta	Lepidoptera	Lasiocampidae	Malacosoma	disstria	Hubner		Forest tree caterpillar moth	Expected
3144	Arthropoda	Insecta	Lepidoptera	Lasiocampidae	Malacosoma	tigris	(Dyar)		Sonoran tent caterpillar	Expected
3145	Arthropoda	Insecta	Lepidoptera	Lasiocampidae	Tolype	distincta	French		Lappet Moth	Expected
3146	Arthropoda	Insecta	Lepidoptera	Limacodidae	Euclea	nanina	Dyar		Slug Caterpillar Moth	Expected
3147	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Apodemia	mormo	(Felder and Felder)	duryi	Duryi's metalmark	Expected
3148	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Apodemia	mormo	(Felder and Felder)	mejicana	Mexican mormon metalmarl	Expected
3149	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Apodemia	palmerii	(W. H. Edwards)		Arizona mesquite metalmark	Expected
3150	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Atlides	halesus	(Cramer)	estesi	Great blue hairstreak	Expected
3151	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Brephidium	exile	(Boisduval)		Western pygmy blue	Expected
3152	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Calephelis	nemesis	(W. H. Edwards)		Mexican/Fatal metalmark	Expected
3153	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Callophrys	henrici	(Grote and Robinson)	solatus	Trans-Pecos elfin	Expected
3154	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Callophrys	mcfarlandi	(Ehrlich and Clench)		Beargrass hairstreak	Expected
3155	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Callophrys	siva	(W.H. Edwards)		Juniper hairstreak	Known
3156	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Callophrys	spinetorum	(Hewitson)		Blue mistletoe hairstreak	Known
3157	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Celastrina	argiolus	(Linnaeus)	cinerea	Spring Azure	Expected
3158	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Euphilotes	rita	(Barnes and McDunnough)		Desert buckwheat blue	Expected
3159	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Everes	comyntas	(Godart)		Eastern tailed blue	Expected
3160	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Fixsenia	polingi	(Barnes and Benjamin)		Poling's hairstreak	Expected
3161	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Hemiargus	ceraunus	(Fabricius)	gyas	Southern blue	Known
3162	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Hemiargus	isola	(Reakirt)	alce	Reakirt's blue	Expected
3163	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Leptotes	marina	(Reakirt)		Striped blue	Expected
3164	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Ministrymon	leda	(W. H. Edwards)		Mesquite hairstreak	Known
3165	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Phaeostrymon	alcestis	(W. H. Edwards)	alcestis	Soapberry hairstreak	Expected
3166	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Plebejus	acmon	(Westwood and Hewitson)	texanus	Texas emerald-studded blue	Expected
3167	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Plebejus	melissa	(W. H. Edwards)		Orange-bordered blue	Expected
3168	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Strymon	melinus	Hubner	franki	Gray hairstreak	Expected
3169	Arthropoda	Insecta	Lepidoptera	Lycaenidae	Zizula	cyna	(W. H. Edwards)		Tiny blue	Expected
3170	Arthropoda	Insecta	Lepidoptera	Lyonetiidae	Bucculatrix	viguierae	Braun		Moth	Expected
3171	Arthropoda	Insecta	Lepidoptera	Megalopygidae	Lagoa	immaculata	(Cassino)		Flannel Moth	Expected
3172	Arthropoda	Insecta	Lepidoptera	Megathymidae	Agathymus	mariae	(Barnes and Benjamin)		Lechuguilla giant skipper	Expected
3173	Arthropoda	Insecta	Lepidoptera	Megathymidae	Agathymus	neumoegeni	(W. H. Edwards)	judithae	Tawny giant skipper	Expected

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3174	Arthropoda	Insecta	Lepidoptera	Megathymidae	Megathymus	ursus	Poling	violae	Desert giant skipper	Expected
3175	Arthropoda	Insecta	Lepidoptera	Megathymidae	Megathymus	yuccae	(Boisduval and Leconte)	reubeni	Yucca giant skipper	Expected
3176	Arthropoda	Insecta	Lepidoptera	Mimallonidae	Cicinnus	melsheimeri	(Harris)		Sac-Bearers	Expected
3177	Arthropoda	Insecta	Lepidoptera	Momphidae	Mompha	definitella	(Zeller)		Casebearer Moth	Expected
3178	Arthropoda	Insecta	Lepidoptera	Noctuidae	Abagrotis	alampeta	Franclemont		Owlet Moth	Expected
3179	Arthropoda	Insecta	Lepidoptera	Noctuidae	Abagrotis	alternata	(Grote)		Greater red dart moth	Known
3180	Arthropoda	Insecta	Lepidoptera	Noctuidae	Abagrotis	barnesi	(Benjamin)		Owlet Moth	Expected
3181	Arthropoda	Insecta	Lepidoptera	Noctuidae	Abagrotis	bimarginalis	(Grote)		Owlet Moth	Expected
3182	Arthropoda	Insecta	Lepidoptera	Noctuidae	Abagrotis	nefascia	(J. B. Smith)		Owlet Moth	Expected
3183	Arthropoda	Insecta	Lepidoptera	Noctuidae	Abagrotis	trigona	(J. B. Smith)		Owlet Moth	Expected
3184	Arthropoda	Insecta	Lepidoptera	Noctuidae	Achytonix	praeacuta	(J. B. Smith)		Owlet Moth	Expected
3185	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	aprica	(Hubner)		Owlet Moth	Expected
3186	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	areli	Strecker		Owlet Moth	Expected
3187	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	arida	J. B. Smith		Owlet Moth	Expected
3188	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	bella	(Barnes and McDunnough)		Owlet Moth	Expected
3189	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	bilmeki	Felder and Rogenhofer		Owlet Moth	Expected
3190	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	cretata	(Grote and Robinson)		Owlet Moth	Expected
3191	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	expolita	(Grote)		Owlet Moth	Expected
3192	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	lanceolata	(Grote)		Owlet Moth	Expected
3193	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	lucasi	J. B. Smith		Owlet Moth	Expected
3194	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	quadriplaga	J. B. Smith		Owlet Moth	Expected
3195	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	sedata	(Hy. Edwards)		Owlet Moth	Expected
3196	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	tenuicula	(Morrison)		Owlet Moth	Expected
3197	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acontia	tetragona	Walker		Owlet Moth	Expected
3198	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acopa	perpallida	Grote		Owlet Moth	Expected
3199	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acronicta	americana	Harris	eldora	Dagger moth	Expected
3200	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acronicta	brumosa	Guenee	liturata	Owlet Moth	Expected
3201	Arthropoda	Insecta	Lepidoptera	Noctuidae	Acronicta	thoracica	(Grote)		Owlet Moth	Expected
3202	Arthropoda	Insecta	Lepidoptera	Noctuidae	Agrotis	dolli	Grote		Owlet Moth	Expected
3203	Arthropoda	Insecta	Lepidoptera	Noctuidae	Agrotis	malefida	Guenee		Pale-sided cutworm moth	Expected
3204	Arthropoda	Insecta	Lepidoptera	Noctuidae	Agrotis	subterranea	(Fabricius)		Granulate cutworm moth	Expected
3205	Arthropoda	Insecta	Lepidoptera	Noctuidae	Agrotis	vetusta	Walker		Owlet Moth	Expected
3206	Arthropoda	Insecta	Lepidoptera	Noctuidae	Agrotis	ypsilon	(Hufnagel)		Black cutworm moth	Expected
3207	Arthropoda	Insecta	Lepidoptera	Noctuidae	Aleptina	inca	Dyar		Owlet Moth	Expected
3208	Arthropoda	Insecta	Lepidoptera	Noctuidae	Aleptina	junctmacula	Blanchard		Owlet Moth	Expected
3209	Arthropoda	Insecta	Lepidoptera	Noctuidae	Amphipyra	pyramidoides	Guenee		Owlet Moth	Known
3210	Arthropoda	Insecta	Lepidoptera	Noctuidae	Amyna	octo	(Guenee)		Owlet Moth	Expected
3211	Arthropoda	Insecta	Lepidoptera	Noctuidae	Andropolia	diversilineata	(Grote)		Owlet Moth	Expected
3212	Arthropoda	Insecta	Lepidoptera	Noctuidae	Anorthodes	triquetra	(Grote)		Owlet Moth	Expected
3213	Arthropoda	Insecta	Lepidoptera	Noctuidae	Apamea	grotei	(Barnes and McDunnough)		Owlet Moth	Expected
3214	Arthropoda	Insecta	Lepidoptera	Noctuidae	Arbrostola	microvalis	Ottolengui		Owlet Moth	Expected
3215	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ascalapha	odorata	(Linnaeus)		Black witch	Expected
3216	Arthropoda	Insecta	Lepidoptera	Noctuidae	Autographa	biloba	(Stephens)		Owlet Moth	Expected
3217	Arthropoda	Insecta	Lepidoptera	Noctuidae	Autographa	californica	(Speyer)		Owlet Moth	Expected
3218	Arthropoda	Insecta	Lepidoptera	Noctuidae	Azenia	implora	Grote		Owlet Moth	Expected
3219	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bagisara	buxea	(Grote)		Owlet Moth	Expected

3220	Arthropoda	Insecta	Lepidoptera	Noctuidae	Basilodes	chrysopis	Grote		Owlet Moth	Expected
3221	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bleptina	flaviguttalis	Barnes and McDunnough		Owlet Moth	Expected
3222	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bleptina	minimalis	Barnes and McDunnough		Owlet Moth	Expected
3223	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bleptina	sangamonia	Barnes and McDunnough		Owlet Moth	Expected
3224	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bryolymnia	semifasciata	(J. B. Smith)		Owlet Moth	Expected
3225	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bulia	deducta	(Morrison)		Owlet Moth	Expected
3226	Arthropoda	Insecta	Lepidoptera	Noctuidae	Bulia	similaris	Richards		Owlet Moth	Expected
3227	Arthropoda	Insecta	Lepidoptera	Noctuidae	Caenurgina	crassiuscula	(Haworth)		Owlet Moth	Expected
3228	Arthropoda	Insecta	Lepidoptera	Noctuidae	Caenurgina	erechtea	(Cramer)		Owlet Moth	Expected
3229	Arthropoda	Insecta	Lepidoptera	Noctuidae	Callistege	intercalaris	(Grote)		Owlet Moth	Expected
3230	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catabena	lineolata	Walker		Owlet Moth	Expected
3231	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catabena	terminella	(Grote)		Owlet Moth	Expected
3232	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catabena	vitrina	(Walker)		Owlet Moth	Expected
3233	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	aholibah	Strecker		Owlet Moth	Known
3234	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	arizonae	Grote		Owlet Moth	Known
3235	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	delilah	Strecker	desdemona	Owlet Moth	Known
3236	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	frederici	Grote		Owlet Moth	Expected
3237	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	hermia	Hy. Edwards	verecunda	Owlet Moth	Expected
3238	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	ilia	(Cramer)		Owlet Moth	Known
3239	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	piatrix	Grote	dionyza	Owlet Moth	Expected
3240	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	verrilliana	Grote		Owlet Moth	Expected
3241	Arthropoda	Insecta	Lepidoptera	Noctuidae	Catocala	violenta	Hy. Edwards		Owlet Moth	Expected
3242	Arthropoda	Insecta	Lepidoptera	Noctuidae	Chalcopasta	fulgens	Barnes and McDunnough		Owlet Moth	Expected
3243	Arthropoda	Insecta	Lepidoptera	Noctuidae	Chalcopasta	howardi	(Hy. Edwards)		Owlet Moth	Expected
3244	Arthropoda	Insecta	Lepidoptera	Noctuidae	Chamaeclea	pernana	(Grote)		Owlet Moth	Expected
3245	Arthropoda	Insecta	Lepidoptera	Noctuidae	Characoma	nilotica	(Roegen)		Owlet Moth	Expected
3246	Arthropoda	Insecta	Lepidoptera	Noctuidae	Charadra	ingenua	J. B. Smith		Owlet Moth	Expected
3247	Arthropoda	Insecta	Lepidoptera	Noctuidae	Chorizagrotis	auxilaris	(Grote)		Owlet Moth	Expected
3248	Arthropoda	Insecta	Lepidoptera	Noctuidae	Chorizagrotis	inconcinna	(Harvey)		Owlet Moth	Expected
3249	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cissusa	valens	(Hy. Edwards)		Owlet Moth	Expected
3250	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cobubatha	dividua	(Grote)		Owlet Moth	Expected
3251	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cobubatha	orthozona	(Hampson)		Owlet Moth	Expected
3252	Arthropoda	Insecta	Lepidoptera	Noctuidae	Condica	albolabes	(Grote)		Owlet Moth	Expected
3253	Arthropoda	Insecta	Lepidoptera	Noctuidae	Condica	temecula	Barnes		Owlet Moth	Expected
3254	Arthropoda	Insecta	Lepidoptera	Noctuidae	Conochares	alter	(J. B. Smith)		Owlet Moth	Expected
3255	Arthropoda	Insecta	Lepidoptera	Noctuidae	Conochares	arizonae	(Hy. Edwards)		Owlet Moth	Expected
3256	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copablepharon	albisericeum	Blanchard		Owlet Moth	Expected
3257	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copablepharon	album	(Harvey)		Owlet Moth	Expected
3258	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copablepharon	gillaspyi (nr.)	Blanchard		Owlet Moth	Expected
3259	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copanarta	aurea	(Grote)		Owlet Moth	Expected
3260	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copanarta	nigerrima	(J. B. Smith)		Owlet Moth	Expected
3261	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copibryophila	angelica	J. B. Smith		Owlet Moth	Expected
3262	Arthropoda	Insecta	Lepidoptera	Noctuidae	Copicucullia	luteodisca	J. B. Smith		Owlet Moth	Expected
3263	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cosmia	calami	(Harvey)		Owlet Moth	Expected
3264	Arthropoda	Insecta	Lepidoptera	Noctuidae	Crambodes	talidiformis	Guenee		Owlet Moth	Expected
3265	Arthropoda	Insecta	Lepidoptera	Noctuidae	Crymodes	devastator	(Brace)		Glassy cutworm moth	Expected

3266	Arthropoda	Insecta	Lepidoptera	Noctuidae	Crymodes	longula	(Grote)		Owlet Moth	Expected
3267	Arthropoda	Insecta	Lepidoptera	Noctuidae	Crymodes	ona	(J. B. Smith)		Owlet Moth	Expected
3268	Arthropoda	Insecta	Lepidoptera	Noctuidae	Crymodes	relicina	(Morrison)		Owlet Moth	Expected
3269	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cucullia	dentilinea	(J. B. Smith)		Owlet Moth	Expected
3270	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cucullia	laetifica	Lintner		Owlet Moth	Expected
3271	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cucullia	lilacina	Schaus		Owlet Moth	Expected
3272	Arthropoda	Insecta	Lepidoptera	Noctuidae	Cucullia	speyeri	Lintner	dorsalis	Owlet Moth	Expected
3273	Arthropoda	Insecta	Lepidoptera	Noctuidae	Dasyblemma	straminea	Dyar		Owlet Moth	Expected
3274	Arthropoda	Insecta	Lepidoptera	Noctuidae	Dicestra	mutata	(Dod)		Owlet Moth	Expected
3275	Arthropoda	Insecta	Lepidoptera	Noctuidae	Dicestra	trifolii	(Hufnagel)		Clover cutworm	Expected
3276	Arthropoda	Insecta	Lepidoptera	Noctuidae	Drasteria	howlandi	Grote		Owlet Moth	Expected
3277	Arthropoda	Insecta	Lepidoptera	Noctuidae	Drasteria	inepta	(Hy. Edwards)		Owlet Moth	Expected
3278	Arthropoda	Insecta	Lepidoptera	Noctuidae	Drasteria	pallescens	(Grote and Robinson)		Owlet Moth	Expected
3279	Arthropoda	Insecta	Lepidoptera	Noctuidae	Drasteria	sabulosa	Hy. Edwards		Owlet Moth	Expected
3280	Arthropoda	Insecta	Lepidoptera	Noctuidae	Draudtia	begallo	(Barnes)		Owlet Moth	Expected
3281	Arthropoda	Insecta	Lepidoptera	Noctuidae	Draudtia	egestis	(J. B. Smith)		Owlet Moth	Expected
3282	Arthropoda	Insecta	Lepidoptera	Noctuidae	Dypterygia	patina	(Harvey)		Owlet Moth	Expected
3283	Arthropoda	Insecta	Lepidoptera	Noctuidae	Elaphria	festivoides	(Guenee)		Owlet Moth	Expected
3284	Arthropoda	Insecta	Lepidoptera	Noctuidae	Emarginea	percara	(Morrison)		Owlet Moth	Expected
3285	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euagrotis	exuberans	(J. B. Smith)		Owlet Moth	Expected
3286	Arthropoda	Insecta	Lepidoptera	Noctuidae	Eubolina	impartialis	Harvey		Owlet Moth	Expected
3287	Arthropoda	Insecta	Lepidoptera	Noctuidae	Eulithosia	discostriga	(J. B. Smith)		Owlet Moth	Expected
3288	Arthropoda	Insecta	Lepidoptera	Noctuidae	Eurois	nigra	(J. B. Smith)		Owlet Moth	Expected
3289	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euscirrhopterus	cosyra	(Druce)		Owlet Moth	Expected
3290	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euscirrhopterus	gloveri	Grote and Robinson		Owlet Moth	Expected
3291	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	auxiliaris	(Grote)		Army cutworm moth	Expected
3292	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	catenula	(Grote)		Owlet Moth	Expected
3293	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	inconcinna	(Harvey)		Owlet Moth	Expected
3294	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	melana	Laf.		Owlet Moth	Expected
3295	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	misturata	(J. B. Smith)		Owlet Moth	Expected
3296	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	niveilinea	(Grote)		Owlet Moth	Expected
3297	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	obeliscoides	(Guenee)		Owlet Moth	Known
3298	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	olivia	(Morrison)		Owlet Moth	Expected
3299	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	pimensis	Barnes and McDunnough		Owlet Moth	Expected
3300	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	sculptilis	(Harvey)		Owlet Moth	Expected
3301	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	setonia	McDunnough		Owlet Moth	Expected
3302	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	siccata	(J. B. Smith)		Owlet Moth	Expected
3303	Arthropoda	Insecta	Lepidoptera	Noctuidae	Euxoa	xasta	Barnes and McDunnough		Owlet Moth	Expected
3304	Arthropoda	Insecta	Lepidoptera	Noctuidae	Faronta	diffusa	(Walker)		Wheat head armyworm mot	Expected
3305	Arthropoda	Insecta	Lepidoptera	Noctuidae	Feltia	herelis	(Grote)		Owlet Moth	Expected
3306	Arthropoda	Insecta	Lepidoptera	Noctuidae	Forsebia	perlaeta	(Hy. Edwards)		Owlet Moth	Expected
3307	Arthropoda	Insecta	Lepidoptera	Noctuidae	Fotella	notalis	Grote		Owlet Moth	Expected
3308	Arthropoda	Insecta	Lepidoptera	Noctuidae	Furcula	nivea	(Neumogen)	meridionalis	Owlet Moth	Expected
3309	Arthropoda	Insecta	Lepidoptera	Noctuidae	Galgula	partita	Guenee		Owlet Moth	Expected
3310	Arthropoda	Insecta	Lepidoptera	Noctuidae	Gloanna	hecate	Blanchard and Knudson		Owlet Moth	Expected
3311	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	binda	Barnes		Owlet Moth	Expected

3312	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	blanchardi	McElvare		Owlet Moth	Expected
3313	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	dis	Grote		Owlet Moth	Expected
3314	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	grisescens	(Barnes and McDunnough)		Owlet Moth	Expected
3315	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	olivacea	Barnes and McDunnough		Owlet Moth	Expected
3316	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	sampita	Barnes		Owlet Moth	Expected
3317	Arthropoda	Insecta	Lepidoptera	Noctuidae	Grotella	septepunctata	Harvey		Owlet Moth	Expected
3318	Arthropoda	Insecta	Lepidoptera	Noctuidae	Helicoverpa	zea	(Boddie)		Corn earworm	Expected
3319	Arthropoda	Insecta	Lepidoptera	Noctuidae	Heliothis	paradoxus	(Grote)		Owlet Moth	Expected
3320	Arthropoda	Insecta	Lepidoptera	Noctuidae	Heliothis	phloxiphagus	Grote and Robinson		Owlet Moth	Expected
3321	Arthropoda	Insecta	Lepidoptera	Noctuidae	Heliothis	toralis	(Grote)		Owlet Moth	Expected
3322	Arthropoda	Insecta	Lepidoptera	Noctuidae	Heliothis	virescens	(Fabricius)		Tobacco budworm	Expected
3323	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hemeroplanis	historalis	(Grote)		Owlet Moth	Expected
3324	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hemibryomima	chryselectra	(Grote)		Owlet Moth	Expected
3325	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hemieuxoa	rudens	(Harvey)		Owlet Moth	Expected
3326	Arthropoda	Insecta	Lepidoptera	Noctuidae	Heteranassa	mima	(Harvey)		Owlet Moth	Expected
3327	Arthropoda	Insecta	Lepidoptera	Noctuidae	Heteranassa	minor	(J. B. Smith)		Owlet Moth	Expected
3328	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hexorthodes	accurata	(Hy. Edwards)		Owlet Moth	Expected
3329	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hexorthodes	optima	(Dyar)		Owlet Moth	Expected
3330	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hexorthodes	serrata	(J. B. Smith)		Owlet Moth	Expected
3331	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hexorthodes	trifascia	(J. B. Smith)		Owlet Moth	Expected
3332	Arthropoda	Insecta	Lepidoptera	Noctuidae	Homoanarta	falcata	(Neumoegen)		Owlet Moth	Expected
3333	Arthropoda	Insecta	Lepidoptera	Noctuidae	Homorthodes	fractura	(J. B. Smith)		Owlet Moth	Expected
3334	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hydroeciodes	serrata	(Grote)		Owlet Moth	Expected
3335	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hypena	minualis	Guenee		Owlet Moth	Expected
3336	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hypenula	caminalis	J. B. Smith		Owlet Moth	Expected
3337	Arthropoda	Insecta	Lepidoptera	Noctuidae	Hyperepia	pi	Barnes and Lindsey		Owlet Moth	Expected
3338	Arthropoda	Insecta	Lepidoptera	Noctuidae	Idia	americalis	(Guenee)		Owlet Moth	Expected
3339	Arthropoda	Insecta	Lepidoptera	Noctuidae	Idia	lubricalis	(Geyer)		Owlet Moth	Expected
3340	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacanobia	subjuncta	(Grote and Robinson)		Owlet Moth	Expected
3341	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	agnata	(J. B. Smith)		Owlet Moth	Expected
3342	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	basiplaga	(J. B. Smith)		Owlet Moth	Expected
3343	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	buscki	(Barnes and Benjamin)		Owlet Moth	Expected
3344	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	illaudabilis	(Grote)		Owlet Moth	Expected
3345	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	marinitincta	(Harvey)		Owlet Moth	Expected
3346	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	quadrilineata	(Grote)		Owlet Moth	Expected
3347	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	rodora	Dyar		Owlet Moth	Expected
3348	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	spiculosa	(Grote)		Owlet Moth	Expected
3349	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	strigicollis	(Wallengren)		Owlet Moth	Expected
3350	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	tricornuta	McDunnough		Owlet Moth	Expected
3351	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	uliginosa	(J. B. Smith)		Owlet Moth	Expected
3352	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	umbrosa	(J. B. Smith)		Owlet Moth	Expected
3353	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	vicina	(Grote)	sareta	Owlet Moth	Expected
3354	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lacinipolia	vittula	(Grote)		Owlet Moth	Expected
3355	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lepipolys	perscripta	Guenee		Owlet Moth	Expected
3356	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lesmone	detrahens	(Walker)		Owlet Moth	Expected
3357	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lesmone	griseipennis	(Grote)		Owlet Moth	Expected

3358	Arthropoda	Insecta	Lepidoptera	Noctuidae	Leucania	imperfecta	J. B. Smith	Owlet Moth	Expected
3359	Arthropoda	Insecta	Lepidoptera	Noctuidae	Leucania	insueta	Guenee	Owlet Moth	Expected
3360	Arthropoda	Insecta	Lepidoptera	Noctuidae	Leucania	multilinea	Walker	Owlet Moth	Expected
3361	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lineostriastiria	hachita	(Barnes)	Owlet Moth	Expected
3362	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lithacodia	musta	(Grote and Robinson)	Owlet Moth	Expected
3363	Arthropoda	Insecta	Lepidoptera	Noctuidae	Litocala	sexsignata	(Harvey)	Owlet Moth	Expected
3364	Arthropoda	Insecta	Lepidoptera	Noctuidae	Loxagrotis	acclivis	(Morrison)	Owlet Moth	Expected
3365	Arthropoda	Insecta	Lepidoptera	Noctuidae	Loxagrotis	grotei	Franclemont and Todd	Owlet Moth	Expected
3366	Arthropoda	Insecta	Lepidoptera	Noctuidae	Lythrodes	radiatus	J. B. Smith	Owlet Moth	Expected
3367	Arthropoda	Insecta	Lepidoptera	Noctuidae	Magusa	orbifera	(Walker)	Owlet Moth	Expected
3368	Arthropoda	Insecta	Lepidoptera	Noctuidae	Mamestra	configurata	Walker	Bertha armyworm moth	Expected
3369	Arthropoda	Insecta	Lepidoptera	Noctuidae	Manruta	elingua	J. B. Smith	Owlet Moth	Expected
3370	Arthropoda	Insecta	Lepidoptera	Noctuidae	Marathyssa	infictia	(Walker)	Owlet Moth	Expected
3371	Arthropoda	Insecta	Lepidoptera	Noctuidae	Matigramma	emmilta	Franclemont	Owlet Moth	Expected
3372	Arthropoda	Insecta	Lepidoptera	Noctuidae	Matigramma	inopinata	Franclemont	Owlet Moth	Expected
3373	Arthropoda	Insecta	Lepidoptera	Noctuidae	Matigramma	rubrosuffusa	Grote	Owlet Moth	Expected
3374	Arthropoda	Insecta	Lepidoptera	Noctuidae	Megalographa	biloba	(Stephens)	Owlet Moth	Expected
3375	Arthropoda	Insecta	Lepidoptera	Noctuidae	Melipotis	acontioides	(Guenee)	Owlet Moth	Expected
3376	Arthropoda	Insecta	Lepidoptera	Noctuidae	Melipotis	indomita	(Walker)	Owlet Moth	Expected
3377	Arthropoda	Insecta	Lepidoptera	Noctuidae	Melipotis	jucunda	Hubner	Owlet Moth	Expected
3378	Arthropoda	Insecta	Lepidoptera	Noctuidae	Melipotis	novanda	(Guenee)	Owlet Moth	Expected
3379	Arthropoda	Insecta	Lepidoptera	Noctuidae	Metalectra	bigallis	(J. B. Smith)	Owlet Moth	Expected
3380	Arthropoda	Insecta	Lepidoptera	Noctuidae	Metalectra	discalis	(Grote)	Owlet Moth	Expected
3381	Arthropoda	Insecta	Lepidoptera	Noctuidae	Metalectra	edilis	(J. B. Smith)	Owlet Moth	Expected
3382	Arthropoda	Insecta	Lepidoptera	Noctuidae	Metalectra	miserulata	(Grote)	Owlet Moth	Known
3383	Arthropoda	Insecta	Lepidoptera	Noctuidae	Metapopneumata	rogenhoferi	Moschler	Owlet Moth	Expected
3384	Arthropoda	Insecta	Lepidoptera	Noctuidae	Micrathetis	costiplaga	(J. B. Smith)	Owlet Moth	Expected
3385	Arthropoda	Insecta	Lepidoptera	Noctuidae	Mimobaratha	antonito	(Barnes)	Owlet Moth	Known
3386	Arthropoda	Insecta	Lepidoptera	Noctuidae	Miniotype	versuta	(J. B. Smith)	Owlet Moth	Expected
3387	Arthropoda	Insecta	Lepidoptera	Noctuidae	Miracavira	brillians	(Barnes)	Owlet Moth	Expected
3388	Arthropoda	Insecta	Lepidoptera	Noctuidae	Mocis	latipes	(Guenee)	Owlet Moth	Expected
3389	Arthropoda	Insecta	Lepidoptera	Noctuidae	Nacopa	melanderi	Barnes and Benjamin	Owlet Moth	Expected
3390	Arthropoda	Insecta	Lepidoptera	Noctuidae	Neleucania	bicolorata	(Grote)	Owlet Moth	Expected
3391	Arthropoda	Insecta	Lepidoptera	Noctuidae	Neogalea	sunia	(Guenee)	Owlet Moth	Expected
3392	Arthropoda	Insecta	Lepidoptera	Noctuidae	Nocloa	plagiata	J. B. Smith	Owlet Moth	Expected
3393	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	angustus	Harvey	Owlet Moth	Expected
3394	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	basifugens	(Dyar)	Owlet Moth	Expected
3395	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	homogena	Grote	Owlet Moth	Expected
3396	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	intruda	J. B. Smith	Owlet Moth	Expected
3397	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	laticosta	Dyar	Owlet Moth	Expected
3398	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	lefarogena	Blanchard	Owlet Moth	Expected
3399	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	levis	Grote	Owlet Moth	Expected
3400	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	melalutea	J. B. Smith	Owlet Moth	Expected
3401	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	occata	(Grote)	Owlet Moth	Expected
3402	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	rosea	J. B. Smith	Owlet Moth	Expected
3403	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oncocnemis	terminalis	J. B. Smith	Owlet Moth	Expected

3404	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oslaria	viridifera	(Grote)	Owlet Moth	Expected
3405	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oxycnemis	acuna	Barnes	Owlet Moth	Expected
3406	Arthropoda	Insecta	Lepidoptera	Noctuidae	Oxycnemis	gracillima	(Grote)	Owlet Moth	Expected
3407	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ozarba	fannia	(Druce)	Owlet Moth	Expected
3408	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ozarba	propera	(Grote)	Owlet Moth	Expected
3409	Arthropoda	Insecta	Lepidoptera	Noctuidae	Paectes	abrostolella	(Walker)	Owlet Moth	Expected
3410	Arthropoda	Insecta	Lepidoptera	Noctuidae	Paectes	pygmaea	Hubner	Owlet Moth	Expected
3411	Arthropoda	Insecta	Lepidoptera	Noctuidae	Panthea	virginaria	(Grote)	Owlet Moth	Expected
3412	Arthropoda	Insecta	Lepidoptera	Noctuidae	Paramiana	marina	(J. B. Smith)	Owlet Moth	Expected
3413	Arthropoda	Insecta	Lepidoptera	Noctuidae	Paramiana	perissa	Nye	Owlet Moth	Expected
3414	Arthropoda	Insecta	Lepidoptera	Noctuidae	Peridroma	saucia	(Hubner)	Variegated cutworm moth	Expected
3415	Arthropoda	Insecta	Lepidoptera	Noctuidae	Perigonica	fulminans	J. B. Smith	Owlet Moth	Expected
3416	Arthropoda	Insecta	Lepidoptera	Noctuidae	Phobolosia	anfracta	(Hy. Edwards)	Owlet Moth	Expected
3417	Arthropoda	Insecta	Lepidoptera	Noctuidae	Phytometra	apicata	Barnes and McDunnough	Owlet Moth	Expected
3418	Arthropoda	Insecta	Lepidoptera	Noctuidae	Phytometra	obliqualis	(Dyar)	Owlet Moth	Expected
3419	Arthropoda	Insecta	Lepidoptera	Noctuidae	Plagiomimicus	triplagiatus	J. B. Smith	Owlet Moth	Expected
3420	Arthropoda	Insecta	Lepidoptera	Noctuidae	Platypergia	extima	(Walker)	Owlet Moth	Expected
3421	Arthropoda	Insecta	Lepidoptera	Noctuidae	Platysenta	albolabes	(Grote)	Owlet Moth	Expected
3422	Arthropoda	Insecta	Lepidoptera	Noctuidae	Platysenta	discistriga	(J. B. Smith)	Owlet Moth	Expected
3423	Arthropoda	Insecta	Lepidoptera	Noctuidae	Platysenta	sutor	(Guenee)	Owlet Moth	Expected
3424	Arthropoda	Insecta	Lepidoptera	Noctuidae	Platysenta	temecula	Barnes	Owlet Moth	Expected
3425	Arthropoda	Insecta	Lepidoptera	Noctuidae	Polenta	tepperi	(Morrison)	Owlet Moth	Expected
3426	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ponometia	sutrix	(Grote)	Owlet Moth	Expected
3427	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ponometia	tripartita	(J. B. Smith)	Owlet Moth	Expected
3428	Arthropoda	Insecta	Lepidoptera	Noctuidae	Properigea	continens	(Hy. Edwards)	Owlet Moth	Expected
3429	Arthropoda	Insecta	Lepidoptera	Noctuidae	Properigea	costa	(Barnes and Benjamin)	Owlet Moth	Expected
3430	Arthropoda	Insecta	Lepidoptera	Noctuidae	Properigea	mephisto	(A. Blanchard)	Owlet Moth	Expected
3431	Arthropoda	Insecta	Lepidoptera	Noctuidae	Properigea	suffusa	(Barnes and McDunnough)	Owlet Moth	Expected
3432	Arthropoda	Insecta	Lepidoptera	Noctuidae	Proragrotis	longidens	(J. B. Smith)	Owlet Moth	Expected
3433	Arthropoda	Insecta	Lepidoptera	Noctuidae	Protoperigea	posticata	(Harvey)	Owlet Moth	Expected
3434	Arthropoda	Insecta	Lepidoptera	Noctuidae	Protorthodes	alfkeni	(Grote)	Owlet Moth	Expected
3435	Arthropoda	Insecta	Lepidoptera	Noctuidae	Protorthodes	melanopis	(Hampson)	Owlet Moth	Expected
3436	Arthropoda	Insecta	Lepidoptera	Noctuidae	Protorthodes	texana	(J. B. Smith)	Owlet Moth	Expected
3437	Arthropoda	Insecta	Lepidoptera	Noctuidae	Proxenus	miranda	(Grote)	Owlet Moth	Expected
3438	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudaletia	unipuncta	(Haworth)	Armyworm moth	Expected
3439	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudanarta	actura	J. B. Smith	Owlet Moth	Expected
3440	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudanarta	caeca	Dod	Owlet Moth	Expected
3441	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudanarta	exasperata	Franclemont	Owlet Moth	Expected
3442	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudanarta	pulverulenta	(J. B. Smith)	Owlet Moth	Expected
3443	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudanarta	singula	Grote	Owlet Moth	Expected
3444	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudopanthea	palata	(Grote)	Owlet Moth	Expected
3445	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudoplusia	includens	(Walker)	Soybean looper	Expected
3446	Arthropoda	Insecta	Lepidoptera	Noctuidae	Pseudoseptis	grandipennis	(Grote)	Owlet Moth	Expected
3447	Arthropoda	Insecta	Lepidoptera	Noctuidae	Rachiplusia	ou	(Guenee)	Owlet Moth	Expected
3448	Arthropoda	Insecta	Lepidoptera	Noctuidae	Raphia	coloradensis	Putnam-Cramer	Owlet Moth	Expected
3449	Arthropoda	Insecta	Lepidoptera	Noctuidae	Renia	hutsoni	J. B. Smith	Owlet Moth	Expected

3450	Arthropoda	Insecta	Lepidoptera	Noctuidae	Renia	rigida	J. B. Smith		Owlet Moth	Known
3451	Arthropoda	Insecta	Lepidoptera	Noctuidae	Rhizagrotis	cloanthoides	(Grote)		Owlet Moth	Expected
3452	Arthropoda	Insecta	Lepidoptera	Noctuidae	Richia	acclivis	(Morrison)		Owlet Moth	Expected
3453	Arthropoda	Insecta	Lepidoptera	Noctuidae	Richia	salina (nr.)	(Barnes)		Owlet Moth	Expected
3454	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ruacodes	tela	(J. B. Smith)		Owlet Moth	Expected
3455	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	albafascia	J. B. Smith		Owlet Moth	Expected
3456	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	argentifascia	Barnes and McDunnough		Owlet Moth	Expected
3457	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	balba	(Grote)	brucei	Owlet Moth	Expected
3458	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	chrysella	(Grote)		Owlet Moth	Expected
3459	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	ciliata	J. B. Smith		Owlet Moth	Expected
3460	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	citrinella	(Grote and Robinson)		Owlet Moth	Expected
3461	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	coercita	(Grote)		Owlet Moth	Expected
3462	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	cupes	(Grote)		Owlet Moth	Expected
3463	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	errans	J. B. Smith		Owlet Moth	Expected
3464	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	gaurae	(J. E. Smith)		Owlet Moth	Expected
3465	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	grandimedia	Hardwick		Owlet Moth	Expected
3466	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	hulstia	Tepp.		Owlet Moth	Expected
3467	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	luxa	(Grote)		Owlet Moth	Expected
3468	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	miniana	(Grote)		Owlet Moth	Expected
3469	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	mortua	(Grote)		Owlet Moth	Expected
3470	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	oculata	J. B. Smith		Owlet Moth	Expected
3471	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	oleagina	Morrison		Owlet Moth	Expected
3472	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	regia	(Strecker)		Owlet Moth	Expected
3473	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	reniformis	J. B. Smith		Owlet Moth	Expected
3474	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	roseitincta	(Harvey)		Owlet Moth	Expected
3475	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	sara	J. B. Smith		Owlet Moth	Expected
3476	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	septentrionalis	(Walker)		Owlet Moth	Expected
3477	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	sexplagiata	J. B. Smith		Owlet Moth	Expected
3478	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	tertia	(Grote)		Owlet Moth	Expected
3479	Arthropoda	Insecta	Lepidoptera	Noctuidae	Schinia	walsinghami	(Hy. Edwards)		Owlet Moth	Expected
3480	Arthropoda	Insecta	Lepidoptera	Noctuidae	Scotogramma	gatei	J. B. Smith		Owlet Moth	Expected
3481	Arthropoda	Insecta	Lepidoptera	Noctuidae	Scotogramma	megaera	J. B. Smith		Owlet Moth	Expected
3482	Arthropoda	Insecta	Lepidoptera	Noctuidae	Scotogramma	ptilodonta	(Grote)		Owlet Moth	Expected
3483	Arthropoda	Insecta	Lepidoptera	Noctuidae	Setagrotis	cineriecollis	(Grote)	vocalis	Owlet Moth	Expected
3484	Arthropoda	Insecta	Lepidoptera	Noctuidae	Setagrotis	fortiter	(Barnes and McDunnough)		Owlet Moth	Expected
3485	Arthropoda	Insecta	Lepidoptera	Noctuidae	Setagrotis	piscipellis	(Grote)	exculpatrix	Owlet Moth	Expected
3486	Arthropoda	Insecta	Lepidoptera	Noctuidae	Simyra	henrici	(Grote)		Owlet Moth	Expected
3487	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spaelotis	clandestina	(Harris)		Owlet Moth	Expected
3488	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spodoptera	exigua	(Hubner)		Beet armyworm moth	Expected
3489	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spodoptera	frugiperda	(J. E. Smith)		Fall armyworm	Expected
3490	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spodoptera	hipparis	(Druce)		Owlet Moth	Expected
3491	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spodoptera	ornithogalli	(Guenee)		Owlet Moth	Expected
3492	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spragueia	funeralis	Grote		Owlet Moth	Expected
3493	Arthropoda	Insecta	Lepidoptera	Noctuidae	Spragueia	obatra	(Morrison)		Owlet Moth	Expected
3494	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stibadium	aureolum	Hy. Edwards		Owlet Moth	Expected
3495	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stibadium	dimidiata	Grote		Owlet Moth	Expected

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3496	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stibadium	navium	(Harvey)		Owlet Moth	Expected
3497	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stibadium	olvello	Barnes		Owlet Moth	Expected
3498	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stibadium	spumosum	Grote		Owlet Moth	Expected
3499	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stiria	blanchardi	(Hogue)		Owlet Moth	Expected
3500	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stiria	intermixta	Dyar		Owlet Moth	Expected
3501	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stiria	rugifrons	Grote		Owlet Moth	Expected
3502	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stiria	sulphuria	Neumoegen		Owlet Moth	Expected
3503	Arthropoda	Insecta	Lepidoptera	Noctuidae	Stretchia	plusiaeformis	Hy. Edwards		Owlet Moth	Expected
3504	Arthropoda	Insecta	Lepidoptera	Noctuidae	Synedoida	divergens	(Behr)		Owlet Moth	Expected
3505	Arthropoda	Insecta	Lepidoptera	Noctuidae	Synedoida	howlandi	(Grote)		Owlet Moth	Expected
3506	Arthropoda	Insecta	Lepidoptera	Noctuidae	Synedoida	inepta	Hy. Edwards		Owlet Moth	Expected
3507	Arthropoda	Insecta	Lepidoptera	Noctuidae	Synedoida	pallescens	(Grote and Robinson)		Owlet Moth	Expected
3508	Arthropoda	Insecta	Lepidoptera	Noctuidae	Syngrapha	angulidens	(J. B. Smith)		Owlet Moth	Expected
3509	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	bicolorata	(Barnes and McDunnough)		Owlet Moth	Expected
3510	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	candefacta	(Hubner)		Owlet Moth	Expected
3511	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	clausula	(Grote)		Owlet Moth	Expected
3512	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	cuta	(J. B. Smith)		Owlet Moth	Expected
3513	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	dorneri	(Barnes and McDunnough)		Owlet Moth	Expected
3514	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	heonyx	Dyar		Owlet Moth	Expected
3515	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	huita	(J. B. Smith)		Owlet Moth	Expected
3516	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	libedis	(J. B. Smith)		Owlet Moth	Expected
3517	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	phecolisca	(Druce)		Owlet Moth	Expected
3518	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	semiflava	(Guenee)		Owlet Moth	Expected
3519	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tarachidia	venustula	(Walker)		Owlet Moth	Expected
3520	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tathorynchus	exsiccatus	(Lederer)		Owlet Moth	Expected
3521	Arthropoda	Insecta	Lepidoptera	Noctuidae	Therasea	angustipennis	(Grote)		Owlet Moth	Expected
3522	Arthropoda	Insecta	Lepidoptera	Noctuidae	Therasea	orba	(J. B. Smith)		Owlet Moth	Expected
3523	Arthropoda	Insecta	Lepidoptera	Noctuidae	Toxonprucha	crudelis	(Grote)		Owlet Moth	Expected
3524	Arthropoda	Insecta	Lepidoptera	Noctuidae	Toxonprucha	volucris	(Grote)		Owlet Moth	Expected
3525	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichocerapoda	oblita	(Grote)		Owlet Moth	Expected
3526	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichocerapoda	strigata	(J. B. Smith)		Owlet Moth	Expected
3527	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichoclea	decepta	Grote		Owlet Moth	Expected
3528	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichoclea	postica	J. B. Smith		Owlet Moth	Expected
3529	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichocosmia	inornata	Grote		Owlet Moth	Expected
3530	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tricholita	chipeta	Barnes	endiva	Owlet Moth	Expected
3531	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichoplusia	ni	(Hubner)		Cabbage looper	Expected
3532	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichopolia	dentatella	Grote		Owlet Moth	Expected
3533	Arthropoda	Insecta	Lepidoptera	Noctuidae	Trichorthosia	diplogramma	(Schaus)		Owlet Moth	Expected
3534	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tridepia	nova	(J. B. Smith)		Owlet Moth	Expected
3535	Arthropoda	Insecta	Lepidoptera	Noctuidae	Triocnemis	saporis	Grote		Owlet Moth	Expected
3536	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tripudia	flavofasciata	Grote		Owlet Moth	Expected
3537	Arthropoda	Insecta	Lepidoptera	Noctuidae	Tripudia	luxuriosa	J. B. Smith		Owlet Moth	Expected
3538	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ulolonche	consopita	(Grote)		Owlet Moth	Expected
3539	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ulolonche	disticha	(Morrison)		Owlet Moth	Expected
3540	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ulolonche	fasciata	J. B. Smith		Owlet Moth	Expected
3541	Arthropoda	Insecta	Lepidoptera	Noctuidae	Ulolonche	orbiculata	(J. B. Smith)		Owlet Moth	Expected

3542	Arthropoda	Insecta	Lepidoptera	Noctuidae	Xestia	adela	Franclemont		Spotted cutworm moth	Expected
3543	Arthropoda	Insecta	Lepidoptera	Noctuidae	Xylomyges	crucialis	(Harvey)		Owlet Moth	Expected
3544	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zale	calycanthata	(J. E. Smith)		Owlet Moth	Expected
3545	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zale	colorado	(J. B. Smith)		Owlet Moth	Expected
3546	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zale	insuda	(J. B. Smith)		Owlet Moth	Expected
3547	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zale	lunata	(Drury)		Owlet Moth	Expected
3548	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zale	termina	(Grote)		Owlet Moth	Expected
3549	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zale	unilineata	(Grote)		Owlet Moth	Known
3550	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zanclognatha	ochreipennis	(Grote)		Owlet Moth	Expected
3551	Arthropoda	Insecta	Lepidoptera	Noctuidae	Zotheca	tranquilla	Grote		Owlet Moth	Expected
3552	Arthropoda	Insecta	Lepidoptera	Notodontidae	Dasylophia	seriata	(Druce)		Prominent Moth	Expected
3553	Arthropoda	Insecta	Lepidoptera	Notodontidae	Datana	perspicua	Grote and Robinson		Prominent Moth	Expected
3554	Arthropoda	Insecta	Lepidoptera	Notodontidae	Dicentria	paradisus	(Benjamin)		Prominent Moth	Expected
3555	Arthropoda	Insecta	Lepidoptera	Notodontidae	Gluphisia	septentrionis	Walker		Prominent Moth	Expected
3556	Arthropoda	Insecta	Lepidoptera	Notodontidae	Heterocampa	amanda	Barnes and Lindsey		Prominent Moth	Expected
3557	Arthropoda	Insecta	Lepidoptera	Notodontidae	Heterocampa	averna	Barnes and McDunnough		Prominent Moth	Expected
3558	Arthropoda	Insecta	Lepidoptera	Notodontidae	Heterocampa	lunata	Hy. Edwards		Prominent Moth	Expected
3559	Arthropoda	Insecta	Lepidoptera	Notodontidae	Hyparpax	venus	Neumoegen		Prominent Moth	Expected
3560	Arthropoda	Insecta	Lepidoptera	Notodontidae	Hyperaeschra	tortuosa	Tepper		Prominent Moth	Expected
3561	Arthropoda	Insecta	Lepidoptera	Notodontidae	Litodonta	alpina	Benjamin		Prominent Moth	Expected
3562	Arthropoda	Insecta	Lepidoptera	Notodontidae	Lochmaeus	manteo	Doubleday		Prominent Moth	Expected
3563	Arthropoda	Insecta	Lepidoptera	Notodontidae	Macrurocampa	dorthea	Dyar		Prominent Moth	Expected
3564	Arthropoda	Insecta	Lepidoptera	Notodontidae	Nadata	gibbosa	(J. E. Smith)		Prominent Moth	Expected
3565	Arthropoda	Insecta	Lepidoptera	Notodontidae	Schizura	ipomoeae	Doubleday		Prominent Moth	Expected
3566	Arthropoda	Insecta	Lepidoptera	Notodontidae	Symmerista	zacualpana	(Draudt)		Prominent Moth	Expected
3567	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Adelpha	bredowii	(Geyer)		California sister	Known
3568	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Anaea	andria	Scudder		Goatweed butterfly	Expected
3569	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Asterocampa	celtis	(Boisduval and Leconte)		Hackberry butterfly	Expected
3570	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Cercyonis	meadii	(W. H. Edwards)		Red wood nymph	Known
3571	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Chlosyne	definita	(Aaron)		Definite patch	Expected
3572	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Chlosyne	lacinia	(Geyer)	crocale	Sunflower patch	Expected
3573	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Chlosyne	leanira	(Felder and Felder)	fulvia	Orange paintbrush checkers	Expected
3574	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Chlosyne	theona	(Menetries)	thekla	Mexican checkerspot	Expected
3575	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Cyllopsis	pertepida	Dyar	dorothea	Nabakov's arroyo satyr	Expected
3576	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Danaus	gilippus	(Cramer)	strigosus	Striated queen	Expected
3577	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Danaus	plexippus	(Linnaeus)		Monarch	Expected
3578	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Dione	vanillae	(Linnaeus)		Gulf fritillary	Expected
3579	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Dymasia	dymas	(W. H. Edwards)		Tiny checkerspot	Expected
3580	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Euptoieta	claudia	(Cramer)		Variegated fritillary	Expected
3581	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Libytheana	carinenta	(Cramer)	bachmanii	Snout butterfly	Expected
3582	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Limenitis	arthemis	(Drury)	arizonensis	Arizona red-spotted purple	Expected
3583	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Megisto	rubricata	(W. H. Edwards)		Red Satyr	Expected
3584	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Mestra	amymone	(Menetries)		Amymone	Expected
3585	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Nymphalis	antiopa	(Linnaeus)		Mourning cloak	Expected
3586	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Phyciodes	campestris	Behr	camillus	Field crescent	Known
3587	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Phyciodes	mylitta	W. H. Edwards	arizonensis	Thistle crescent	Expected

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3588	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Phyciodes	pictus	(W. H. Edwards)		Painted crescent	Expected
3589	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Phyciodes	texanus	(W. H. Edwards)		Texas crescent	Expected
3590	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Phyciodes	tharos	(Drury)		Pearl crescent	Expected
3591	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Phyciodes	vesta	(W. H. Edwards)		Mesquite crescent	Expected
3592	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Polygonia	interrogationis	(Fabricius)		Question mark	Expected
3593	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Polygonia	satyrus	(W. H. Edwards)		Tawny anglewing	Expected
3594	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Precis	coenia	(Hubner)		Buckeye	Expected
3595	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Precis	evarete	(Cramer)	nigrosuffusa	Dark buckeye	Known
3596	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Texola	elada	(Hewitson)	ulrica	Ulrica checkerspot	Expected
3597	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Vanessa	annabella	(Field)		West coast lady	Known
3598	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Vanessa	atalanta	Linnaeus)		Red admiral	Known
3599	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Vanessa	cardui	Linnaeus)		Painted lady	Known
3600	Arthropoda	Insecta	Lepidoptera	Nymphalidae	Vanessa	virginiensis	(Drury)		American painted lady	Known
3601	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Antaeotrichia	furcata	Walsingham		Concealer Moth	Expected
3602	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Antaoetricha	lindseyi	(Barnes and Busck)		Concealer Moth	Expected
3603	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Ethmia	discostrigella	(Chambers)		Concealer Moth	Expected
3604	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Ethmia	hagenella	(Chambers)	josephinella	Concealer Moth	Expected
3605	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Ethmia	mirusella	(Chambers)		Concealer Moth	Expected
3606	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Ethmia	umbrimarginella	Busck		Concealer Moth	Expected
3607	Arthropoda	Insecta	Lepidoptera	Oecophoridae	Menestomorpha	oblongata	Walsingham		Concealer Moth	Expected
3608	Arthropoda	Insecta	Lepidoptera	Papilionidae	Battus	philenor	(Linnaeus)		Pipevine swallowtail	Expected
3609	Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio	cresphontes	Cramer		Giant swallowtail	Expected
3610	Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio	multicaudatus	W. F. Kirby		Two-tailed swallowtail	Known
3611	Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio	ornythion	Boisduval		Ornythion swallowtail	Expected
3612	Arthropoda	Insecta	Lepidoptera	Papilionidae	Papilio	polyxenes	Fabricius	asterius	Eastern black swallowtail	Expected
3613	Arthropoda	Insecta	Lepidoptera	Pieridae	Anteos	clorinde	(Godart)	nivifera	Ghost brimstone	Expected
3614	Arthropoda	Insecta	Lepidoptera	Pieridae	Anthocharis	cethura	(Felder and Felder)	pima	Pima orangetip	Expected
3615	Arthropoda	Insecta	Lepidoptera	Pieridae	Anthocharis	sara	Lucas	inghami	Sara orangetip	Known
3616	Arthropoda	Insecta	Lepidoptera	Pieridae	Ascia	monuste	(Linnaeus)		Great southern white	Expected
3617	Arthropoda	Insecta	Lepidoptera	Pieridae	Colias	cesonia	Stoll		Southern dogface	Expected
3618	Arthropoda	Insecta	Lepidoptera	Pieridae	Colias	eurytheme	Boisduval		Orange sulphur	Expected
3619	Arthropoda	Insecta	Lepidoptera	Pieridae	Colias	philodice	Godart	eriphyle	Common sulphur	Expected
3620	Arthropoda	Insecta	Lepidoptera	Pieridae	Euchloe	hyantis	(W. H. Edwards)	lotta	Western marble	Known
3621	Arthropoda	Insecta	Lepidoptera	Pieridae	Eurema	lisa	Boisduval and LeConte		Little Yellow	Expected
3622	Arthropoda	Insecta	Lepidoptera	Pieridae	Eurema	mexicana	(Boisduval)		Mexican yellow	Known
3623	Arthropoda	Insecta	Lepidoptera	Pieridae	Eurema	nicippe	(Cramer)		Sleepy orange	Expected
3624	Arthropoda	Insecta	Lepidoptera	Pieridae	Eurema	proterpia	(Fabricius)		Tailed orange	Expected
3625	Arthropoda	Insecta	Lepidoptera	Pieridae	Kricogonia	lyside	(Godart)		Guayacan sulphur	Expected
3626	Arthropoda	Insecta	Lepidoptera	Pieridae	Nathalis	iole	Boisduval		Dwarf yellow	Expected
3627	Arthropoda	Insecta	Lepidoptera	Pieridae	Phoebis	agarithe	(Boisduval)		Orange Giant sulphur	Expected
3628	Arthropoda	Insecta	Lepidoptera	Pieridae	Phoebis	sennae	(Linnaeus)		Cloudless giant sulphur	Known
3629	Arthropoda	Insecta	Lepidoptera	Pieridae	Pieris	protodice	Boisduval and Leconte		Checkered white	Known
3630	Arthropoda	Insecta	Lepidoptera	Pieridae	Pieris	rapae	(Linnaeus)		European cabbage white	Expected
3631	Arthropoda	Insecta	Lepidoptera	Pieridae	Pieris	sisymbrii	Boisduval	tranversa	Spring white	Known
3632	Arthropoda	Insecta	Lepidoptera	Plutellidae	Plutella	xylostella	(Linnaeus)		Moth	Expected
3633	Arthropoda	Insecta	Lepidoptera	Plutellidae	Ypsolopha	cockerella	(Busck)		Moth	Expected

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3634	Arthropoda	Insecta	Lepidoptera	Plutellidae	Ypsolopha	gerdanella	Busck	Moth	Expected
3635	Arthropoda	Insecta	Lepidoptera	Plutellidae	Ypsolopha	striatella	(Busck)	Moth	Expected
3636	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Prodoxus	coloradensis	(Riley)	False yucca moth	Expected
3637	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Prodoxus	quinquepunctella	(Chambers)	False yucca moth	Expected
3638	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Prodoxus	y-inversum	Riley	False yucca moth	Expected
3639	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Tegeticula	baccatella	Pellmyr	Yucca moth	Expected
3640	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Tegeticula	carnerosanella	Pellmyr	Yucca moth	Expected
3641	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Tegeticula	corruptrix	Pellmyr	Cheater yucca moth	Expected
3642	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Tegeticula	elatella	Pellmyr	Yucca moth	Expected
3643	Arthropoda	Insecta	Lepidoptera	Prodoxidae	Tegeticula	treculeanella	Pellmyr	Yucca moth	Expected
3644	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Emmelina	monodactyla	(Linnaeus)	Plume Moth	Expected
3645	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	auster	Barnes and Lindsey	Plume Moth	Expected
3646	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	caudelli	(Dyar)	Plume Moth	Expected
3647	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	citrites	(Meyrick)	Plume Moth	Expected
3648	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	longifrons	(Walsingham)	Plume Moth	Expected
3649	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	paleaceus	(Zeller)	Plume Moth	Expected
3650	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	pollux	Barnes and Lindsey	Plume Moth	Expected
3651	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Oidaematophorus	sulphureodactylus	(Packard)	Plume Moth	Expected
3652	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Stenoptilodes	crenulata	(Barnes and McDunnough)	Plume Moth	Expected
3653	Arthropoda	Insecta	Lepidoptera	Pterophoridae	Trichoptilus	californicus	(Walsingham)	Plume Moth	Expected
3654	Arthropoda	Insecta	Lepidoptera	Pyralidae	Abagesta	reluctalis	(Hulst)	Pyralid Moth	Expected
3655	Arthropoda	Insecta	Lepidoptera	Pyralidae	Acallis	gripalis	(Hulst)	Pyralid Moth	Expected
3656	Arthropoda	Insecta	Lepidoptera	Pyralidae	Achyra	bifidalis	(Fabricius)	Pyralid Moth	Expected
3657	Arthropoda	Insecta	Lepidoptera	Pyralidae	Achyra	rantalis	(Guenee)	Garden webworm	Expected
3658	Arthropoda	Insecta	Lepidoptera	Pyralidae	Aglossa	baba	Dyar	Pyralid Moth	Expected
3659	Arthropoda	Insecta	Lepidoptera	Pyralidae	Alberada	bidentella	(Dyar)	Pyralid Moth	Expected
3660	Arthropoda	Insecta	Lepidoptera	Pyralidae	Alberada	parabates	(Dyar)	Pyralid Moth	Expected
3661	Arthropoda	Insecta	Lepidoptera	Pyralidae	Anania	labeculalis	(Hulst)	Pyralid Moth	Expected
3662	Arthropoda	Insecta	Lepidoptera	Pyralidae	Anderida	sonorella	(Ragonot)	Pyralid Moth	Expected
3663	Arthropoda	Insecta	Lepidoptera	Pyralidae	Anemisella	obliquata	(Hy. Edwards)	Pyralid Moth	Expected
3664	Arthropoda	Insecta	Lepidoptera	Pyralidae	Arta	epicoenalis	Ragonot	Pyralid Moth	Expected
3665	Arthropoda	Insecta	Lepidoptera	Pyralidae	Barberia	affinitella	Dyar	Pyralid Moth	Expected
3666	Arthropoda	Insecta	Lepidoptera	Pyralidae	Blepharomastix	ranalis	(Guenee)	Pyralid Moth	Expected
3667	Arthropoda	Insecta	Lepidoptera	Pyralidae	Cacozelia	trabalis	(Grote)	Pyralid Moth	Expected
3668	Arthropoda	Insecta	Lepidoptera	Pyralidae	Caphys	arizonensis	Munroe	Pyralid Moth	Expected
3669	Arthropoda	Insecta	Lepidoptera	Pyralidae	Choristostigma	purpulchralis	(Hampson)	Pyralid Moth	Expected
3670	Arthropoda	Insecta	Lepidoptera	Pyralidae	Coenochroa	bipunctella	(Barnes and McDunnough)	Pyralid Moth	Expected
3671	Arthropoda	Insecta	Lepidoptera	Pyralidae	Condylorrhiza	vestigialis	(Guenee)	Pyralid Moth	Expected
3672	Arthropoda	Insecta	Lepidoptera	Pyralidae	Daulia	arizonensis	Munroe	Pyralid Moth	Expected
3673	Arthropoda	Insecta	Lepidoptera	Pyralidae	Decaturia	pectinalis	Barnes and McDunnough	Pyralid Moth	Expected
3674	Arthropoda	Insecta	Lepidoptera	Pyralidae	Desmia	funeralis	(Hubner)	Grape leaf roller	Expected
3675	Arthropoda	Insecta	Lepidoptera	Pyralidae	Diacme	elealis	(Walker)	Pyralid Moth	Expected
3676	Arthropoda	Insecta	Lepidoptera	Pyralidae	Diastictis	fracturalis	(Zellar)	Pyralid Moth	Expected
3677	Arthropoda	Insecta	Lepidoptera	Pyralidae	Diastictis	sperryorum	Munroe	Pyralid Moth	Expected
3678	Arthropoda	Insecta	Lepidoptera	Pyralidae	Diathrausta	harlequinalis	Dyar	Pyralid Moth	Expected
3679	Arthropoda	Insecta	Lepidoptera	Pyralidae	Dichozoma	parvipicta	(Barnes and McDunnough)	Pyralid Moth	Expected

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3680	Arthropoda	Insecta	Lepidoptera	Pyralidae	Eremberga	insignis	Heinrich		Pyralid Moth	Expected
3681	Arthropoda	Insecta	Lepidoptera	Pyralidae	Etiella	zinckenella	(Treitschke)		Lima-bean pod borer	Expected
3682	Arthropoda	Insecta	Lepidoptera	Pyralidae	Euchromius	ocelleus	(Haworth)		Pyralid Moth	Expected
3683	Arthropoda	Insecta	Lepidoptera	Pyralidae	Eufernaldia	cadarella	(Druce)		Pyralid Moth	Expected
3684	Arthropoda	Insecta	Lepidoptera	Pyralidae	Eumysia	mysiella	(Dyar)		Pyralid Moth	Expected
3685	Arthropoda	Insecta	Lepidoptera	Pyralidae	Eustixia	pupula	Hubner		Pyralid Moth	Expected
3686	Arthropoda	Insecta	Lepidoptera	Pyralidae	Evergestis	lunulalis	(Barnes and McDunnough)		Pyralid Moth	Expected
3687	Arthropoda	Insecta	Lepidoptera	Pyralidae	Evergestis	obliqualis	(Grote)		Pyralid Moth	Expected
3688	Arthropoda	Insecta	Lepidoptera	Pyralidae	Evergestis	simulatilis	(Grote)		Pyralid Moth	Expected
3689	Arthropoda	Insecta	Lepidoptera	Pyralidae	Evergestis	triangularis	Barnes and McDunnough		Pyralid Moth	Expected
3690	Arthropoda	Insecta	Lepidoptera	Pyralidae	Evergestis	vinctalis	Barnes and McDunnough		Pyralid Moth	Expected
3691	Arthropoda	Insecta	Lepidoptera	Pyralidae	Fissicrambus	intermedius	(Kearfott)		Pyralid Moth	Expected
3692	Arthropoda	Insecta	Lepidoptera	Pyralidae	Fissicrambus	profanellus	(Walker)		Pyralid Moth	Expected
3693	Arthropoda	Insecta	Lepidoptera	Pyralidae	Freschinia	texanalis	Munroe		Pyralid Moth	Expected
3694	Arthropoda	Insecta	Lepidoptera	Pyralidae	Galleria	mellonella	(Linnaeus)		Greater wax moth	Expected
3695	Arthropoda	Insecta	Lepidoptera	Pyralidae	Hahncappsia	alpinensis	(Capps)		Pyralid Moth	Expected
3696	Arthropoda	Insecta	Lepidoptera	Pyralidae	Hahncappsia	mancalis	(Lederer)		Pyralid Moth	Expected
3697	Arthropoda	Insecta	Lepidoptera	Pyralidae	Hahncappsia	pergilvalis	(Hulst)		Pyralid Moth	Expected
3698	Arthropoda	Insecta	Lepidoptera	Pyralidae	Hellula	aqualis	Barnes and McDunnough		Pyralid Moth	Expected
3699	Arthropoda	Insecta	Lepidoptera	Pyralidae	Heterographis	morrisonella	Ragonot		Pyralid Moth	Expected
3700	Arthropoda	Insecta	Lepidoptera	Pyralidae	Homoeosoma	electellum	(Hulst)		Sunflower moth	Expected
3701	Arthropoda	Insecta	Lepidoptera	Pyralidae	Honora	mellinella	Grote)		Pyralid Moth	Expected
3702	Arthropoda	Insecta	Lepidoptera	Pyralidae	Hymenia	perspectalis	(Hubner)		Spotted beet webworm	Expected
3703	Arthropoda	Insecta	Lepidoptera	Pyralidae	Jativa	castanealis	(Hulst)		Pyralid Moth	Expected
3704	Arthropoda	Insecta	Lepidoptera	Pyralidae	Jocara	trabalis	(Grote)		Pyralid Moth	Expected
3705	Arthropoda	Insecta	Lepidoptera	Pyralidae	Laetilia	dilatifasciella	Ragonot		Pyralid Moth	Expected
3706	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostege	albiceralis	(Grote)		Pyralid Moth	Expected
3707	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostege	allectalis	(Grote)		Pyralid Moth	Expected
3708	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostege	cereralis	(Zeller)		Alfalfa webworm	Expected
3709	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostege	egregialis	Munroe		Pyralid Moth	Expected
3710	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostege	kearfottalis	Walter		Pyralid Moth	Expected
3711	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostege	sticticalis	(Linnaeus)		Beet webworm	Expected
3712	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostegopsis	curialis	Barnes and McDunnough		Pyralid Moth	Expected
3713	Arthropoda	Insecta	Lepidoptera	Pyralidae	Loxostegopsis	polle	Dyar		Pyralid Moth	Expected
3714	Arthropoda	Insecta	Lepidoptera	Pyralidae	Lygropia	octonalis	(Zeller)		Pyralid Moth	Expected
3715	Arthropoda	Insecta	Lepidoptera	Pyralidae	Macrorrhinia	aureofasciella	Ragonot		Pyralid Moth	Expected
3716	Arthropoda	Insecta	Lepidoptera	Pyralidae	Macrotheca	interalbicalis	Ragonot		Pyralid Moth	Expected
3717	Arthropoda	Insecta	Lepidoptera	Pyralidae	Martia	arizonella	Ragonot		Pyralid Moth	Expected
3718	Arthropoda	Insecta	Lepidoptera	Pyralidae	Melitara	doddalis	Dyar		Pyralid Moth	Expected
3719	Arthropoda	Insecta	Lepidoptera	Pyralidae	Microcrambus	croesus	Blez.		Pyralid Moth	Expected
3720	Arthropoda	Insecta	Lepidoptera	Pyralidae	Microtheoris	ophionalis	(Walker)		Pyralid Moth	Expected
3721	Arthropoda	Insecta	Lepidoptera	Pyralidae	Mimorista	trimaclalis	(Grote)		Pyralid Moth	Expected
3722	Arthropoda	Insecta	Lepidoptera	Pyralidae	Mimoschinia	rufofascialis	(Stephens)	novalis	Barberpole caterpillar moth	Expected
3723	Arthropoda	Insecta	Lepidoptera	Pyralidae	Mojavia	achemonalis	(Barnes and McDunnough)		Pyralid Moth	Expected
3724	Arthropoda	Insecta	Lepidoptera	Pyralidae	Nephopterix	bifasciella	Hulst		Pyralid Moth	Expected
3725	Arthropoda	Insecta	Lepidoptera	Pyralidae	Nephopterix	celtidella	(Hulst)		Pyralid Moth	Expected

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3726	Arthropoda	Insecta	Lepidoptera	Pyralidae	Nephopterix	gilvibasella	Hulst	Pyralid Moth	Expected
3727	Arthropoda	Insecta	Lepidoptera	Pyralidae	Noctueliopsis	brunnealis	Munroe	Pyralid Moth	Expected
3728	Arthropoda	Insecta	Lepidoptera	Pyralidae	Noctueliopsis	bububattalis	(Hulst)	Pyralid Moth	Expected
3729	Arthropoda	Insecta	Lepidoptera	Pyralidae	Nomophila	nearctica	Munroe	Pyralid Moth	Expected
3730	Arthropoda	Insecta	Lepidoptera	Pyralidae	Olybria	aliculella	(Hulst)	Pyralid Moth	Expected
3731	Arthropoda	Insecta	Lepidoptera	Pyralidae	Omphalocera	occidentalis	Barnes and Benjamin	Pyralid Moth	Expected
3732	Arthropoda	Insecta	Lepidoptera	Pyralidae	Palpita	gracilalis	(Hulst)	Pyralid Moth	Expected
3733	Arthropoda	Insecta	Lepidoptera	Pyralidae	Palpita	quadristigmalis	(Guenee)	Pyralid Moth	Expected
3734	Arthropoda	Insecta	Lepidoptera	Pyralidae	Parapediasia	teterrella	Zincken	Pyralid Moth	Expected
3735	Arthropoda	Insecta	Lepidoptera	Pyralidae	Passadena	flavidorsella	(Ragonot)	Pyralid Moth	Expected
3736	Arthropoda	Insecta	Lepidoptera	Pyralidae	Peoria	johnstoni	Shaffer	Pyralid Moth	Expected
3737	Arthropoda	Insecta	Lepidoptera	Pyralidae	Peoria	opacella	(Hulst)	Pyralid Moth	Expected
3738	Arthropoda	Insecta	Lepidoptera	Pyralidae	Petrophila	jaliscalensis	(Schaus)	Pyralid Moth	Expected
3739	Arthropoda	Insecta	Lepidoptera	Pyralidae	Petrophila	schaefferalis	(Dyar)	Pyralid Moth	Expected
3740	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pima	albiplagiatella	(Packard)	Pyralid Moth	Expected
3741	Arthropoda	Insecta	Lepidoptera	Pyralidae	Plodia	interpunctella	(Hubner)	Indian meal moth	Expected
3742	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pococera	euphemella	(Hulst)	Pyralid Moth	Expected
3743	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pococera	subcanalis	(Walker)	Pyralid Moth	Expected
3744	Arthropoda	Insecta	Lepidoptera	Pyralidae	Prorasea	fernaldi	Munroe	Pyralid Moth	Expected
3745	Arthropoda	Insecta	Lepidoptera	Pyralidae	Psara	obscuralis	(Lederer)	Pyralid Moth	Expected
3746	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pseudoschinia	elautalis	(Grote)	Pyralid Moth	Expected
3747	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pseudoschoenobius	opalescens	(Hulst)	Pyralid Moth	Expected
3748	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	inornitalis	(Fernald)	Pyralid Moth	Expected
3749	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	klotsi	Munroe	Pyralid Moth	Expected
3750	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	lethalis	(Grote)	Pyralid Moth	Expected
3751	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	nexalis	(Hulst)	Pyralid Moth	Expected
3752	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	pseudonythesalis	Munroe	Pyralid Moth	Expected
3753	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	scurralis	(Hulst)	Pyralid Moth	Expected
3754	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	tyralis	(Guenee)	Pyralid Moth	Expected
3755	Arthropoda	Insecta	Lepidoptera	Pyralidae	Pyrausta	volupialis	(Grote)	Pyralid Moth	Expected
3756	Arthropoda	Insecta	Lepidoptera	Pyralidae	Quasisalebria	admixta	Heinrich	Pyralid Moth	Expected
3757	Arthropoda	Insecta	Lepidoptera	Pyralidae	Rhagea	packardella	(Ragonot)	Pyralid Moth	Expected
3758	Arthropoda	Insecta	Lepidoptera	Pyralidae	Rhodocantha	diagonalis	Munroe	Pyralid Moth	Expected
3759	Arthropoda	Insecta	Lepidoptera	Pyralidae	Rostrolaetilia	ardeniferella	(Hulst)	Pyralid Moth	Expected
3760	Arthropoda	Insecta	Lepidoptera	Pyralidae	Rostrolaetilia	texanella	Blanchard and Ferguson	Pyralid Moth	Expected
3761	Arthropoda	Insecta	Lepidoptera	Pyralidae	Satole	ligniperdalis	Dyar	Pyralid Moth	Expected
3762	Arthropoda	Insecta	Lepidoptera	Pyralidae	Scoparia	palloralis	Dyar	Pyralid Moth	Expected
3763	Arthropoda	Insecta	Lepidoptera	Pyralidae	Scybalistodes	regularis	Munroe	Pyralid Moth	Expected
3764	Arthropoda	Insecta	Lepidoptera	Pyralidae	Sitochroa	aureolalis	(Hulst)	Pyralid Moth	Expected
3765	Arthropoda	Insecta	Lepidoptera	Pyralidae	Sosipatra	anthophila	(Dyar)	Pyralid Moth	Expected
3766	Arthropoda	Insecta	Lepidoptera	Pyralidae	Sosipatra	rileyella	Ragonot	Pyralid Moth	Expected
3767	Arthropoda	Insecta	Lepidoptera	Pyralidae	Spoladea	recurvalis	(Fabricius)	Hawaiian beet webworm	Expected
3768	Arthropoda	Insecta	Lepidoptera	Pyralidae	Stegea	salutalis	(Hulst)	Pyralid Moth	Expected
3769	Arthropoda	Insecta	Lepidoptera	Pyralidae	Tacoma	feriella	Hulst	Pyralid Moth	Expected
3770	Arthropoda	Insecta	Lepidoptera	Pyralidae	Thaumatopsis	crenulatella	Kearfott	Pyralid Moth	Expected
3771	Arthropoda	Insecta	Lepidoptera	Pyralidae	Thaumatopsis	fernandella (nr.)	Kearfott	Pyralid Moth	Expected

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3772	Arthropoda	Insecta	Lepidoptera	Pyralidae	Thaumatopsis	repanda	(Grote)		Pyralid Moth	Expected
3773	Arthropoda	Insecta	Lepidoptera	Pyralidae	Udea	rubigalis	(Guenee)		Pyralid Moth	Expected
3774	Arthropoda	Insecta	Lepidoptera	Pyralidae	Uresiphita	reversalis	(Guenee)		Pyralid Moth	Expected
3775	Arthropoda	Insecta	Lepidoptera	Pyralidae	Urola	nivalis	(Drury)		Pyralid Moth	Expected
3776	Arthropoda	Insecta	Lepidoptera	Pyralidae	Yosemitia	graciella	Hulst		Pyralid Moth	Expected
3777	Arthropoda	Insecta	Lepidoptera	Saturniidae	Agapema	anona	(Ottol.)	dyari	Silkmoth	Expected
3778	Arthropoda	Insecta	Lepidoptera	Saturniidae	Automeris	io	(Fabricius)		Io moth	Expected
3779	Arthropoda	Insecta	Lepidoptera	Saturniidae	Automeris	zephyria	Grote		Silkmoth	Expected
3780	Arthropoda	Insecta	Lepidoptera	Saturniidae	Coloradia	pandora	Blake	davisi	Pandora moth	Expected
3781	Arthropoda	Insecta	Lepidoptera	Saturniidae	Hemileuca	juno	Packard		Silkmoth	Expected
3782	Arthropoda	Insecta	Lepidoptera	Saturniidae	Hemileuca	nevadensis	Stretch		Silkmoth	Expected
3783	Arthropoda	Insecta	Lepidoptera	Saturniidae	Hemileuca	tricolor	(Packard)		Silkmoth	Expected
3784	Arthropoda	Insecta	Lepidoptera	Saturniidae	Hyalophora	gloveri	Strecker		Silkmoth	Expected
3785	Arthropoda	Insecta	Lepidoptera	Saturniidae	Sphingicampa	hubbardi	(Dyar)		Silkmoth	Expected
3786	Arthropoda	Insecta	Lepidoptera	Scythrididae	Arotrura	divaricata	(Braun)		Flower Moth	Expected
3787	Arthropoda	Insecta	Lepidoptera	Scythrididae	Arotrura	longissima	B. Landry		Flower Moth	Expected
3788	Arthropoda	Insecta	Lepidoptera	Scythrididae	Neoscythris	fissirostris	(Meyrick)		Flower Moth	Expected
3789	Arthropoda	Insecta	Lepidoptera	Scythrididae	Scythris	anthracina	Braun		Flower Moth	Expected
3790	Arthropoda	Insecta	Lepidoptera	Scythrididae	Scythris	mixaula	Meyrick		Flower Moth	Expected
3791	Arthropoda	Insecta	Lepidoptera	Sesiidae	Carmenta	mimuli	(Hy Edwards)		Clearwing Moth	Expected
3792	Arthropoda	Insecta	Lepidoptera	Sesiidae	Paranthrene	robiniae	(Hy. Edwards)		Clearwing Moth	Expected
3793	Arthropoda	Insecta	Lepidoptera	Sesiidae	Synanthedon	exitiosa	(Say)		Clearwing Moth	Expected
3794	Arthropoda	Insecta	Lepidoptera	Sesiidae	Zenodoxus	rubens	Engelhardt		Clearwing Moth	Expected
3795	Arthropoda	Insecta	Lepidoptera	Sphingidae	Agrius	cingulatus	(Fabricius)		Pink-spotted hawkmoth	Expected
3796	Arthropoda	Insecta	Lepidoptera	Sphingidae	Erynnis	obscura	(Linnaeus)		Sphinx Moth	Expected
3797	Arthropoda	Insecta	Lepidoptera	Sphingidae	Eumorpha	achemon	(Drury)		Achemon sphinx	Expected
3798	Arthropoda	Insecta	Lepidoptera	Sphingidae	Hyles	lineata	(Fabricius)		White-lined sphinx	Expected
3799	Arthropoda	Insecta	Lepidoptera	Sphingidae	Manduca	quinquemaculata	(Haworth)		Tomato hornworm	Expected
3800	Arthropoda	Insecta	Lepidoptera	Sphingidae	Manduca	rustica	(Rothschild and Jordan)		Rustic sphinx	Expected
3801	Arthropoda	Insecta	Lepidoptera	Sphingidae	Manduca	sexta	(Linnaeus)		Tobacco hornworm	Expected
3802	Arthropoda	Insecta	Lepidoptera	Sphingidae	Pachysphinx	modesta	(Harris)	occidentalis	Western poplar sphinx	Expected
3803	Arthropoda	Insecta	Lepidoptera	Sphingidae	Paonias	myops	(J. E. Smith)		Sphinx Moth	Expected
3804	Arthropoda	Insecta	Lepidoptera	Sphingidae	Paratrea	plebeja	(Fabricius)		Sphinx Moth	Expected
3805	Arthropoda	Insecta	Lepidoptera	Sphingidae	Smerinthus	cerisyi	Kirby		Sphinx Moth	Expected
3806	Arthropoda	Insecta	Lepidoptera	Sphingidae	Smerinthus	jamaicencis (nr.)	(Drury)		Twin-spot sphinx	Expected
3807	Arthropoda	Insecta	Lepidoptera	Sphingidae	Sphinx	asella	(Rothschild and Jordan)		Sphinx Moth	Expected
3808	Arthropoda	Insecta	Lepidoptera	Sphingidae	Sphinx	chersis	(Hbn.)		Great ash sphinx	Expected
3809	Arthropoda	Insecta	Lepidoptera	Sphingidae	Sphinx	separata	Neumoegen		Sphinx Moth	Expected
3810	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	arizonellus	Walsingham		Cloth Moth	Expected
3811	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	cockerelli	Dyar		Cloth Moth	Expected
3812	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	filicornus	(Walsingham)		Cloth Moth	Expected
3813	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	furcatus	(Walsingham)		Cloth Moth	Expected
3814	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	griseus	(Walsingham)		Cloth Moth	Expected
3815	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	mortipinella	(Grote)		Cloth Moth	Expected
3816	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	parvipalpus	Hasbrouck		Cloth Moth	Expected
3817	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	popeanella	(Clemens)		Cloth Moth	Expected

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3818	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	punctellus	(Busck)		Cloth Moth	Expected
3819	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	sinclairi	Hasbrouck	nelsoni	Cloth Moth	Expected
3820	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	variabilis	Walsingham		Cloth Moth	Expected
3821	Arthropoda	Insecta	Lepidoptera	Tineidae	Acrolophus	vauriei	Hasbrouck		Cloth Moth	Expected
3822	Arthropoda	Insecta	Lepidoptera	Tineidae	Amydria	onagella	(Dietz)		Cloth Moth	Expected
3823	Arthropoda	Insecta	Lepidoptera	Tineidae	Dorata	lineata	Walsingham		Cloth Moth	Expected
3824	Arthropoda	Insecta	Lepidoptera	Tineidae	Dytopasta	yumaeela	(Kearfott)		Cloth Moth	Expected
3825	Arthropoda	Insecta	Lepidoptera	Tineidae	Hypoplesia	busckiella	(Dietz)		Cloth Moth	Expected
3826	Arthropoda	Insecta	Lepidoptera	Tineidae	Nemapogon	defectella	(Zeller)		Cloth Moth	Expected
3827	Arthropoda	Insecta	Lepidoptera	Tineidae	Xylesthia	pruniramiella	Clemens		Cloth Moth	Expected
3828	Arthropoda	Insecta	Lepidoptera	Tortricidae	Acroplectis	haemanthes	Meyrick		Tortricid Moth	Expected
3829	Arthropoda	Insecta	Lepidoptera	Tortricidae	Ahmosia	galbinea	Heinrich		Tortricid Moth	Expected
3830	Arthropoda	Insecta	Lepidoptera	Tortricidae	Bactra	verutana	Zeller		Tortricid Moth	Expected
3831	Arthropoda	Insecta	Lepidoptera	Tortricidae	Cydia	latiferreanus	(Walsingham)		Tortricid Moth	Expected
3832	Arthropoda	Insecta	Lepidoptera	Tortricidae	Cydia	membrosa	(Heinrich)		Tortricid Moth	Expected
3833	Arthropoda	Insecta	Lepidoptera	Tortricidae	Decodes	basiplaganus	(Walsingham)		Tortricid Moth	Expected
3834	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	agassizzi	(Robinson)		Tortricid Moth	Expected
3835	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	albiguttana	(Zeller)		Tortricid Moth	Expected
3836	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	bobana	Kearfott		Tortricid Moth	Expected
3837	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	bolandrana	(Walsingham)		Tortricid Moth	Expected
3838	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	galenapunctana	Kearfott		Tortricid Moth	Expected
3839	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	mirosignata	Heinrich		Tortricid Moth	Expected
3840	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	persolita	Heinrich		Tortricid Moth	Expected
3841	Arthropoda	Insecta	Lepidoptera	Tortricidae	Eucosoma	ridingsana	(Robinson)		Tortricid Moth	Expected
3842	Arthropoda	Insecta	Lepidoptera	Tortricidae	Ofatulena	duodecemstriata	(Walsingham)		Tortricid Moth	Expected
3843	Arthropoda	Insecta	Lepidoptera	Tortricidae	Ofatulena	luminosa	(Heinrich)		Tortricid Moth	Expected
3844	Arthropoda	Insecta	Lepidoptera	Tortricidae	Pelochrista	occipitana	(Zeller)		Tortricid Moth	Expected
3845	Arthropoda	Insecta	Lepidoptera	Tortricidae	Pelochrista	palousana	(Kearfott)		Tortricid Moth	Expected
3846	Arthropoda	Insecta	Lepidoptera	Tortricidae	Pelochrista	scintillana	(Clemens)		Tortricid Moth	Expected
3847	Arthropoda	Insecta	Lepidoptera	Tortricidae	Phaneta	granulatana	(Kearfott)		Tortricid Moth	Expected
3848	Arthropoda	Insecta	Lepidoptera	Tortricidae	Phaneta	offectalis	Hulst		Tortricid Moth	Expected
3849	Arthropoda	Insecta	Lepidoptera	Tortricidae	Phaneta	verniochranea	(Heinrich)		Tortricid Moth	Expected
3850	Arthropoda	Insecta	Lepidoptera	Tortricidae	Platynota	stultana	Walsingham		Tortricid Moth	Expected
3851	Arthropoda	Insecta	Lepidoptera	Tortricidae	Ptycholoma	peritana	(Clemens)		Tortricid Moth	Expected
3852	Arthropoda	Insecta	Lepidoptera	Tortricidae	Sonia	vovana	Kearfott		Tortricid Moth	Expected
3853	Arthropoda	Insecta	Lepidoptera	Tortricidae	Suleima	mendaciana	Blanchard and Knutson		Tortricid Moth	Expected
3854	Arthropoda	Insecta	Lepidoptera	Tortricidae	Synnoma	lynosyrana	Walsingham		Tortricid Moth	Expected
3855	Arthropoda	Insecta	Lepidoptera	Yponomeutidae	Orinympha	aetherias	Meyrick		Ermine Moth	Expected
3856	Arthropoda	Insecta	Lepidoptera	Zygaenidae	Harrisina	brillians	Barnes and McDunnough		Western grape leaf skeletoni	Expected
3857	Arthropoda	Insecta	Lepidoptera	Zygaenidae	Harrisina	coracina	(Clemens)		Leaf Skeletonizer Moth	Expected
3858	Arthropoda	Insecta	Lepidoptera	Zygaenidae	Harrisina	cyanea	(Barnes and McDunnough)		Leaf Skeletonizer Moth	Expected
3859	Arthropoda	Insecta	Mallophaga	Menoponidae	Actornithophilus	paludosus	Clay		Chewing Lice	Expected
3860	Arthropoda	Insecta	Mallophaga	Philopteridae	Cunningsiella	similis	(Giebel)		Chewing Lice	Expected
3861	Arthropoda	Insecta	Mantodea	Mantidae	Litaneutria	minor	(Scudder)		Ground Mantid	Expected
3862	Arthropoda	Insecta	Mantodea	Mantidae	Stagmomantis	californica	Rehn and Hebard		Mantid	Expected
3863	Arthropoda	Insecta	Mantodea	Mantidae	Stagmomantis	limbata	(Hahn)		Mantid	Expected

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3864	Arthropoda	Insecta	Mantodea	Mantidae	Yersinops	solitarium	Scudder	Grasshopper Mantis	Expected
3865	Arthropoda	Insecta	Mantodea	Mantidae	Yersiniops	sophronicum	(Rehn and Hebard)	Grasshopper Mantis	Expected
3866	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopa	coloradensis	Banks	Green Lacewing	Expected
3867	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopa	excepta	(Banks)	Green Lacewing	Expected
3868	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopa	harrisii	(Fitch)	Green Lacewing	Expected
3869	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopa	majuscula	Banks	Green Lacewing	Expected
3870	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopa	nigricornis	(Burmeister)	Green Lacewing	Expected
3871	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysoperla	carnea	(Stephens)	Green Lacewing	Expected
3872	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopiella	pallida	Banks	Green Lacewing	Expected
3873	Arthropoda	Insecta	Neuroptera	Chrysopidae	Chrysopiella	sabulosa	(Banks)	Green Lacewing	Expected
3874	Arthropoda	Insecta	Neuroptera	Chrysopidae	Eremochrysa	hageni	Banks	Green Lacewing	Expected
3875	Arthropoda	Insecta	Neuroptera	Chrysopidae	Eremochrysa	punctinervis	(McLachlan)	Green Lacewing	Expected
3876	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	arceuthobi	Meinander	Dustywing	Expected
3877	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	maculipennis	Meinander	Dustywing	Expected
3878	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	megacornis	Johnson	Dustywing	Expected
3879	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	punctata	Meinander	Dustywing	Expected
3880	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	simillima	Meinander	Dustywing	Expected
3881	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	vulgaris	Meinander	Dustywing	Expected
3882	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Aleuropteryx	werneri	Johnson	Dustywing	Expected
3883	Arthropoda	Insecta	Neuroptera	Coniopterygidae	Bidesmida	morrisoni	Johnson	Dustywing	Expected
3884	Arthropoda	Insecta	Neuroptera	Hemerobiidae	Megalomus	moestus	(Banks)	Brown Lacewings	Expected
3885	Arthropoda	Insecta	Neuroptera	Hemerobiidae	Micromus	subanticus	(Walk.)	Brown Lacewings	Expected
3886	Arthropoda	Insecta	Neuroptera	Hemerobiidae	Micromus	variolosus	Hagen	Brown Lacewings	Expected
3887	Arthropoda	Insecta	Neuroptera	Hemerobiidae	Sympherobius	angustus	(Banks)	Brown Lacewings	Expected
3888	Arthropoda	Insecta	Neuroptera	Hemerobiidae	Sympherobius	perparvus	(McLachlan)	Brown Lacewings	Expected
3889	Arthropoda	Insecta	Neuroptera	Hemerobiidae	Wesmaelius	schwarzi	(Banks)	Brown Lacewings	Expected
3890	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	abdominalis	(Say)	Antlions	Expected
3891	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	carrizonicus	(Hagen)	Antlions	Expected
3892	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	eiseni	Banks	Antlions	Expected
3893	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	elongatus	Banks	Antlions	Expected
3894	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	expansus	Navas	Antlions	Expected
3895	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	longipalpus	Hagen	Antlions	Expected
3896	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	minisculus	Banks	Antlions	Expected
3897	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	pallidus	Banks	Antlions	Expected
3898	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	papago	Currie	Antlions	Expected
3899	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	peregrinus	(Hagen)	Antlions	Expected
3900	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	pusillus	Currie	Antlions	Expected
3901	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	sackeni	Hagen	Antlions	Expected
3902	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Brachynemurus	tuberculatus	Banks	Antlions	Expected
3903	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Myrmeleon	crudelis	(Walk.)	Antlions	Expected
3904	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Paranthaclisis	hageni	(Banks)	Antlions	Expected
3905	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Puren	inscriptus	(Hagen)	Antlions	Expected
3906	Arthropoda	Insecta	Neuroptera	Myrmeleontidae	Vella	texana	Hagen	Antlions	Expected
3907	Arthropoda	Insecta	Odonata	Aeshnidae	Aeshna	dugesi	Calvert	Arroyo darner	Expected
3908	Arthropoda	Insecta	Odonata	Aeshnidae	Aeshna	multicolor	Hagen	Blue-eyed darner	Expected
3909	Arthropoda	Insecta	Odonata	Aeshnidae	Anax	junius	Drury	Common green darner	Expected

3910	Arthropoda	Insecta	Odonata	Aeshnidae	Epiaeshna	heros	(Fabricius)	Swamp darner	Expected
3911	Arthropoda	Insecta	Odonata	Calopterygidae	Hetaerina	americana	(Fabricius)	American rubyspot	Expected
3912	Arthropoda	Insecta	Odonata	Coenagrionidae	Amphiagrion	abbreviatus	(Burm.)	Western red damsel	Expected
3913	Arthropoda	Insecta	Odonata	Coenagrionidae	Argia	moesta	(Hagen)	Powdered dancer	Expected
3914	Arthropoda	Insecta	Odonata	Coenagrionidae	Argia	nahuana	Calvert	Aztec dancer	Expected
3915	Arthropoda	Insecta	Odonata	Coenagrionidae	Argia	plana	Calvert	Springwater dancer	Expected
3916	Arthropoda	Insecta	Odonata	Coenagrionidae	Argia	sedula	(Hagen)	Blue-ringed dancer	Expected
3917	Arthropoda	Insecta	Odonata	Coenagrionidae	Argia	translata	Hagen	Dusky dancer	Expected
3918	Arthropoda	Insecta	Odonata	Coenagrionidae	Argia	vividula	Hagen	Vivid dancer	Expected
3919	Arthropoda	Insecta	Odonata	Coenagrionidae	Enallagama	aspersum	(Hagen)	Narrow-winged Damselfly	Expected
3920	Arthropoda	Insecta	Odonata	Coenagrionidae	Enallagama	basidens	Calvert	Double-striped bluet	Expected
3921	Arthropoda	Insecta	Odonata	Coenagrionidae	Enallagama	carunculatum	Morse	Tule bluet	Expected
3922	Arthropoda	Insecta	Odonata	Coenagrionidae	Enallagama	civile	(Hagen)	Familiar bluet	Expected
3923	Arthropoda	Insecta	Odonata	Coenagrionidae	Enallagama	cyathigerum	(Charpentier)	Northern bluet	Expected
3924	Arthropoda	Insecta	Odonata	Coenagrionidae	Enallagama	praevarum	(Hagen)	Arroyo bluet	Expected
3925	Arthropoda	Insecta	Odonata	Coenagrionidae	Hesperagrion	heterodoxum	(Selys)	Painted damsel	Expected
3926	Arthropoda	Insecta	Odonata	Coenagrionidae	Ischnura	barberi	Currie	Desert forktail	Expected
3927	Arthropoda	Insecta	Odonata	Coenagrionidae	Ischnura	demorsa	(Hagen)	Mexican forktail	Expected
3928	Arthropoda	Insecta	Odonata	Coenagrionidae	Ischnura	denticollis	(Burmeister)	Black-fronted forktail	Expected
3929	Arthropoda	Insecta	Odonata	Coenagrionidae	Ischnura	perparva	McLachlan	Western forktail	Expected
3930	Arthropoda	Insecta	Odonata	Gomphidae	Progomphus	borealis	McLachlan	Beaverpond clubtail	Expected
3931	Arthropoda	Insecta	Odonata	Lestidae	Archilestes	grandis	(Rambur)	Great spreadwing	Expected
3932	Arthropoda	Insecta	Odonata	Lestidae	Lestes	alacer	Hagen	Plateau spreadwing	Expected
3933	Arthropoda	Insecta	Odonata	Libellulidae	Celithemis	eponia	Drury	Halloween pennant	Expected
3934	Arthropoda	Insecta	Odonata	Libellulidae	Erythemis	collocata	(Hagen)	Western pondhawk	Expected
3935	Arthropoda	Insecta	Odonata	Libellulidae	Erythemis	simplicollis	(Say)	Eastern pondhawk	Expected
3936	Arthropoda	Insecta	Odonata	Libellulidae	Libellula	forensis	Hagen	Eight-spotted skimmer	Expected
3937	Arthropoda	Insecta	Odonata	Libellulidae	Libellula	luctuosa	Burmeister	Widow skimmer	Expected
3938	Arthropoda	Insecta	Odonata	Libellulidae	Libellula	saturata	Uhler	Flame skimmer	Expected
3939	Arthropoda	Insecta	Odonata	Libellulidae	Pachydiplax	longipennis	Burmeister	Blue dasher	Expected
3940	Arthropoda	Insecta	Odonata	Libellulidae	Paltothemis	lineatipes	Karsch	Red rock skimmer	Expected
3941	Arthropoda	Insecta	Odonata	Libellulidae	Pantala	hymenaea	Say	Spot-winged glider	Expected
3942	Arthropoda	Insecta	Odonata	Libellulidae	Perithemis	tenera	Say	Eastern amberwing	Expected
3943	Arthropoda	Insecta	Odonata	Libellulidae	Pseudoleon	superbus	Hagen	Filigree skimmer	Expected
3944	Arthropoda	Insecta	Odonata	Libellulidae	Sympetrum	corruptum	(Hagen)	Variegated meadowhawk	Expected
3945	Arthropoda	Insecta	Odonata	Libellulidae	Sympetrum	rubicondulum	(Say)	Ruby meadowhawk	Expected
3946	Arthropoda	Insecta	Odonata	Libellulidae	Sympetrum	vicinum	Hagen	Yellow-legged meadowhawk	Expected
3947	Arthropoda	Insecta	Odonata	Libellulidae	Tramea	lacerata	Hagen	Black saddlebags	Expected
3948	Arthropoda	Insecta	Odonata	Libellulidae	Tramea	onusta	Hagen	Red saddlebags	Expected
3949	Arthropoda	Insecta	Orthoptera	Acrididae	Acantherus	piperatus	Scudder & Cockerell	Slender range grasshopper	Expected
3950	Arthropoda	Insecta	Orthoptera	Acrididae	Acrolophitis	maculipennis	(Scudder)	Point headed grasshopper	Expected
3951	Arthropoda	Insecta	Orthoptera	Acrididae	Aeoloplides	elegans	(Scudder)	Short-horned Grasshopper	Expected
3952	Arthropoda	Insecta	Orthoptera	Acrididae	Ageneotettix	deorum	(Scudder)	White whiskers grasshopper	Expected
3953	Arthropoda	Insecta	Orthoptera	Acrididae	Amphitornus	coloradus	(Thomas)	Striped slantface grasshoppe	Expected
3954	Arthropoda	Insecta	Orthoptera	Acrididae	Anconia	hebardi	Rehn	Short-horned Grasshopper	Expected
3955	Arthropoda	Insecta	Orthoptera	Acrididae	Arphia	conspersa	Scudder	Speckled rangeland grasshop	Expected

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3956	Arthropoda	Insecta	Orthoptera	Acrididae	Arphia	pseudonietana	(Thomas)	Red-winged grasshopper	Expected
3957	Arthropoda	Insecta	Orthoptera	Acrididae	Aulocara	ellioti	(Thomas)	Big-headed grasshopper	Expected
3958	Arthropoda	Insecta	Orthoptera	Acrididae	Aulocara	femoratum	(Scudder)	White cross grasshopper	Expected
3959	Arthropoda	Insecta	Orthoptera	Acrididae	Barytettix	humphreysii	(Thomas)	Humphrey's grasshopper	Expected
3960	Arthropoda	Insecta	Orthoptera	Acrididae	Boopedon	nubilum	(Say)	Black-males grasshopper	Expected
3961	Arthropoda	Insecta	Orthoptera	Acrididae	Bootettix	argentatus	Bruner	Creosotebush grasshopper	Expected
3962	Arthropoda	Insecta	Orthoptera	Acrididae	Campylacantha	olivacea	(Scudder)	Fuzzy olive-green grasshoppe	Expected
3963	Arthropoda	Insecta	Orthoptera	Acrididae	Chortophaga	viridifasciata	(De Geer)	Northern green-striped locus	Expected
3964	Arthropoda	Insecta	Orthoptera	Acrididae	Cibolacris	parviceps	(Walker)	Cream grasshopper	Expected
3965	Arthropoda	Insecta	Orthoptera	Acrididae	Cibolacris	samalayucae	Tinkham	Short-horned Grasshopper	Expected
3966	Arthropoda	Insecta	Orthoptera	Acrididae	Clematodes	larreae	Scudder	Gray creosotebush grasshop	Expected
3967	Arthropoda	Insecta	Orthoptera	Acrididae	Conozoa	sulcifrons	(Scudder)	Groove-headed grasshopper	Expected
3968	Arthropoda	Insecta	Orthoptera	Acrididae	Conozoa	texana	(Bruner)	Short-horned Grasshopper	Expected
3969	Arthropoda	Insecta	Orthoptera	Acrididae	Cordillacris	crenulata	(Bruner)	Crenulated grasshopper	Expected
3970	Arthropoda	Insecta	Orthoptera	Acrididae	Cordillacris	occipitalis	(Thomas)	Spotted-wing grasshopper	Expected
3971	Arthropoda	Insecta	Orthoptera	Acrididae	Dacylotum	bicolor	(Thomas)	Barber pole grasshopper	Expected
3972	Arthropoda	Insecta	Orthoptera	Acrididae	Derotmema	haydeni	(Thomas)	Hayden's grasshopper	Expected
3973	Arthropoda	Insecta	Orthoptera	Acrididae	Derotmema	laticinctum	Scudder	Short-horned Grasshopper	Expected
3974	Arthropoda	Insecta	Orthoptera	Acrididae	Dissosteira	carolina	(Linneaus)	Carolina grasshopper	Expected
3975	Arthropoda	Insecta	Orthoptera	Acrididae	Encomptolophus	subgracilis	Caudell	Short-horned Grasshopper	Expected
3976	Arthropoda	Insecta	Orthoptera	Acrididae	Eritettix	simplex	(Scudder)	Velvet striped grasshopper	Expected
3977	Arthropoda	Insecta	Orthoptera	Acrididae	Hadrotettix	trifasciatus	(Say)	Three-banded range grassho	Expected
3978	Arthropoda	Insecta	Orthoptera	Acrididae	Helialula	rufa	(Scudder)	Rufous grasshopper	Expected
3979	Arthropoda	Insecta	Orthoptera	Acrididae	Hesperotettix	viridis	(Thomas)	Snakeweed grasshopper	Expected
3980	Arthropoda	Insecta	Orthoptera	Acrididae	Hippopedon	capito	Stal	Short-horned Grasshopper	Expected
3981	Arthropoda	Insecta	Orthoptera	Acrididae	Horesidotes	cinereus	Scudder	Short-horned Grasshopper	Expected
3982	Arthropoda	Insecta	Orthoptera	Acrididae	Lactista	aztecus	(Saussure)	Aztec range grasshopper	Expected
3983	Arthropoda	Insecta	Orthoptera	Acrididae	Leprus	intermedius	Saussure	Blue-winged grasshopper	Expected
3984	Arthropoda	Insecta	Orthoptera	Acrididae	Leprus	wheeleri	(Thomas)	Blue-winged grasshopper	Expected
3985	Arthropoda	Insecta	Orthoptera	Acrididae	Ligurotettix	planum	(Bruner)	Pecos clicker grasshopper	Expected
3986	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	aridus	(Scudder)	Arid lands spur-throat	Expected
3987	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	arizonae	(Scudder)	Arizona spur-throat	Expected
3988	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	bivittatus	(Say)	Two-striped grasshopper	Expected
3989	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	bohemani	(Stal)	Short-horned Grasshopper	Expected
3990	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	bowditchi	Scudder	Sagebrush grasshopper	Expected
3991	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	differentialis	(Thomas)	Differential grasshopper	Expected
3992	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	femurrubrum	(De Geer)	Red-legged grasshopper	Expected
3993	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	gladstoni	Scudder	Gladston's spur-throat	Expected
3994	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	herbaceus	Bruner	Arrowweed grasshopper	Expected
3995	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	lakinis	(Scudder)	Short-horned Grasshopper	Expected
3996	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	occidentalis	(Thomas)	Flabellate grasshopper	Expected
3997	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	packardii	Scudder	Packard's grasshopper	Expected
3998	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	ponderosus	Scudder	Ponderous spur-throat	Expected
3999	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	regalis	(Dodge)	Regal spur-throat	Expected
4000	Arthropoda	Insecta	Orthoptera	Acrididae	Melanoplus	sanguinipes	(Fabricius)	Lesser migratory locust	Expected
4001	Arthropoda	Insecta	Orthoptera	Acrididae	Mermiria	bivittata	(Serville)	Mermiria grasshopper	Expected

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4002	Arthropoda	Insecta	Orthoptera	Acrididae	Mermiria	texana	Bruner		Short-horned Grasshopper	Expected
4003	Arthropoda	Insecta	Orthoptera	Acrididae	Mestobregma	plattei	(Thomas)		Platte range grasshopper	Expected
4004	Arthropoda	Insecta	Orthoptera	Acrididae	Mestobregma	terricolor	Rehn.		Short-horned Grasshopper	Expected
4005	Arthropoda	Insecta	Orthoptera	Acrididae	Opeia	obscura	(Thomas)		Obscure grasshopper	Expected
4006	Arthropoda	Insecta	Orthoptera	Acrididae	Orphuella	speciosa	(Scudder)		Short-horned Grasshopper	Expected
4007	Arthropoda	Insecta	Orthoptera	Acrididae	Parapomala	pallida	Bruner		Desert toothpick grasshoppe	Expected
4008	Arthropoda	Insecta	Orthoptera	Acrididae	Parapomala	virgata	(Scudder)		Short-horned Grasshopper	Expected
4009	Arthropoda	Insecta	Orthoptera	Acrididae	Parapomala	wyomingensis	(Thomas)		Wyoming toothpick grasshop	Expected
4010	Arthropoda	Insecta	Orthoptera	Acrididae	Philbostroma	quadrimaculatum	Thomas)		Four-spotted grasshopper	Expected
4011	Arthropoda	Insecta	Orthoptera	Acrididae	Phoetaliotes	nebrascensis	(Thomas)		Large-headed locust	Expected
4012	Arthropoda	Insecta	Orthoptera	Acrididae	Psoloessa	delicatula	(Scudder)		Brownspotted range grassho	Expected
4013	Arthropoda	Insecta	Orthoptera	Acrididae	Psoloessa	texana	Scudder		Short-horned Grasshopper	Expected
4014	Arthropoda	Insecta	Orthoptera	Acrididae	Schistocerca	alutacea	Scudder	shoshone	Lined bird grasshopper	Expected
4015	Arthropoda	Insecta	Orthoptera	Acrididae	Schistocerca	nitens	(Thunberg)		Gray bird locust	Expected
4016	Arthropoda	Insecta	Orthoptera	Acrididae	Shotwellia	isleta	Gurney		Short-horned Grasshopper	Expected
4017	Arthropoda	Insecta	Orthoptera	Acrididae	Syrbula	admirablis	(Uhler)		Slant-faced grasshopper	Expected
4018	Arthropoda	Insecta	Orthoptera	Acrididae	Syrbula	montezuma	(Saussure)		Slant-faced grasshopper	Expected
4019	Arthropoda	Insecta	Orthoptera	Acrididae	Trachyrachys	kiowa	(Thomas)		Kiowa range grasshopper	Expected
4020	Arthropoda	Insecta	Orthoptera	Acrididae	Trepidulus	rosaceus	Scudder		Shy rose-winged grasshoppe	Expected
4021	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	californica	Bruner		Strenuous grasshopper	Expected
4022	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	fratercula	McNeill		Short-horned Grasshopper	Expected
4023	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	maritima	(Harris)		Citrus-winged grasshopper	Expected
4024	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	modesta	Bruner		Short-horned Grasshopper	Expected
4025	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	pallidipennis	(Burmeister)		Pallidwinged grasshopper	Expected
4026	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	pistrinaria	Saussure		Barren land grasshopper	Expected
4027	Arthropoda	Insecta	Orthoptera	Acrididae	Trimerotropis	salina	(Thomas)		Short-horned Grasshopper	Expected
4028	Arthropoda	Insecta	Orthoptera	Acrididae	Tropidolopus	formosus	(Say)		Great crested grasshopper	Expected
4029	Arthropoda	Insecta	Orthoptera	Acrididae	Xanthippus	corralipes	(Haldeman)		Red shanks grasshopper	Expected
4030	Arthropoda	Insecta	Orthoptera	Acrididae	Xanthippus	montanus	(Thomas)		Short-horned Grasshopper	Expected
4031	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Ammobaenetes	arenicolus	Strohecker		Raspy Cricket	Expected
4032	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Ammobaenetes	phrixocnemoides	(Caudell)		Raspy Cricket	Expected
4033	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Ceuthophilus	leptopus	Strohecker		Raspy Cricket	Expected
4034	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Ceuthophilus	pallidus	Thomas		Camel cricket	Expected
4035	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Ceuthophilus	variegatus	Scudder		Raspy Cricket	Expected
4036	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Daihinioides	hastiferum	(Rehn)		Raspy Cricket	Expected
4037	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Daihinioides	larvale	Strohecker		Raspy Cricket	Expected
4038	Arthropoda	Insecta	Orthoptera	Gryllacrididae	Stenopelmatus	fuscus	(Haldeman)		Raspy Cricket	Expected
4039	Arthropoda	Insecta	Orthoptera	Gryllidae	Gryllus	integer	Scudder		True Cricket	Expected
4040	Arthropoda	Insecta	Orthoptera	Gryllidae	Gryllus	personatus	Uhler		True Cricket	Expected
4041	Arthropoda	Insecta	Orthoptera	Gryllidae	Gryllus	veletis	Alexander		True Cricket	Expected
4042	Arthropoda	Insecta	Orthoptera	Gryllidae	Hoplosphyrum	borea	Scudder		True Cricket	Expected
4043	Arthropoda	Insecta	Orthoptera	Gryllidae	Oecanthus	argentinus	Saussure		Tree cricket	Expected
4044	Arthropoda	Insecta	Orthoptera	Gryllidae	Oecanthus	californicus	Saussure		True Cricket	Expected
4045	Arthropoda	Insecta	Orthoptera	Gryllidae	Oecanthus	fultoni	Walker		True Cricket	Expected
4046	Arthropoda	Insecta	Orthoptera	Gryllidae	Oecanthus	quadripunctatus	Beut.		True Cricket	Expected
4047	Arthropoda	Insecta	Orthoptera	Gryllidae	Oecanthus	rileyi	Baker		True Cricket	Expected

4048	Arthropoda	Insecta	Orthoptera	Romaleidae	Brachystola	magna	(Girard)		Lubber grasshopper	Expected
4049	Arthropoda	Insecta	Orthoptera	Romaleidae	Phrynotettix	robustus	(Bruner)		Robust toad hopper	Expected
4050	Arthropoda	Insecta	Orthoptera	Romaleidae	Phrynotettix	tshivavensis	(Haldeman)		Chihuahua toad lubber	Expected
4051	Arthropoda	Insecta	Orthoptera	Romaleidae	Taeniopoda	eques	(Burmeister)		Horse lubber	Expected
4052	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Arethaea	semialata	Rehn and Hebard		Thread-legged Katydid	Expected
4053	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Capnobotes	fulginosus	(Thomas)		Shield-backed Katydid	Expected
4054	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Conocephalus	fasciatus	(De Geer)		Meadow Katydid	Expected
4055	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Conocephalus	striatus	(Scudder)		Meadow Katydid	Expected
4056	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Dichoptela	brevihastata	Morse		Short-winged Katydid	Expected
4057	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Eremopedes	ephippiatus	(Scudder)		Shield-backed Katydid	Expected
4058	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Eremopedes	scudderi	Cockerell		Shield-backed Katydid	Known
4059	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Insara	elegans	(Scudder)		Western Bush Katydid	Expected
4060	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Microcentrum	californicum	Hebard		Angle-wing Katydid	Expected
4061	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Microcentrum	rhombifolium	(Saussure)		Angle-wing Katydid	Expected
4062	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Neoconocephalus	triops	(Linnaeus)		Common Conehead	Expected
4063	Arthropoda	Insecta	Orthoptera	Tettigoniidae	Scudderia	furcata	Brunner		Bush Katydid	Expected
4064	Arthropoda	Insecta	Phasmatodea	Phasmatidae	Diapheromera	covilleae	(Rehn and Hebard)		Creosotebush Walkingstick	Expected
4065	Arthropoda	Insecta	Phasmatodea	Phasmatidae	Diapheromera	femorata	(Say)		Common Walkingstick	Expected
4066	Arthropoda	Insecta	Phasmatodea	Phasmatidae	Diapheromera	velii	Walsh	eucnemis	Prairie Walkingstick	Expected
4067	Arthropoda	Insecta	Phasmatodea	Phasmatidae	Parabacillus	coloradus	(Scudder)		Shorthorned Walkingstick	Expected
4068	Arthropoda	Insecta	Phasmatodea	Phasmatidae	Pseudosermyle	straminea	(Scudder)		Walkingstick	Expected
4069	Arthropoda	Insecta	Plecoptera	Perlodidae	Isoperla	nr. longiseta	Banks		Perlodid stonefly	Expected
4070	Arthropoda	Insecta	Siphonaptera	Ceratophyllidae	Orchopeas	agilis	Rothschild		Flea	Expected
4071	Arthropoda	Insecta	Siphonaptera	Ceratophyllidae	Thrassis	aridus	Prince		Flea	Expected
4072	Arthropoda	Insecta	Siphonaptera	Ceratophyllidae	Thrassis	campestris	Prince		Flea	Expected
4073	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Anomiopsyllus	novomexicanus	Williams and Hoff		Flea	Expected
4074	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Meringis	altipectin	Traub and Hoff		Flea	Expected
4075	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Meringis	arachis	(Jordan)		Flea	Expected
4076	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Meringis	bilsingi	Eads and Menzies		Flea	Expected
4077	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Meringis	disparilis	Eads		Flea	Expected
4078	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Meringis	nidi	Williams and Hoff		Flea	Expected
4079	Arthropoda	Insecta	Siphonaptera	Ctenophthalmidae	Meringis	rectus	Morlan		Flea	Expected
4080	Arthropoda	Insecta	Siphonaptera	Pulicidae	Echidnophaga	gallinacea	(Westwood)		Flea	Expected
4081	Arthropoda	Insecta	Siphonaptera	Pulicidae	Euhoplopyslla	affinis	(Baker)		Flea	Expected
4082	Arthropoda	insecta	Thysanoptera	Aeolthripidae	Aeolothrips	duvali	Moulton		Predatory Thrips	Expected
4083	Arthropoda	insecta	Thysanoptera	Phlaeothripidae	Cryptothrips	rectangularis	Hood		Tube-tailed Thrip	Expected
4084	Arthropoda	insecta	Thysanoptera	Phlaeothripidae	Haplothrips	halophilus (nr.)	Hood		Tube-tailed Thrip	Expected
4085	Arthropoda	insecta	Thysanoptera	Phlaeothripidae	Leptothrips	mali	(Fitch)		Tube-tailed Thrip	Expected
4086	Arthropoda	insecta	Thysanoptera	Thripidae	Anaphothrips	obscurus	(Muller)		Thrip	Expected
4087	Arthropoda	insecta	Thysanoptera	Thripidae	Bregmatothrips	sonorensis	Stannard		Thrip	Expected
4088	Arthropoda	insecta	Thysanoptera	Thripidae	Bregmatothrips	venustus	Hood		Thrip	Expected
4089	Arthropoda	insecta	Thysanoptera	Thripidae	Chirothrips	falsus	Priesner		Thrip	Expected
4090	Arthropoda	insecta	Thysanoptera	Thripidae	Chirothrips	mexicanus	Crawford		Thrip	Expected
4091	Arthropoda	insecta	Thysanoptera	Thripidae	Chirothrips	simplex	Hood		Thrip	Expected
4092	Arthropoda	insecta	Thysanoptera	Thripidae	Frankliniella	fusca	(Hinds)		Tobacco thrips	Expected
4093	Arthropoda	insecta	Thysanoptera	Thripidae	Frankliniella	gossypiana	Hood		Thrip	Expected

4094	Arthropoda	insecta	Thysanoptera	Thripidae	Frankliniella	minuta	(Moulton)		Thrip	Expected
4095	Arthropoda	insecta	Thysanoptera	Thripidae	Frankliniella	occidentalis	(Pergande)		Western flower thrips	Expected
4096	Arthropoda	insecta	Thysanoptera	Thripidae	Frankliniella	williamsi	Hood		Thrip	Expected
4097	Arthropoda	insecta	Thysanoptera	Thripidae	Heliothrips	haemorrhoidalis	(Bouche)		Greenhouse thrips	Expected
4098	Arthropoda	insecta	Thysanoptera	Thripidae	Kurtomathrips	morrilli	Moulton		Thrip	Expected
4099	Arthropoda	insecta	Thysanoptera	Thripidae	Microcephalothrips	abdominalis	(Crawford)		Composite thrips	Expected
4100	Arthropoda	insecta	Thysanoptera	Thripidae	Neohydatothrips	floridanus	(Watson)		Thrip	Expected
4101	Arthropoda	insecta	Thysanoptera	Thripidae	Neohydatothrips	setosus	(Hood)		Thrip	Expected
4102	Arthropoda	insecta	Thysanoptera	Thripidae	Plesiothrips	perplexus (nr.)	(Beach)		Thrip	Expected
4103	Arthropoda	insecta	Thysanoptera	Thripidae	Pseudothrips	inequalis	(Beach)		Thrip	Expected
4104	Arthropoda	insecta	Thysanoptera	Thripidae	Thrips	brevipilosus	Moulton		Thrip	Expected
4105	Arthropoda	insecta	Thysanoptera	Thripidae	Thrips	tabaci	Lindeman		Onion thrips	Expected
4106	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche	lasia	Ross		Netspinning Caddisfly	Expected
4107	Arthropoda	Insecta	Trichoptera	Hydropsychidae	Smicridea	fasciatella	MacLachlan		Netspinning Caddisfly	Expected
4108	Arthropoda	Crustacea	Conchostraca	Limnadiidae	Eulimnadia	texana	Packard		Clam shrimp	Expected
4109	Mollusca	Gastropoda	Bassommatophora	Lymnaeidae	Fossaria	bulimoides	Lea		Prairie Fossaria	Expected
4110	Mollusca	Gastropoda	Bassommatophora	Physidae	Physa	acuta	Draparnaud		Pewter Physa	Expected
4111	Mollusca	Gastropoda	Bassommatophora	Planorbidae	Planorbella	tenuis	(Dunker)		Mexican Rams-horn	Expected
4112	Mollusca	Gastropoda	Stylommatophora	Achatinidae	Rumina	decollata	(Linnaeus)		Decollate snail	Expected
4113	Mollusca	Gastropoda	Stylommatophora	Bulimulidae	Rabdotus	dealbatus	(Say)	neomexicanus	Whitewashed Rabdotus Snai	Expected
4114	Mollusca	Gastropoda	Stylommatophora	Bulimulidae	Rabdotus	durangoanus	(von Martens)		Whitewashed Rabdotus Snai	Expected
4115	Mollusca	Gastropoda	Stylommatophora	Cionellidae	Cionella	lubrica	(Muller)		Glossy pillar	Expected
4116	Mollusca	Gastropoda	Stylommatophora	Ferrussaciidae	Cecilioides	acicula	(Muller)		Blind awlsnail	Expected
4117	Mollusca	Gastropoda	Stylommatophora	Helicarionidae	Euconulus	fulvus	(Muller)		Brown hive	Expected
4118	Mollusca	Gastropoda	Stylommatophora	Helicarionidae	Glyphyalinia	indentata	(Say)		Carved glyph	Expected
4119	Mollusca	Gastropoda	Stylommatophora	Helicarionidae	Hawaiia	miniscula	(Binney)	neomexicana	Minute gem	Expected
4120	Mollusca	Gastropoda	Stylommatophora	Helicarionidae	Striatura	meridionalis	(Pilsbry and Ferriss		Median striate	Expected
4121	Mollusca	Gastropoda	Stylommatophora	Helicarionidae	Zonitoides	arboreus	(Say)		Quick gloss	Expected
4122	Mollusca	Gastropoda	Stylommatophora	Helicidae	Helix	aspersa	Muller		Brown gardensnail	Expected
4123	Mollusca	Gastropoda	Stylommatophora	Helicodiscidae	Helicodiscus	eigenmanni	Pilsbry		Mexican Coil	Expected
4124	Mollusca	Gastropoda	Stylommatophora	Helicodiscidae	Helicodiscus	singleyanus	(Pilsbry)		Smooth coil	Expected
4125	Mollusca	Gastropoda	Stylommatophora	Helminthoglyptidae	Sonorella	metcalfi	Miller		Franklin Mountain talussnail	Expected
4126	Mollusca	Gastropoda	Stylommatophora	Helminthoglyptidae	Sonorella	orientis	Pilsbry		Organ Mountain talussnail	Known
4127	Mollusca	Gastropoda	Stylommatophora	Limacidae	Deroceras	laeve	(Muller)		Meadow slug	Expected
4128	Mollusca	Gastropoda	Stylommatophora	Limacidae	Lehmannia	valentiana	(d'A. de Ferussac)		Threebanded gardenslug	Expected
4129	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	auriculata	Vagvolgyi		Boulder Canyon woodlandsn	Known
4130	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	beasleyi	K. S. Score, A. L. Metcalf		Beasley's Woodlandsnail	Known
4131	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	harrisi	Metcalf and Smartt		Goat Mountain woodlandsna	Expected
4132	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	kochii	Clapp		San Andres woodlandsnail	Expected
4133	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	organensis	Pilsbry		Organ Mountains woodlands	Known
4134	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	pasonis	(Drake)	pasonis	Franklin Mtn. woodlandsnail	Expected
4135	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	pasonis	(Drake)	polygyroidea	Franklin Mountain Woodlan	Expected
4136	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Ashmunella	todseni	Metcalf & Smart		Maple Canyon woodlandsna	Known
4137	Mollusca	Gastropoda	Stylommatophora	Polygyridae	Polygyra	septemvolva	Say		Florida flatcoil	Expected
4138	Mollusca	Gastropoda	Stylommatophora	Pupilidae	Gastrocopta	procera	(Gould)		Wing snaggletooth	Expected
4139	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Gastrocopta	ashmuni	(Sterki)		Sluice snaggletooth	Expected

Invertebrate Species List

4140	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Gastrocopta	cristata	(Pilsbry and Vanatta)		Crested snaggletooth	Expected
4141	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Gastrocopta	pellucida	(Pfeiffer)	hordeacella	Slim snaggletooth	Expected
4142	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Gastrocopta	pilsbryana	(Sterki)		Montane snaggletooth	Expected
4143	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Pupilla	sonorana	(Sterki)		Three-tooth column	Expected
4144	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Pupoides	albilabris	(Adams)		White-lip dagger	Expected
4145	Mollusca	Gastropoda	Stylommatophora	Pupillidae	Vertigo	gouldii	(Binney)		Variable vertigo	Expected
4146	Mollusca	Gastropoda	Stylommatophora	Succineidae	Succinea	grosvenori	Lea		Santa Rita ambersnail	Expected
4147	Mollusca	Gastropoda	Stylommatophora	Succineidae	Succinea	luteola	Gould		Mexico ambersnail	Expected
4148	Mollusca	Gastropoda	Stylommatophora	Thysanophoridae	Thysanophora	hornii	(Gabb)		Southwestern fringed-sanil	Expected
4149	Mollusca	Gastropoda	Stylommatophora	Urocoptidae	Coelostemma	pyrgonasta	Thompson		Bishop tubeshell	Expected
4150	Mollusca	Gastropoda	Stylommatophora	Urocoptidae	Metastoma	roemeri	(Pfeiffer)		Distorted metastoma	Expected
4151	Mollusca	Gastropoda	Stylommatophora	Valloniidae	Vallonia	perspectiva	Sterki		Thin-lip vallonia	Expected
4152	Mollusca	Gastropoda	Stylommatophora	Valloniidae	Vallonia	pulchella	(Muller)		Lovely vallonia	Expected

APPENDIX E: Research Requirements

Research Requirements

Fort Bliss has adopted a resource management approach using regional ecosystem management units (EMUs). are contained in Table E-1 below.

Table E-1: Research Potential for Ecosystem Management Units on Fort Bliss

Fort Bliss EMU	Research Potential
Basin Aeolian	▪ Investigations of geochronologic and paleoclimatic events ▪ Dune behavior, genesis of dunes, redistribution of nutrients by vehicles, role in groundwater recycling ▪ Resource limitations to vertebrate communities ▪ Ant surveys on Cantonment Area to check for presence of red imported fire ant (*Solenopsis invicta*), especially around the watered lawn areas near William Bliss Parade Grounds and Building 2
Basin Alluvial	▪ Erosion studies ▪ Cryptogam response to maneuvers
Foothill-Bajada Complex	▪ Baseline for ungrazed blue/black grama grassland ▪ Erosion studies ▪ Effects of fire on vegetation ▪ Cryptogam recovery on simulated maneuver sites ▪ Paleoclimate reconstruction from packrat middens
Franklin Mountains	▪ Cacti survey
Hueco Mountains	▪ Ecology of endemics ▪ Packrat middens ▪ Survey of available water for wildlife ▪ Biodiversity surveys
Organ Mountains	▪ Ecology of endemic species ▪ Erosion studies ▪ Effects of fire on vegetation communities ▪ Tree ring chronology, Paleoclimate research ▪ Survey for spotted owls (*Strix occidentalis*)
Otero Mesa	▪ Long-term monitoring of vegetation change; grassland response to stresses (training, grazing, drought), grassland response to fire, effects of training and grazing on cryptogams ▪ Road revegetation experiments ▪ Current research on road impacts on vegetation and erosion ▪ Habitat requirements of wintering grassland birds ▪ Prairie dog population monitoring
Sacramento Mountains	▪ Paleoclimate studies from packrat middens ▪ Baseline surveys of vertebrate species ▪ Survey for spotted owls (*Strix occidentalis*)

Suggestion for Installation Wide Invertebrate Survey

Extensive vertebrate studies and incidental observations have been well documented on Fort Bliss. However there is not a lot of documentation about invertebrate species occurring within Fort Bliss boundaries. In total there are over 4,150 invertebrate species ID's in the database, for which 65 are species known to occur, 4,086 are expected to occur but have not been verified. Currently there are over 1,637 invertebrate records in the Natural Resource Database derived from six studies and reviews done for Fort Bliss. Of the known records, six are invertebrate species at risk, including four for the Franklin Mountain Tallus Snail *(Sonorella metcalfi)* and two for the Los Olmos Tiger Beetle (*Cicindela nevadica olmosa)* (Figure E-1). Most of these records exist from literature review, museum records, and some surveying. Records for species occurring on Fort Bliss are concentrated in the Organ Mountains and around the Franklin Mountains; remaining records documented within the Fort Bliss boundaries are sparse. The majority of the invertebrate records occur outside of Fort Bliss.

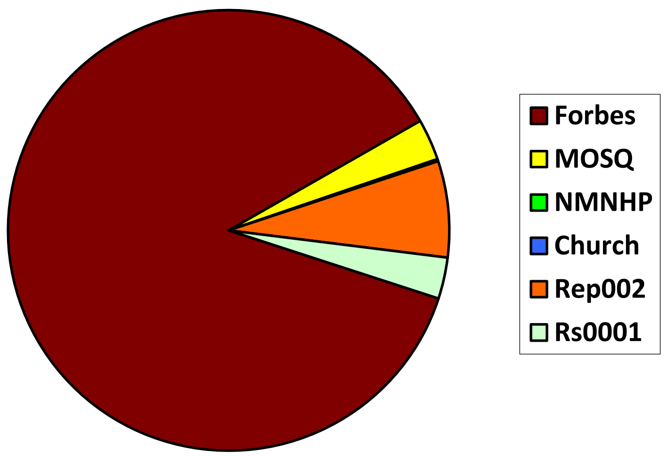

Table E-2. Record Sources. Below are data sources from which the records for known invertebrates occurrences are derived. The Data Source ID is that which is assigned to the source in the Natural Resource Database.

Data Source ID	Report	No. Records
Invert	Forbes (1996)	1,422
MOSQ04	Mosquito Sampling Survey (2004)	55
NMNHP	Data accessed 2007 NMNHP Biotics Database	2
Playas	Church (2002)	1
Rep002	Mehlhop (1994)	116
Rs0001	Boykin (2001)	41

Records obtained from the Forbes (1996) Invertebrate Conservation Status Report were obtained from available information from that of previous studies/surveys in the region and natural history collections. Records of Anthony Blister Beetle *(Lytta mirifica)* have not been documented on Fort Bliss. Originally this species was described as an endemic beetle to the Samalayuca dunes (Corral and MacKay, 2000), 20 km south of Ciudad Juarez, Chihuahua, Mexico, however it has been collected in Las Cruces in 1961 and Anthony, New Mexico in 1941. Both these records are paratypes in the NMSU Entomology Collection. It is suggested that this species may respond more in periods of increased rainfall, and occurs in desert sandy arroyos and coppice dunes, as well as agricultural sites. A concerted effort to survey or investigate for suitable habitat on Fort Bliss has not been undertaken. As a future project, it is recommended that habitat surveys for the Anthony Blister Beetle and the Los Olmos Tiger Beetle be conducted. Further to avoid overlap with reviews that have been conducted based on natural history records and literature, it is highly recommended that an extensive invertebrate survey be conducted on Fort Bliss perhaps based on EMU priority.

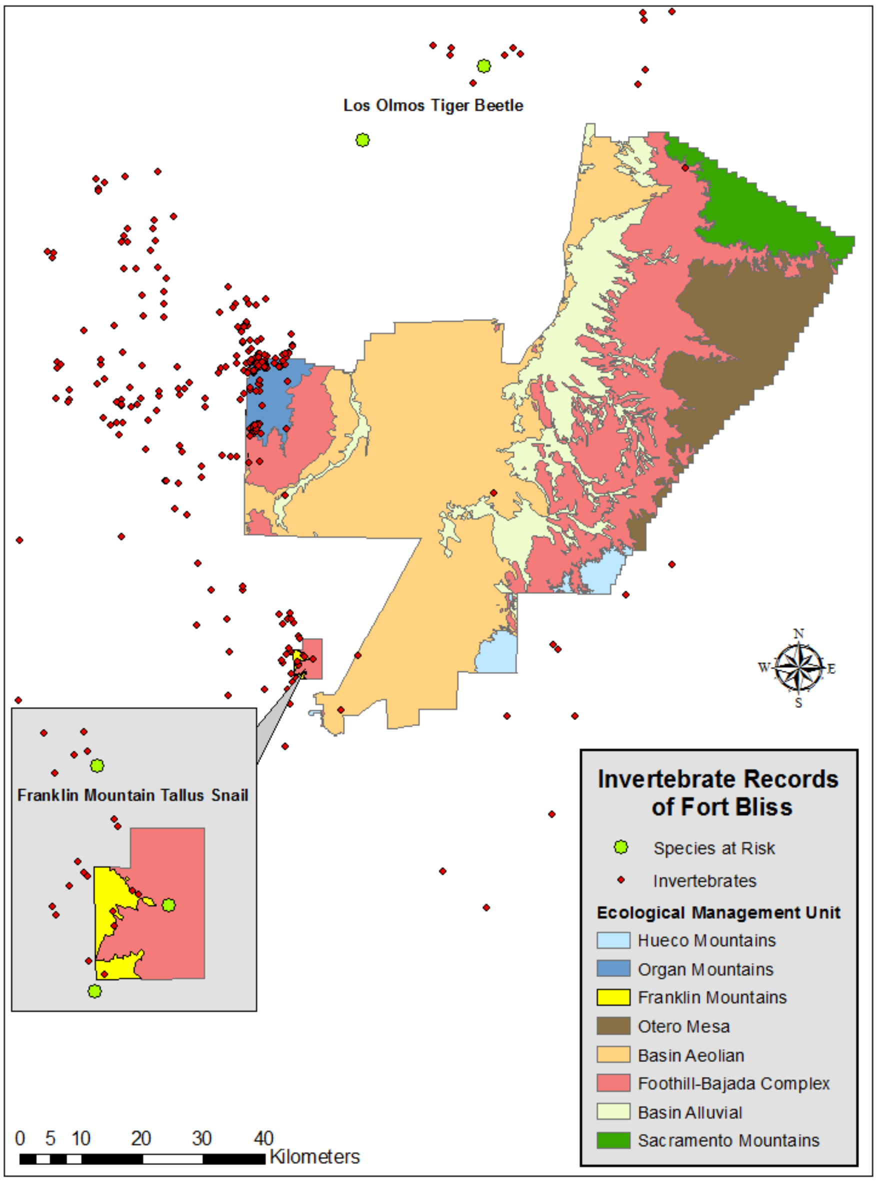

Figure E-1. Current Invertebrate Records of Fort Bliss.

Corral, R. and W. MacKay. 2000. Samalayuca Dunes. P. F-48 in Dinerstein, E. et al. (eds.), Ecoregion-Based Conservation in the Chihuahuan Desert: A Biological Assessment. World Wildlife Fund, Comision Nacional para el Conocimiento y Uso de la Biodiversidad, The Nature Conservancy, PRONATURA Noreste, and the Instituto Tecnologico y de Estudios Superiores de Monterrey. Accessible through the WWF website: www.worldwildlife.org

Forbes, Gregory S. 1996. Conservation Status Report for Fort Bliss Invertebrates

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APPENDIX F: Migratory Bird Management

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Migratory Bird Management

Laws, Regulations, and Policies

The Migratory Bird Treaty Act of 1918 protects migratory birds (MBTA), as amended. This act makes it illegal to pursue, hunt, take, attempt to take, capture, kill, or possess any migratory bird, any part, nest, or egg of any such bird except under a valid permit or as permitted in the implementing regulations. In addition, The U.S. Fish and Wildlife Service (USFWS) has defined 'take' as "pursue, hunt, shoot, wound, kill, trap, capture, collect," or attempt these activities (USFWS 2005b).

Executive Order (EO) 13186 requires federal agencies to evaluate the effects of their actions and management plans on migratory birds (with an emphasis on Species of Concern) in their NEPA documents. Species of Concern (SOC) are those that are identified by established Bird Conservation Plans such as those prepared by Partners in Flight (PIF). EO 13186 also requires federal agencies to collaborate with the USFWS through a Memorandum of Understanding (MOU) to promote the conservation of migratory bird populations. The Department of Defense (DoD) developed an MOU in 2006 (and renewed it in 2011) that outlines the responsibilities of the DoD and USFWS and provides a framework for managing military lands and actions (DOI 2006d, EO 13186).

Military Readiness Activities (MRA's)

In a 2002 lawsuit brought forward against the U.S. Navy by the Center for Biological Diversity, the U.S. District Court in Washington DC ruled that military training exercises that result in the incidental (unintentional) take of migratory birds without a permit was a violation of the MBTA (Federal Register 2007). Later in the same year, Congress passed the National Defense Authorization Act for Fiscal Year 2003, which established an interim period during which the prohibition of incidental take of migratory birds would not apply to otherwise authorized Military Readiness Activities (MRA's). The interim period was to give the USFWS time to develop regulations to exempt the armed forces from incidental take during authorized MRA's. Congress defined MRA's as all training and operations of the Armed Forces that relate to combat, and the testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Incidental take remained prohibited for all other routine military installation support operations such as construction, maintenance, and administration (PL 107-314).

In 2007, the interim period expired and the USFWS released its final ruling authorizing incidental take resulting from MRA's with limitations. Incidental take is authorized unless the Army identifies a significant adverse effect on migratory birds. The ruling defines a significant adverse effect as one that diminishes the capacity of a population to sustain itself at a biologically viable level (Federal Register 2007).

Non-Military Readiness Activities (Non-MRA's)

Non-MRA's were defined by Congress as routine installation operating support functions, and includes all activities that are not directly related to combat or active training. Examples of non-MRA's include routine installation support, housing, motor pools, landscaping, and construction/maintenance of facilities (even those that are used for combat training). All non-MRA's are subject to all of the requirements of the MBTA and EO 13186. As mentioned above, EO 13186 requires federal agencies to develop and implement an MOU to promote the conservation of migratory birds. The MOU between the DoD and USFWS outlines the responsibilities of each agency concerning non-MRA's. The Army has issued guidance regarding migratory bird conservation for installations to use while considering the effects of non-MRA's. Fort Bliss will follow this guidance by achieving the following goals (DOI 2006d):

- Incorporate migratory bird management objectives in the preparation of planning documents
- Integrate conservation measures addressed in Bird Conservation Plans (BCP's) into the installation INRMP
- Follow all migratory bird permitting requirements for non-MRA's (including scientific collecting and depredation)
- Allow USFWS and other partners reasonable access (where safety and security allows) to conduct sampling or survey programs such as MAPS, BBS, BBIRD, International Shorebird Survey, and breeding bird atlases
- Using the NEPA process:
    - Indentify species likely to occur in the area of the proposed action
    - Assess and document the effect of the proposed action using best available data
    - Engage USFWS in early planning and scoping to address potential impacts and initiate appropriate actions to avoid or minimize the take of migratory birds
- Manage military lands and non-MRA's to support migratory bird conservation
- Develop and implement inventory and monitoring programs to evaluate the effectiveness of conservation measures to minimize or mitigate take of migratory birds, emphasizing Species of Concern (SOC's).
- Promote the timely and effective review of INRMP's by USFWS and state wildlife agencies

Integration

The MOU between the DoD and USFWS requires that installations incorporate management objectives and conservation measures addressed in regional or state conservation plans (DOI 2006d). Fort Bliss has integrated the New Mexico Bird Conservation Plan (NMBCP) into the management of its natural resources. The New Mexico Partners in Flight (NMPIF) wrote this plan with participation by numerous state, federal, and non-governmental agencies, including the DoD. The latest revision of the NMBCP was released in 2007. This plan was developed using input from experts and interested individuals from throughout the state, and incorporates objectives set by regional, national and continental conservation plans. The plan was written specifically for land managers to incorporate into planning documents such as this INRMP. The Texas PIF has not released a Bird Conservation Plan, so management recommendations from the NMBCP and the Department of Defense Partners in Flight (DoDPIF) are used to guide migratory bird conservation for the entire installation.

Species Inventory and Monitoring

Species Inventory and Conservation Lists

The NMBCP lists SOC's and explains the assessment and prioritization process used by NMPIF. The distribution, ecology, and population trends, as well as management recommendations, are in the plan for each species. Each priority species receives a score based on distribution, threats, global population size, local population trend, and the importance of New Mexico to breeding (NMPIF 2007). In many cases, less than one percent of the breeding population of a priority species occurs in New Mexico, so management actions in New Mexico may not have a measurable impact on the overall conservation of the species. However, maintaining breeding populations of these species is crucial to sustain the biodiversity in the state. To address this, NMPIF categorized priority species of overall conservation concern under Species Conservation (SC) and species of concern to maintain state biodiversity under Biodiversity Conservation (BC). Each species' vulnerability was rated as Level 1 (High) or Level 2 (Moderate) (NMPIF 2007).

In addition, the DoDPIF has developed a SOC list for Fort Bliss and White Sands Missile Range (WSMR), which is a consolidation of species listed by the U.S PIF, USFWS Migratory Birds of Concern, and The North American Waterbird Conservation Plan (NAWCP). This list is in Table APP 6-1.

NMPIF lists 85 priority bird species associated with the habitat types present on Fort Bliss, while the DoDPIF lists 97 SOC as potentially occurring on Fort Bliss. A combined total of 141 priority species or SOC potentially occur on Fort Bliss (Table APP 6-1). Fort Bliss records show 106 of those species have been observed on the installation (U.S. Army 2013). Often bird species are observed in habitats or locations where they are not expected; migrant species are often observed on Fort Bliss that are not associated with breeding in these habitats. Table APP 6-1 serves only as a rough guide to species-habitat relationships of particular conservation importance.

Monitoring

Fort Bliss will employ standardized monitoring techniques to ensure mitigation measures are employed and effective in minimizing take of migratory birds. An example is walking power line right-of-ways to search for electrocutions and surveying power poles for cavity nests or droppings for species presence. Regarding MRA's, Fort Bliss will monitor to ensure impacts are not causing significant adverse impacts to migratory bird species. Fort Bliss allows USFWS and other partners reasonable access for conducting sampling or survey programs.

Table F-1. NMPIF Priority Bird Species with Potential to Occur on Fort Bliss. Please see table key on last page.

1350

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
American Avocet	X				R			
American Bittern		WET		BC1				
American Pipit	X				R			
American White Pelican	X							Moderate
American Wigeon	X				R		X	
Ash-throated Flycatcher	X				W			
Baird's Sparrow (winter)	X	(CDG)		BC1		X		
Bald Eagle	X	MER, WET, SWR		BC2				
Band-tailed Pigeon	X	MCF, PPF	SFF, MPO	SC2			X	
Bank Swallow	X	MER	PMS (Forages widely)	BC1				
Bell's Vireo	X	MER, SWR	CDS	SC1	O	X		
Belted Kingfisher	X	MER	MOR, SWR, WET	BC2				
Bendire's Thrasher		PJW, GBS, PMG, CDS		SC1	O	X		
Black Swift	X	MOR	(Forages widely)	BC1				

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Black-capped Vireo	X				O			
Black-chinned Hummingbird	X	MER, SWR	URB	SC2	O			
Black-chinned Sparrow	X	MOS	PJW	SC1	O	X		
Black-crowned Night-heron								Moderate
Black-tailed Gnatcatcher	X				O			
Black-throated Gray Warbler	X	PJW, MPO		SC2				
Black-throated Sparrow	X	CDS	GBS, PMS	SC2	R			
Blue Grosbeak	X				W			
Brewer's Sparrow	X				O			
Broad-tailed Hummingbird	X	MCF, PPF	SFF, PJW, MOR, WMG	SC2				
Bullock’s Oriole	X	MER	SWR, CDS, AGR	SC2				
Burrowing Owl	X				R/O	X		

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Cactus Wren	X				R			
Canvasback	X				O		X	
Canyon Towhee	X				O			
Canyon Wren	X				R			
Cassin's Kingbird	X	PPF, PJW, MPO, MER, SWR, AGR		SC2	O			
Cassin's Finch	X				R			
Cassin's Sparrow	X				O	X		
Chestnut-collared Longspur					O	X		
Chihuahuan Raven	X				W			
Clark's Grebe		WET		SC2				
Clay-colored Sparrow	X				O			
Common Black-Hawk	X	SWR	MER	BC1	O	X		
Common Ground-Dove		SWR	CDS, AGR	BC1				
Common Nighthawk	X				R			
Common Poorwill	X				R			
Cordilleran Flycatcher	X	MCF	SFF, PPF, MOR	SC2				
Costa's Hummingbird		MOS, CDS	SWR	BC2				

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Crissal Thrasher	X	PJW, CDS	MOS, MER, SWR	SC2	O	X		
Curve-billed Thrasher	X				R			
Dickcissel	X	PMG, AGR		BC2				
Eared Grebe		WET		SC2				Moderate
Elegant Trogon	X	MOR, SWR		BC1				
Elf Owl		MPO, SWR		SC2		X		
Ferruginous Hawk	X	PMG	PJW, GBS, PMS, AGR	SC1	R	X		
Flammulated Owl	X	MCF, PPF	MPO	SC1	O	X		
Forster's Tern								Moderate
Golden Eagle	X	CLI		BC2				
Grace's Warbler	X	PPF	MCF, MPO	SC1		X		
Grasshopper Sparrow	X	PMG	CDG, AGR	BC2				
Gray Vireo	X	PJW, MOS	GBS, CDS	SC1	O	X		
Greater Roadrunner	X				R			
Green-tailed Towhee	X				R			
Hepatic Tanager	X				W			
Hooded		SWR	MER,	BC2	O	X		

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Oriole								
Juniper Titmouse	X	PJW	MPO	SC1				
Killdeer	X				R			
Ladder-backed Woodpecker	X				R/O			
Lark Bunting	X				O	X		
Lark Sparrow	X				R			
Lazuli Bunting	X	MOS, MER		SC2				
Least Bittern		WET		BC2				
Least Sandpiper					R			
Least Tern		WET		BC2				
Lesser Nighthawk	X				W			
Lesser Scaup							X	
Lewis's Woodpecker		PPF, MER	MOR, AGR	SC1				
Loggerhead Shrike	X	PJW, GBS, PMS, PMG, CDS, CDG, AGR		SC2	R/O	X		
Long-billed Curlew	X	PMG		SC1	O	X		
Long-eared Owl	X				R			
Lucifer Hummingbird		MOS, CDS		BC1	O	X		
Lucy's Warbler	X	SWR	MER	SC1	O			

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Magnificent Hummingbird	X	PPF, MPO	MCF, SWR	BC2				
Mallard	X						X	
Marsh Wren	X				R			
McCown's Longspur (winter)		(CDG)	(AGR)	SC1	O	X		
Mexican Spotted Owl	X	MCF, PPF	SFF, MOR, MPO	SC1	O			
Mississippi Kite	X	URB	AGR, MER	SC2				
Montezuma Quail	X	PJW, MPO	PPF	SC2		X		
Mountain Bluebird	X	PJW	MOR, WMG, GBS	SC2	R			
Mountain Plover	X	PMG	CDG	SC1	O	X		
Mourning Dove	X						X	
Neotropic Cormorant		WET	MER	BC2				Moderate
Northern Aplomado Falcon	X	CDG		BC1	R			
Northern Harrier	X	WET	PMG, CDS, CDG	BC2	R	X		
Northern Mockingbird	X				W			
Northern		MCF, PPF	SFF,	SC2				

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Pygmy-Owl			MPO					
Olive Warbler	X	MCF, PPF		BC2				
Olive-sided Flycatcher	X	MCF	SFF, PPF	BC2				
Painted Bunting		MER, CDS	AGR	BC1	O	X		
Painted Redstart		MOR	MCF, MPO, SWR	BC2				
Peregrine Falcon	X	CLI	(Forages widely)	BC1	R	X		
Piñon Jay	X	PJW	PPF	SC1				
Plumbeous Vireo	X	MCF, PPF	PJW, MOR, MPO, SWR	SC2				
Prairie Falcon	X	CLI	(Forages widely)	SC2	R			
Pyrruloxia	X				R/O			
Red-faced Warbler	X	MCF, PPF	MOR	SC1	O	X		
Redhead					O		X	
Red-naped Sapsucker		MCF	SFF, PPF, MOR	SC2	O			
Ring-necked Duck	X						X	
Ross's Goose					O			
Rufous-crowned Sparrow	X				O			

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Sage Sparrow	X	GBS		SC2	O	X		
Sage Thrasher		GBS		BC2	R			
Sandhill Crane					O	X		
Scaled Quail	X	PMG, CDG	GBS, PMS, CDS, AGR	SC2				
Scott's Oriole	X				O			
Short-eared Owl	X				R			
Snow Goose	X						X	
Snowy Egret		WET	MER	BC2				High
Snowy Plover		WET		SC1	W	X		
Southwestern Willow Flycatcher	X	MER, SWR	MOR	SC1				
Spotted Towhee	X				R			
Sprague's Pipit (winter)	X	(CDG)		BC1	O	X		
Summer Tanager	X	MER, SWR		BC2				
Swainson's Hawk	X	PMG, PMS, CDG, CDS, AGR, GBS		SC2	O			
Turkey Vulture	X				W			
Varied Bunting	X	CDS	SWR	BC2	O	X		
Verdin	X				R			

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Vermilion Flycatcher								
Vesper Sparrow	X	GBS, PMG	PJW, WMG, PMS	SC2	R			
Virginia's Warbler	X	PPF, MOS	MCF, PJW, MPO	SC1	O			
Warbling Vireo	X	MCF, MOR	SFF, PPF, MER	SC2				
Western Bluebird	X	PJW, MPO	PPF, MOR	SC2				
Western Grebe		WET		BC2				Moderate
Western Kingbird	X				R			
Western Scrub-Jay	X	PJW	MPO, MOS, URB	SC2				
Whip-poor-will	X	PPF	MCF, MPO	BC2				
Whiskered Screech-Owl	X	MPO, MOR, SWR		BC2				
White-throated Swift	X	CLI	(Forages widely)	SC2				
Williamson's Sapsucker		MCF	PPF	SC2	O			
Wilson's Warbler	X	MOR		BC2				
Yellow-billed	X	MER, SWR	AGR,	BC1	R	X		

Species Name	Observed on Fort Bliss	NMPIF Primary Breeding Habitats	NMPIF Additional Breeding Habitats	NMPIF Conservation Concern	National PIF Conservation Concern Level	USFWS Bird of Concern	USFWS Game Birds Below Condition	NAWCP Conservation Concern
Cuckoo			URB					
Yellow-headed Blackbird	X				O			
Zone-tailed Hawk	X				R			

NMPIF Habitat Codes
Bold codes indicate those that are present on Fort Bliss, as described in the NMBCP. Habitat codes are only listed for those species identified by NMPIF

Code	**Habitat**	**Code**	**Habitat**
AGR	Agricultural	MOS	Montane Shrub
ALP	Alpine Tundra	MPO	Madrean Pine-Oak Woodland
CDG	Chihuahuan Desert Grassland	PJW	Piñon-Juniper Woodland
CDS	Chihuahuan Desert Shrub	PMG	Plains Mesa Sand Shrub
CLI	Cliff/Cave	PPF	Ponderosa Pine Forest
GBS	Great Basin Shrub	SFF	Spruce Fir Forest
MCF	Mixed Conifer Forest	SWR	Southwest Riparian
MER	Middle-Elevation Riparian	URB	Urban
MOR	Montane Riparian	WMG	Wet Meadows and Montane Grassland

National PIF Conservation Codes

Code	**Concern Type**
O	Overall High
R	Regional High
W	Watch

NMPIF Conservation Concern Codes			
Type Of Concern	Prefix	Suffix	Level of Concern
State Biodiversity Conservation	BC	1	High
Overall Species Conservation	SC	2	Moderate

Habitat Conservation and Management Practices

Priority Habitats

The NMBCP describes the four Bird Conservation Regions (as identified by the national PIF) that occur in New Mexico as well as 20 habitat types designated by NMPIF. These habitat types are based on the work done by Dick-Peddie (1993) and incorporate both bird assemblages and vegetation associations. Each habitat type receives a priority ranking (high to low) based on its importance to birds and the degree of threat to the habitat. Finally, each habitat type is ranked for the opportunity for conservation (NMPIF 2007).

The following sections discuss conservation measures by NMBCP habitat type. The Urban (URB) habitat section provides the most information about management practices that apply specifically to non-MRA's since most of these activities (infrastructure, safety/security, landscaping, etc.) are typically associated with the cantonment, training facilities, or other developed areas.

Fort Bliss Habitats and Conservation

Fort Bliss is located within the Chihuahuan Desert Bird Conservation Region, with 10 NMPIF habitat types occurring on the installation. The table below lists those habitats, their priority rankings, and opportunity for conservation as identified by NMPIF on a statewide scale.

Table F-2. NMBCP Habitat Types present on Fort Bliss

Scores listed are the habitat's opportunity for conservation statewide: 1= High 2= Moderate 3= Low.					
Highest Level of Concern		**High Level of Concern**		**Moderate/Low Level of Concern**	
Score	**Habitat**	**Score**	**Habitat**	**Score**	**Habitat**
2	Chihuahuan Desert Grassland	**3**	Chihuahuan Desert Shrub	**3**	Cliff/Cave
1	Middle-Elevation Riparian	**2**	Montane Shrub	**1**	Urban
2	Piñon-Juniper Woodland	**2**	Mixed Conifer Forest		
2	Ponderosa Pine Forest				
1	Emergent wetlands, playas and Lakes				
Source: NMPIF 2007.					

Chihuahuan Desert Shrub is the dominant habitat type found on Fort Bliss. About 1/3 of the installation is composed of mesquite coppice dunes, and another third is creosote shrubland. All of the other habitat types occur in less abundance. Much of the activity that occurs on Fort Bliss is located in Chihuahuan Desert Shrub and Urban habitat types, and some training activity that occurs in Piñon-Juniper habitat in the Sacramento Mountains foothills. Most other habitat types experience little to no disturbances because of land use designations or resource protection measures enacted by Fort Bliss.

Fort Bliss has instituted conservation measures by developing land use designations that restrict the types of activities that occur in a given location. These designations protect cultural resources, natural resources, or maintain mission sustainability by limiting high-impact training activities in areas sensitive to degradation. In addition, standard operating procedure for training exercises is that vegetation will not be used for camouflage or collected, and that nests will not be disturbed anywhere on the installation (US Army 2005). This is to preserve nests and available nesting structure. Chapter 2.1.5 describes and maps the land use designations and the activities permitted; impacts to migratory birds and their habitat is discussed below.

Limited Use Areas (LUA's) and Off Limits Areas (OLA's) are scattered throughout the installation. They exist to protect a specific resource or site such as endangered species habitat, sensitive wetlands, or cultural sites (Table 2.1.6). OLA's prohibit all entry and are marked by siber stakes. LUA's are less restrictive but are more widespread across the installation. These areas are open to 'roll-through' military training activities, but are off-limits to:

- Static vehicle positions
- All logistical, training units assembly (except in designated FTX sites)
- Fuel depots
- Digging or ground disturbance
- Field fortifications
- Bivouac areas
- Tactical Operations Centers (TOCs)
- Any other concentrations of vehicles or personnel

Riparian areas, earthen tanks and playas, vegetation along arroyo areas, and the Otero Mesa grasslands are examples of LUA's that benefit migratory birds. While MRA's may still occur in these areas, impacts to migratory birds seldom occur because activities that cause disturbances to birds are prohibited.

While many of these land use designations and activity restrictions were not designed specifically for bird conservation, migratory birds still benefit directly by these restrictions because the most destructive activities are limited to less desirable, highly abundant habitats, while sensitive or important habitats are preserved. The sections below discuss impacts to migratory birds by habitat type and incorporate the NMBCP's conservation measures. For detailed descriptions of the areas, land use designations, and OLAs / LUAs, see Chapter 2.

Chihuahuan Desert Grassland (CDG)

This habitat type primarily occurs on Otero Mesa on McGregor Range, but small patches of intact grasslands exist in the Tularosa Basin. The NMBCP also includes degraded, shrub-invaded grasslands in this habitat category. These areas are scattered throughout the installation, especially in foothill/bajada areas. About half of the habitat on Otero Mesa is in

Land Use F, which limits vehicle maneuvers to roads and FTX sites to designated locations. The other half is in Land Use A, with no restrictions on FTX sites or off-road vehicle maneuvers. However, the entire mesa and the intact grasslands located off the mesa have been designated as LUAs which limits the amount of activity that occurs. In addition to these LUA's, the Fort Bliss Master Plan states that no off-road vehicle maneuvers will occur in grasslands on the Otero Mesa (U.S. Army 2010a).

Wildfires can occur frequently in these areas and may affect migratory birds depending on the time of the year. The road system on Otero Mesa and throughout the installation acts as firebreaks. These roads are regularly maintained and allow MRA caused fires to remain small and allow for quick fire control, limiting the amount of habitat impacted at any one time. Because training occurs year-round on Fort Bliss, military training areas must remain open and in ready condition throughout the year. Maintenance or construction of firebreaks can occur at any time as needed to ensure the effectiveness of the firebreaks to keep wildfires small and easily controlled. The potential exists for the unintentional take of ground- or shrub-nesting migratory birds during construction or maintenance of these firebreaks. However, the benefits of maintaining firebreaks outweigh the negative impacts of a large wildfire.

The Otero Mesa grassland is considered one of the largest intact grasslands in the Chihuahuan Desert eco-region and is important for regional species diversity. These land use designations incorporate the conservation measures recommended by NMPIF by ensuring these grasslands remain intact. NMPIF Priority species such as the Aplomado falcon, Baird's Sparrow, Sprague's pipit and mountain plover have been observed on Fort Bliss in these areas. Because a large portion of the mesa is within the installation boundaries, management by Fort Bliss is critical for the continued existence of these ecologically important grasslands.

Chihuahuan Desert Scrub (CDS)

Chihuahuan Desert Shrub (CDS) is the dominant habitat type on Fort Bliss. All of the Tularosa Basin floor and much of the foothills on the installation are CDS. Mesquite coppice dunes dominate the basin floor and occupy about 1/3 of the installation. South facing slopes, rocky foothills and bajadas support creosote, ocotillo, and acacia shrublands. Most of the military ranges and training facilities are located in this habitat type. Training occurs in this habitat type year-round. Facilities, targets and infrastructure at the ranges must be maintained year-round to keep them open and ready for training exercises.

The majority of CDS habitat is designated Land Use A, with no restrictions on maneuvers. The more diverse CDS habitat occurring on the rocky bajadas surrounding the Organ Mountains is designated Land Use D, which restricts all off-road maneuvers. Heavy vehicle off-road use is prohibited within the foothills of the Sacramento Mountains, and light vehicle off-road use is only permitted within 500 meters of roads. OLA's and LUA's protect playas, arroyo vegetation, patches of shinnery oak, and dirt tanks. Within the Culp Canyon Wilderness Study Area (designated by the BLM) all motor vehicles and aircraft landings are prohibited.

Non-MRA activities include maintenance of targets, roads, fences, firebreaks, utilities, and removal of obsolete infrastructure (discussed further in the Urban Habitat Section). As with the CDG habitat, wildfires resulting from training exercises occur here frequently throughout the year but are usually limited in size by firebreaks or lack of fuel. While most of these activities pose negligible impacts to migratory birds, some activities may result in incidental take of migratory birds because these activities are essential to support MRA's and may occur during nesting season. The potential for loss of active nests is small and not likely to affect priority species. Impacts to habitat will not significantly affect migratory birds (particularly priority species) because of the high abundance of this habitat type. In addition, NMPIF priority species that are associated with CDS (See Priority Birds section below) and occur on Fort Bliss generally prefer arroyo-riparian habitat for nesting or are associated with the acacia and creosote habitats found on foothills and bajadas. LUA's restrict activity and mostly protect both of these habitat types. The mesquite coppice dunes (where most MRA's in this habitat occurs) are stable and are mostly unaffected by training exercises due to their steep nature and soil structure.

Middle Elevation Riparian (MER) and Emergent Wetlands, Playas, and Lakes (WET)

Although they are rare on Fort Bliss, riparian areas and playas provide important bird habitat for both priority and non-priority species. Vegetation such as cottonwoods, willows, and cattails are found at springs in mountainous areas and provide small patches of riparian habitat near sources of water. Playas, which are located in the Tularosa Basin and Otero Mesa, are dry most of the year but generally support a higher diversity of plants overall compared to non-playa areas. Whenever water is present during active monsoon seasons, migratory water-birds not normally seen on Fort Bliss occur at the playas, especially after the birds begin to migrate north.

All riparian areas and playas on Fort Bliss are protected by LUA designations. Most of the active springs on the installation occur in the Organ Mountains and MRA's are limited to on-road or dismounted exercises (Land Use E) in this part of the Installation. In addition, the Organ Mountains serve as a safety buffer for surrounding live-fire artillery ranges and entry is prohibited while the ranges are active. Safe and legal access to these riparian areas is extremely limited and reduces human activity even further.

Piñon Juniper Woodlands (PJW) and Montane Shrub (MOR)

These habitat types are in the mid to high elevations of the Organ and Sacramento Mountains on Fort Bliss. Sunny, south facing slopes are characterized by mountain mahogany and sotol while north facing slopes and canyon bottoms are a mixture of juniper and piñon trees. Grasses are the dominant ground cover except in areas with rocky, shallow soils. This mixture creates a mosaic of habitat types that is beneficial to wildlife.

Land use designations and standard operating procedures contain conservation measures to protect these habitats. Parts of the Organ Mountains where these habitats occur is designated Land Use E, which limits exercises to on-foot training exercises and vehicle traffic to existing roads. Live-fire training on artillery ranges surrounding the mountains restricts access further; the mountains serve as a safety buffer and entry is prohibited while the ranges are active. In the Sacramento Mountains, lands managed by the USFS are restricted to on-road or dismounted maneuvers, with a limited number of FTX sites where assemblies of troops, vehicles, and logistics support can occur (Land Use F) and live-fire exercises are not permitted. In all other areas, live-fire exercises and FTX sites are permitted (Land Use C). Off-road, light vehicle maneuvers are permitted within 500 meters of existing roads (Land Use B). Mission support facilities such as training ranges and radar facilities are also permitted, although none exists at this time in these habitats. LUA's exist to protect sensitive areas and standard operating procedures prohibit the collection of vegetation for camouflage or cover.

Non-MRA's that directly supports an MRA are allowed to occur throughout the year. The training areas in these habitats see heavy use throughout the year. Non-MRA's that occur on the installation in PJW/MOR habitats are mostly construction and maintenance of roads, installation boundary and interior fences, and utilities. Prescribed fires and firebreak construction or maintenance also occurs throughout the year. While these activities may have an impact on migratory birds, the impact is minimal when compared to a large-scale wildfire. Prescribed fires can be beneficial to migratory birds because they help maintain juniper savannahs. All other non-MRA activities that do not provide direct and essential support to an MRA will be delayed until after the nesting season or conducted to avoid active nests, if encountered.

Ponderosa Pine Forest (PPF) and Mixed Conifer Forest (MCF)

Ponderosa pine and Douglas fir trees occur in small patches where temperatures and precipitation are favorable, mainly within the highest elevations of the Organs Mountains. In the Sacramento Mountains, only small stands of ponderosa pine occur near the installation boundary adjacent to the village of Timberon.

These areas have the same land designations as the PJW/MOR habitats described above. However, these areas see limited human activity on the installation because of their remote locations in the Organ Mountains. Pine stands in the Sacramento Mountains occur near private buildings and most training exercises avoid this area. The Organ Mountains are extremely rugged at these high elevations and are only accessible by aircraft or hiking by foot for several miles. Impacts to these habitats are mostly from wildfires started by MRA's, which last occurred in 2011.

Fort Bliss is in the process of expanding firebreaks surrounding firing ranges to better control MRA caused fires and prevent them from spreading outside training ranges. While the PPF/MCF habitats are fire adapted, MRA caused wildfires can be particularly damaging to natural resources because they can occur during drought or early summer when plants are heat and water stressed. High fire frequency and high burn severity can replace native trees and perennial grasses with less desirable annual grasses, noxious weeds and forbs.

Cliff/Cave

While few caves or mineshafts occur on Fort Bliss, cliffs occur frequently in all habitat types. The rugged terrain in the Organ Mountains, the escarpment of Otero Mesa, and the sharply incised canyons of the Sacramento foothills and Hueco Mountains all provide excellent habitat for bird species that use cliffs. Due to the physical characteristics of these areas (steepness, remoteness, etc.) MRA's and non-MRA essentially have no impact to these habitats on the installation. Trespass recreational rock climbing does occur near Hueco Tanks State Park. This area is an LUA and signs have been posted stating that rock climbing is not allowed.

Urban Habitat (URB)

The NMBCP broadly defines this habitat type as urban and suburban areas where native vegetation is replaced, including golf courses. This habitat type includes targetry, communication sites, and all other stationary equipment or facilities associated with training, including the main cantonment. The cantonment contains buildings, landscaping, parks, warehouses, flood control ponds, roads, and Biggs Army Air Field. Base camps and training ranges' buildings, roads, utilities, and military equipment (e.g., targets) and other infrastructure are found throughout the installation. These areas provide habitat not normally found in desert areas to native and non-native bird species, causing a change in bird species composition and populations. Power poles and trees provide roosting and nesting structure where there normally might be fewer such sites, or roosts and nests in shorter vegetation (yucca, mesquite, or other large shrubs).

Training Range and Equipment Maintenance

The FBTC provides Soldiers training in the use of numerous types of weaponry and vehicles that involve target practice, maneuvers, and mock battlefields to develop or sustain their skills to ensure battle readiness. To meet these battle ready standards, training occurs at the target ranges or maneuver areas year round in all seasons and weather conditions. Maintenance on targets and facilities also occurs year round to keep facilities and ranges open and in ready condition. As such, unintentional take of migratory birds may occur, but not to the extent to cause significant impacts to any species. The firing ranges are all located on desert shrub bajadas and do not inhabit grassland and arroyo areas where species of concern are most likely to be. These firing ranges constitute approximately 3.4% of Fort Bliss, so the maintenance activities do not affect the most important habitats for migratory birds or a significant portion of migratory bird habitat.

Installation Safety and Security

Security of the installation provides a safe environment for training and prevents trespass by the public. A safe and secure installation ensures that training facilities remain open and in ready condition year-round. As a result, training and maintenance activities cannot be delayed until after the breeding season. While much of the installation boundary is unmarked, other sections, especially those around the cantonment or near civilian private property, must be clear of vegetation to provide a secure border or to serve as firebreaks to prevent wildfires from escaping the installation. Unintentional take of migratory birds during road or firebreak construction or maintenance is possible. Such take will not significantly affect species at the individual level and not impact populations.

Avian Power Line Interactions

Power lines contain structures that naturally attract bird species and can provide roosting or nesting habitat that may not be otherwise available. This infrastructure can also be a cause of mortality from electrocution if not designed with bird conservation in mind. The Avian Power Line Interaction Committee (APLIC) has developed design features for use by utility companies to prevent electrocutions. Various wire configurations and shielding options are in use for different voltages and pole types with the underlying theme that there be a minimum of 60 inches of horizontal separation and 40 inches of vertical separation between all wires and grounded hardware. If this spacing is not possible, then the wires or grounded hardware of the power pole are shielded. Jumper wires are insulated and connections on transformers must be insulated to prevent electrocutions and power outages. Perch discouraging devices are installed if shielding is not feasible (APLIC 2006). Fort Bliss has incorporated all of the APLIC design features into the construction of new power lines.

Landscaping and Vegetation Removal

The impacts of landscape maintenance do not cause significant impacts to migratory bird populations. The impacts are limited to species of birds that inhabit the landscaping found around buildings and houses of suburban areas in southern New Mexico and far west Texas.

Whenever possible, landscaping activities that affect migratory birds are delayed until after the breeding season. Dead trees or vegetation that pose a risk of injury, fire, or property damage around residential or administrative sites will be removed as soon as the hazard is identified. Unintentional take of migratory birds might occur during such vegetation removal activities.

Pesticides are applied on the installation to control weeds, insects and other pests. As required by the Federal Insecticide, Fungicide, Rodenticide Act, these chemicals are to be applied and disposed of by a licensed applicator. This procedure minimizes the risk that pesticides will have an impact to migratory birds through unintentional contact or ingestion.

Other non-MRA

All non-MRA that are not essential or critical to the military mission will employ timing and avoidance tactics to minimize risks to migratory birds. Migratory birds and their nests are avoided wherever possible. This avoids significant impact to migratory bird populations.

Future expansion of the cantonment or construction in the Fort Bliss Training Center that is not covered by existing Fort Bliss EISs will be evaluated through the NEPA process. The appropriate environmental document that is necessary to analyze impacts to the environment, including migratory birds, will be completed.

Collaboration and Coordination

Within the confines of safety and security, Fort Bliss will cooperate with the USFWS and other partners to complete sampling or survey programs such as MAPS (Monitoring Avian Productivity and Survivorship) or BBS (Breeding Bird Survey). Fort Bliss also works cooperatively with the BLM on all migratory bird issues on McGregor Range.

Outreach and Public Access

Fort Bliss public access is managed by Range Operations and all activities on the FBTC are controlled in accordance with the SOPs for Weapons Firing and Maneuver Area Use (U.S. Army 2005). Many parts of the installation are available for public recreation such as bird watching (Chapter 3). Members of the public must obtain FBTC Recreation Access Permits and all recreation users must comply with permission procedures for entry, use and exit of the Training Center.

Popular birding areas on the installation are the oxidation ponds at the Fred Hervey water treatment plant, which can see a significant water bird use during the migration season. Bird watching occurs at this location without actually entering the installation (or needing to obtain an access pass), so this area sees the highest amount of use by bird enthusiasts.

APPENDIX G: Benefits for Endangered Species

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INRMP Benefits for Federally Threatened and Endangered Species

Section 4(a)(3)(B)(i) of the ESA states that the Secretaries of the Departments of Interior and Commerce are prohibited from designating as critical habitat any lands or other geographical areas owned by the DoD that are subject to an INRMP prepared pursuant to section 670a of the Sikes Act. This restriction applies if either Secretary determines in writing that a given INRMP provides a benefit to the species for which critical habitat is proposed for designation pursuant to section 318 of PL 108-136. To take advantage of this exemption and avoid USFWS designation of critical habitat on DoD installations, each installation implements its INRMP by executing appropriate projects and activities in accordance with timeframes identified in the INRMP.

The objective of Appendix G is to identify all INRMP management and conservation efforts pertaining to listed species that the U.S. Fish and Wildlife Service (USFWS) would take into consideration when making a determination not to designate critical habitat on an installation. This will speed the review process by identifying upfront projects and actions conducted by the installation that benefit listed species, and thereby aiding the USFWS to obviate the need to designate critical habitat on military installations.

Currently, there are nine species designated as endangered, threatened or candidate by the USFWS known to occur or could potentially occur on Fort Bliss. One endangered species grows on Fort Bliss, Sneed pincushion cactus (*Escobaria sneedii* var. *sneedii*). Six endangered, threatened, or candidate species have been observed on Fort Bliss as rare, transitory, or seasonal migrants; these are: northern aplomado falcon (*Falco femoralis septentrionalis*) [endangered], southwestern willow flycatcher (*Empidonax trailii extimus*) [endangered], Mexican spotted owl (*Strix occidentalis lucida*) [threatened], piping plover (*Charadrius melodus*) [threatened], Sprague's pipit (*Anthus spragueii*) [candidate], and yellow-billed cuckoo (*Coccyzus americanus*) [candidate]. Lastly, two endangered species that are not known to occur but for which potential habitat exists on Fort Bliss are: Kuenzler's hedgehog cactus (*Echinocereus fendleri* var*. kuenzleri*), and interior least tern (*Sterna antillarum athalassos*).

Fort Bliss actively implements management and conservation actions that benefit federally listed species. In general, these actions include: 1) Keeping up-to-date with federally listed species that could potentially occur on the installation. 2) Conducting formal surveys for and monitoring of endangered species [Section 4.1]. 3) Encouraging documentation of incidental plant and animal observations that occur during the course of any formal survey, DPW-E staff field outing, and recreational use of the FBTC. 4) Compiling survey data and incidental observations in a spatial database. 5) Establishing off-limits areas (OLA) to military training activities and other disturbances, and areas of limited use (LUAs) [Section 3.1.1]. 6) Developing conservation goals for listed species. 7) Educating military personnel through the Environmental Officer Training program [Section 3.10.1]. Management and conservation efforts specific to listed species known to occur or potentially to occur on Fort Bliss are outlined below.

Sneed Pincushion cactus (*Escobaria sneedii* var. *sneedii)* [Endangered]

- Three populations are documented on Fort Bliss south of the Organ Mountains.
- Monitoring of known plants occurs nearly annually: 1996, 1998 - 2001, 2003 - 2006, 2010 - 2013.
- Monitoring plots and plant locations are stored in a spatial database.
- The three populations are located within OLAs which are delineated by siber stakes.
- Through environmental awareness instruction, all military units training on the FBTC are made aware of the federal status of this species and its protection within OLAs.

- Livestock grazing is not allowed in areas where this species is known to occur.
- Installation conservation goals are to maintain the populations located in the Bishop's Cap Hills, and to survey for and protect additional populations that may be located on Fort Bliss (Corral et al. 1998).
- GSRC obtained permits to survey and study the genetics of Sneed and similar species. Plant material was sent to Dr. J. Mark Porter of Rancho Santa Ana Botanical Gardens in Claremont, CA for genetic analysis. Fort Bliss is waiting for the report as of this time (GSRC 2013b).
- Surveys have been conducted in the Organ Mountains and on Castner Range where potential habitat is known to exist. However, no plants outside of the three known populations have been discovered on Fort Bliss.

Northern aplomado falcon (*Falco femoralis septentrionalis)* [Endangered]

- Nine documented sightings have occurred on Fort Bliss between 1917 and 2010. During the summer of 2008, two birds were observed occupying El Paso Draw, possibly attempting to maintain a territory (GRSC 2013a). No nesting attempts have been documented.
- Surveys occur nearly annually: 1994, 1996 - 2012 (GRSC 2013c).
- Survey transects/point locations and observations are stored in a spatial database.
- Direct assessment of habitat suitability studies were conducted in 2008 and 2009.
- Grasslands are protected in LUAs.
- Fort Bliss conservation goals are to maintain grasslands on Otero Mesa, avoid further grassland fragmentation, reduce shrub encroachment on grasslands through the use of prescribed fires, identify future mission requirements that could adversely affect habitat and find alternatives where practicable, and cooperate with other agencies (e.g., USFWS and PIF) with research efforts (GSRC 2013a).

Kuenzler's hedgehog cactus (*Echinocereus fendleri kuenzleri)* [Endangered]

- This species has not been documented on Fort Bliss.
- Potential habitat was identified and delineated in the Sacramento Mountains on Fort Bliss.
- Surveys occur within potential habitat nearly annually: 2005 - 2007, 2009 - 2012.
- Potential habitat and areas surveyed are stored in a spatial database.
- The installation conservation goal is to continue to survey for the species in potential habitat.

Southwestern willow flycatcher (*Empidonax trailii extimus)* [Endangered]

- This subspecies has not been documented on Fort Bliss.
- No suitable nesting habitat occurs on Fort Bliss (Johnson et al. 1998).
- Surveys for this subspecies occurred in 1996 (Leary and Corral 1998a).
- Riparian corridors are designated as LUAs.
- Installation conservation goals are to protect riparian areas in the Organ Mountains as stopover habitat and cooperate with the USFWS and other agencies to achieve recovery goals (Leary and Corral 1998).

Interior least tern (*Sterna antillarum athalassos)* [Endangered]

- Potential nesting habitat for this species does not occur on Fort Bliss.

Mexican spotted owl (*Strix occidentalis lucida)* [Threatened]

- Three sightings (one individual located twice) have been documented on Fort Bliss in the Sacramento Mountains during the winter of 1989 - 1990 (Meyer 1996).
- Critical habitat has been designated by the USFWS but does not occur on Fort Bliss.
- No nesting habitat occurs on Fort Bliss.
- Surveys for the species were conducted in 1991 and 1996.
- Survey transects/point locations and observations are stored in a spatial database.
- Installation conservation goals are to maintain and protect forested areas in both the Sacramento and Organ Mountains, minimize disturbance in those areas especially in winter, evaluate changes in mission requirements to determine potential impacts to those areas, and cooperate with the USFWS and other agencies to achieve recovery goals (Leary and Corral 1998a).

Piping plover (*Charadrius melodus)* [Threatened]

- This species has not been documented on Fort Bliss.
- Potential habitat of playas, earthen livestock tanks, and other wildlife water sources are designated as LUAs.

Sprague's pipit (*Anthus spragueii)* [Candidate]

- This species is a regularly observed winter migrant on Fort Bliss on Otero Mesa; it was first documented in 1995.
- No formal surveys have been conducted specifically for this species; however, it has been documented incidentally and during other grassland bird surveys in 1995 - 1997, and 2001 - 2012 (GSRC 2013d).
- Observations are stored in a spatial database.
- Grasslands where Sprague's pipit has been documented are protected and designated as LUAs.
- Installation conservation goals are to maintain existing native grassland as a functioning ecosystem; avoid fragmentation, destruction or denigration of potentially suitable habitat; map and monitor habitat use by and for the abundance of this species; map habitat extent and suitability; identify future mission requirements that could adversely affect habitat and find alternatives where practicable; and cooperate with other agencies (e.g., USFWS and PIF) with research efforts (GSRC 2013b)

Yellow-billed cuckoo (*Coccyzus americanus)* [Candidate]

- Five sightings have been documented on Fort Bliss: Sacramento Mountains (1), Otero Mesa (3), and Organ Mountains (1).
- Nesting habitat for this species does not occur on Fort Bliss.
- A pair of this species nested on the Organ Mountains west of the Fort Bliss boundary in 1992 (Griffin et al. 2012).
- Observations are stored in a spatial database.
- Riparian corridors are designated as LUAs.

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APPENDIX H: Memoranda of Understanding, Interagency Agreements, Cooperative Agreements

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1. Memorandum of Understanding (MOU) Between The U.S Department of Defense (DOD) and The U.S. Fish and Wildlife Service (USFWS) and The Association of Fish and Wildlife Agencies (AFWA) for A cooperative Integrated Natural Resource Management Program On Military Installations

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MEMORANDUM OF UNDERSTANDING
BETWEEN
THE U.S. DEPARTMENT OF DEFENSE
AND
THE U.S. FISH AND WILDLIFE SERVICE
AND
THE ASSOCIATION OF FISH AND WILDLIFE AGENCIES
FOR A
COOPERATIVE INTEGRATED NATURAL RESOURCE MANAGEMENT PROGRAM ON MILITARY INSTALLATIONS

A. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to further a cooperative relationship between the U.S. Department of Defense (DoD), U.S. Department of the Interior – Fish and Wildlife Service (FWS), and state fish and wildlife agencies (states) acting through the Association of Fish and Wildlife Agencies (AFWA) (hereafter referred to as the Parties) in preparing, reviewing, revising, updating and implementing Integrated Natural Resource Management Plans (INRMPs) for military installations.

B. BACKGROUND

In recognition that military lands have significant natural resources, Congress enacted the Sikes Act in 1960 to address wildlife conservation and public access on military installations. The 1997 amendments to the Sikes Act require the DoD to develop and implement an INRMP for each military installation with significant natural resources. A 2012 amendment to the Sikes Act now authorizes the preparation of INRMPs for state-owned National Guard installations used for training pursuant to chapter 5 of title 32 of the United States Code. DoD must prepare all INRMPs in cooperation with the FWS and states. Each INRMP must reflect the mutual agreement of the Parties concerning conservation, protection, and management of fish, wildlife, plants and their habitats on military lands.

INRMPs provide for the management of natural resources, including fish and wildlife and their habitats. To the maximum extent practicable, they incorporate ecosystem management principles, and describe procedures and projects that manage and maintain the landscapes necessary to sustain military-controlled lands for mission purposes. INRMPs also allow for multipurpose uses of resources, including public access appropriate for those uses, provided such access does not conflict with military land use, security requirements, safety, or ecosystem needs, including the needs of fish and wildlife resources. Effective communications and coordination among the Parties, initiated early in the planning process at national, regional, and the military installation levels, is essential to developing, reviewing, and implementing comprehensive INRMPs. When such partnering involves the participation and coordination of all Parties regarding existing FWS and state natural resources management plans or initiatives, such as threatened and endangered species recovery plans or State Wildlife Action Plans, the mutual agreement of all Parties is achieved more easily. INRMPs provide for the conservation and rehabilitation of natural resources on military lands in ways that help ensure the readiness of the Armed Forces. Thus, a clear understanding of land use objectives for military lands should enable the Parties to have a common understanding of DoD's land management requirements.

This MOU addresses the responsibilities of the Parties to facilitate optimum management of natural resources on military installations. It replaces a DoD-FWS-AFWA MOU for *Cooperative Integrated Natural Resources Management Program on Military Installations* dated January 31, 2006, which expired January 31, 2011.

C. AUTHORITIES

This MOU is established under the authority of the Sikes Act, as amended, 16 U.S.C. 670a-670f, which requires the Secretary of Defense to carry out a program to provide for the conservation and rehabilitation of natural resources on military installations in cooperation with the FWS and states. The DoD's primary mission is national defense. DoD manages approximately 28 million acres of land and waters under the Sikes Act to support sustained military activities while conserving and protecting biological resources.

The FWS manages approximately 150 million acres of the National Wildlife Refuge System, and administers numerous fish and wildlife conservation and management statutes and authorities, including the: Fish and Wildlife Coordination Act, Migratory Bird Treaty Act of 1918, Endangered Species Act, Marine Mammal Protection Act, Bald and Golden Eagle Protection Act, Anadromous Fish Conservation Act, Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, Federal Noxious Weed Act, Alien Species Prevention Enforcement Act of 1992, North American Wetland Conservation Act, and Coastal Barrier Resources Act.

The states in general possess broad trustee and police powers over fish and wildlife within their borders, including – absent a clear expression of Congressional intent to the contrary – fish and wildlife on federal lands within their borders. Where Congress has given federal agencies certain conservation responsibilities, such as for migratory birds or species listed as threatened or endangered under the Endangered Species Act, the states, in most cases, have cooperative management responsibilities.

The Sikes Act (16 U.S.C. 670c-1) allows the Secretary of a military department to enter into cooperative agreements with the states, local governments, Indian tribes, nongovernmental organizations, and individuals to provide for the maintenance and improvement of natural resources, or to benefit natural and historic research, both on and off DoD installations.

The Sikes Act (16 U.S.C. 670a(d)(2) also encourages the Secretary of Defense, to the greatest extent practicable, to enter into agreements to use the services, personnel, equipment, and facilities, with or without reimbursement, of the Secretary of the Interior or states in carrying out the provisions of this section.

The Economy Act (31 U.S.C. 1535 and 1536) allows a federal agency to enter into an agreement with another federal agency for services, when those services can be rendered in a more convenient or cost effective manner by another federal agency.

D. RESPONSIBILITIES

The Parties to this agreement hereby enter into a cooperative program of INRMP development, review, and implementation with mutually agreed-upon fish and wildlife conservation objectives to satisfy Sikes Act goals.

1. **The DoD, the FWS and AFWA (Parties) mutually agree:**

   a. To meet at least annually at the headquarters' level to discuss implementation of this MOU. The DoD and FWS will alternate responsibilities for coordinating this annual meeting and any other meetings related to this MOU. Proposed amendments to the MOU should be presented in writing to the parties at least 15 days prior to the annual meeting. The terms of this MOU and any proposed amendments may be reviewed at the annual meeting. The meeting may also review mutual Sikes Act research and technology needs, accomplishments, and other emerging issues.

   b. To participate in a Sikes Act Tripartite Core Group consisting of representatives from the Parties. This Core Group will meet at least quarterly, coordinated by the DoD, to discuss and develop projects and guidance to help prepare and implement INRMPs and to discuss Sikes Act issues of national importance.

   c. To engage in sound management practices for natural resource protection and management pursuant to this MOU with full consideration for military readiness; native fish and wildlife; threatened, endangered and at-risk species; and the environment.

   d. To promote the sustainable multipurpose use of natural resources on military installations – including hunting, fishing, trapping, and non-consumptive uses such as wildlife viewing, boating, and camping – in ways that are consistent with DoD's primary military mission and to the extent reasonably practicable.

   e. To develop and implement supplemental Sikes Act MOUs or other agreements, as needed, at the regional and/or state level.

   f. To recognize the most current DoD and FWS Sikes Act Guidance as the guidance for communication and cooperation of the Parties represented by this MOU.

   g. To post current DoD, FWS, and state Sikes Act guidance documents within 14 days of completion on the following sites:

      i. For DoD: https://www.denix.osd.mil/nr

      ii. For FWS: http://www.fws.gov/habitatconservation/sikes_act.html

      iii. For the states: http://www.fishwildlife.org

h. To cooperatively prepare and conduct full reviews of all new INRMPs in a timely manner.

i. To require the DoD Components and appropriate FWS and state offices to conduct a review for operation and effect of each INRMP no less often than every five years, as required by the Sikes Act, and to document these reviews. As a means of facilitating and streamlining this statutory requirement, use the annual progress review of each INRMP as conducted by each DoD Component per DoD policy.

j. To encourage collaboration in annual progress reviews between representatives from each military installation with an INRMP and appropriate representatives from the other Parties.

    i. The Parties shall discuss the performance of each military installation in meeting relevant DoD Natural Resources Focus Area metrics, and potential improvements to INRMP implementation, such as new projects or management practices.

    ii. Meetings may be in person or by another mutually acceptable means.

    iii. The Parties shall discuss methods and projects that the FWS and states can implement that support INRMP goals and objectives.

k. To streamline and expedite the review of INRMP updates or revisions, and to effectively address review for critical habitat exclusions based on the INRMP conservation benefit, when feasible:

    i. DoD and the FWS will develop and implement a streamlined review process within six months of signature of this MOU that will allow for expedited review and approval (new signatures) of updated sections of each INRMP.

    ii. DoD will provide a means of easily identifying all changes to each updated or revised INRMP when forwarding it for review.

    iii. FWS will focus review on those parts of updated INRMPs that reflect changes from the previously reviewed version.

    iv. FWS and the appropriate states will review all INRMPs with major revisions (e.g., changes required by mission realignments, the listing of new species or other significant action that has the potential to affect military operations or readiness).

    v. DoD, FWS, and the states (acting through AFWA) will continue to seek opportunities to make INRMP review processes more efficient while sustaining and enhancing INRMP conservation effectiveness.

    vi. The DoD Components may submit to the USFWS, a priority INRMP list to address those installations seeking critical habitat exclusions to facilitate coordination with USFWS Endangered Species office.

vii. To ensure consistency, the Parties accept the following definitions:

a) **Compliant INRMP**: An INRMP that has been both approved in writing, and reviewed, within the past five years, as to operation and effect, by authorized officials of DoD, DOI, and each appropriate state fish and wildlife agency.
b) **Review for operation and effect**: A comprehensive, joint review by the parties to the INRMP, conducted no less often than every five years, to determine whether the plan needs an update or revision to continue to address adequately Sikes Act purposes and requirements.
c) **INRMP update**: Any change to an INRMP that, if implemented, is not expected to result in consequences materially different from those in the existing INRMP and analyzed in an existing NEPA document. Such changes will not result in a significant environmental impact, and installations are not required to invite the public to review or to comment on the decision to continue implementing the updated INRMP.
d) **INRMP revision**: Any change to an INRMP that, if implemented, may result in a significant environmental impact, including those not anticipated by the parties to the INRMP when the plan was last approved and/or reviewed as to operation and effect. All such revisions require approval by all parties to the INRMP, and will require a new or supplemental NEPA analysis.

l. That none of the Parties to the MOU is relinquishing any authority, responsibility, or duty established by law, regulation, policy, or directive.

m. To designate the officials listed below, or their delegates to participate in the activities pursuant to this MOU.

i. DoD: Deputy Director, Natural Resources Conservation Compliance, ODUSD (I&E) ESOH

ii. FWS: National Sikes Act Coordinator, Fish and Aquatic Conservation

iii. AFWA: Director, Government Affairs

2. DoD agrees to:

a. Communicate the establishment of this MOU to all DoD Components.

b. Take the lead in developing policies and guidance related to INRMP development, updates, revisions, and implementation, and to ensure the involvement, as appropriate, in these processes of the FWS and state fish and wildlife agencies.

c. Ensure distribution of the DoD and FWS Sikes Act Guidance to all appropriate DoD Components.

d. Encourage DoD Components to invite appropriate FWS and state fish and wildlife agency offices to participate in annual INRMP reviews. All such invitations should be extended at least 15 business days in advance of the scheduled review to facilitate meaningful participation by all three Parties. Meetings may be in person or by other mutually agreed upon means.

e. Encourage DoD Components to take full advantage of FWS and state fish and wildlife agency natural resources expertise through the use of Economy Act transfers and cooperative agreements. Encourage DoD Components and FWS to explore the use of the Fish and Wildlife Coordination Act for technical assistance, fish stocking, and other conservation projects. Priority should be given to projects that:

    i. Sustain the military mission.

    ii. Effectively apply ecosystem management principles.

    iii. Consider the strategic planning priorities of the FWS and the state fish and wildlife agency.

f. Encourage DoD Components to give priority to INRMP requirements that:

    i. Sustain military mission activities while ensuring conservation of natural resources.

    ii. Provide adequate staffing with the appropriate expertise for updating, revising, and implementing each INRMP within the scope of DoD Component responsibilities, mission, and funding constraints.

g. Encourage DoD Components to discuss with the FWS and state fish and wildlife agencies all issues of mutual interest related to the protection, conservation, and management of fish and wildlife resources on DoD installations.

h. Subject to mission, safety, security, and ecosystem requirements, provide public access to military installations to facilitate the sustainable multipurpose use of its natural resources.

i. Identify natural resource research needs, and develop research proposals with input from the Parties.

j. Identify opportunities to work with the DoD Components to facilitate:

    i. Cooperative regional and local natural resource conservation partnerships and initiatives with FWS and state fish and wildlife agency offices.

    ii. Natural resources conservation technology transfer and training initiatives between the DoD Components, federal land management agencies, and state fish and wildlife agencies.

k. Provide law enforcement support to protect fish, wildlife, and plant resources on military installations consistent with jurisdiction and authority.

3. FWS agrees to:

a. Communicate the establishment of this MOU to each FWS Regional Office and appropriate field offices in close proximity to military installations.

b. Distribute the DoD and FWS Sikes Act Guidelines to each FWS Regional Office and appropriate field office in close proximity to military installations.

c. Designate regional and field office FWS liaisons to develop partnerships and help DoD implement joint management of ecosystem-based natural resource management programs, and provide a list of those liaisons to the DoD as needed.

d. Provide technical assistance with the appropriate expertise to the DoD in managing its resources within the scope of FWS responsibilities and funding constraints.

e. Encourage field offices to coordinate current and proposed FWS natural resource initiatives and research efforts with those that may relate to DoD installations, and to provide applicable installations with new and relevant information pertaining to distribution and/or research regarding listed and candidate species and species at-risk.

f. Inform DoD Components and affected installations regarding upcoming and reasonably foreseeable proposed listing and critical habitat designations that may potentially affect military installations in a timely manner before publication of such proposals in the Federal Register.

g. Encourage regional and field offices to expedite pending INRMP reviews that may affect foreseeable proposed listing of threatened and endangered species and critical habitat designations.

h. Provide law enforcement support as appropriate to protect fish, wildlife, and plant resources on military installations within the jurisdiction of the FWS.

i. Identify FWS refuges and other potential federal management areas in close proximity to military installations, and, where appropriate, participate in the joint management of ecosystem-based natural resource management projects that support INRMP and other planning goals, objectives, and implementation.

4. AFWA agrees to:

a. Communicate the establishment of this MOU to each state fish and wildlife agency director and appropriate personnel.

b. Distribute the DoD and FWS Sikes Act Guidelines to each state fish and wildlife agency director and appropriate staff.

c. Facilitate and coordinate with the states to encourage them to:

   i. Participate in developing, reviewing, updating, revising, approving and, as appropriate implementing INRMPs in a timely way upon request by military installation personnel.

   ii. Designate state liaisons to help develop partnerships and to help DoD installation staff implement natural resource conservation and management programs.

   iii. Identify state wildlife management areas in close proximity to military installations and, where appropriate, participate in the joint management of ecosystem-based natural resources projects that support INRMP goals, objectives, and implementation.

   iv. Provide technical assistance to DoD installation staff in adaptively managing natural resources within the scope of state responsibilities, funding constraints, and expertise.

   v. Identify state personnel needs to develop, review, update/revise, approve, and implement INRMPs, and facilitate the identification of funding opportunities to address the fulfillment of state priorities.

   vi. Coordinate current and proposed state natural resources research efforts with those that may relate to DoD installations.

   vii. Coordinate with DoD installations to develop new, and implement existing, conservation plans and strategies, including, but not limited to State Wildlife Action Plans; the National Fish, Wildlife and Plants Climate Adaptation Strategy; goals or initiatives of the North American Bird Conservation Initiative (NABCI) and/or Partners in Amphibian and Reptile Conservation (PARC); and the National Fish Habitat Action Plan.

E. STATEMENT OF NO FINANCIAL OBLIGATION

This MOU does not impose any financial obligation on the part of any signatory.

F. ESTABLISHMENT OF COOPERATIVE AGREEMENTS

The Parties are encouraged to enter into cooperative or interagency agreements to coordinate and implement natural resource management on military installations. If fiscal resources are required, the Parties must develop a separately funded cooperative or interagency agreement.

Such cooperative or interagency agreements may also be entered into under the authority of the Sikes Act (16 U.S.C. 670c-l). Interagency agreements may be entered into under the authority of the Economy Act (31 U.S.C. 1535 and 1536). The Parties should also explore opportunities to utilize the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-666c) to facilitate agreements for FWS technical assistance, fish stocking, and other conservation activities. Each funded cooperative or interagency agreement shall include a work plan and a financial plan that identify goals, objectives, and a budget and payment schedule. A cooperative or interagency agreement to accomplish a study or research also will include a study design and methodology in the work plan. It is understood and agreed that any funds allocated via these cooperative or interagency agreements shall be expended in accordance with its terms and in the manner prescribed by the fiscal regulations and/or administrative policies of the party making the funds available.

G. AMENDMENTS

This MOU may be amended at any time by mutual written agreement of the Parties.

H. TERMINATION

Any party to this MOU may remove itself upon sixty (60) days written notice to the other parties.

I. EFFECTIVE DATE AND DURATION

This MOU will be in effect upon date of final signature, and will continue for ten years from date of final signature. The parties will meet six (6) months prior to the expiration of this MOU to discuss potential modifications and renewal terms.

7-29-13 John Conger

Date

John Conger
Acting Deputy Under Secretary of Defense
(Installations and Environment)
U.S. Department of Defense

6.24.13 Dan Ashe

Date

Dan Ashe
Director
Fish and Wildlife Service
U.S. Department of Interior

7-15/2013 Ronald J. Regan

Date

Ron Regan
Executive Director
Association of Fish and Wildlife Agencies

2. Memorandum of Understanding (MOU) Between U.S. Department of Agriculture, Forest Service, Department of the Army Corps of Engineers

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MEMORANDUM OF UNDERSTANDING
Between
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
And
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

This memorandum of understanding is made by and between the United States Department of Agriculture, Forest Service, acting through the Regional Forester, Southwestern Region, hereinafter called the SERVICE and the United States Department of Defense, Corps of Army Engineers, acting for the United States Army Air Defense Center, hereinafter called the CENTER.

WHEREAS, Public Land Order No. 1470, dated August 21, 1957, as amended by Public Land Order No. 1547, dated November 7, 1957, issued under the provisions of Executive Order 10355, withdrew certain lands, hereinafter called the LANDS, within the Lincoln National Forest from all forms of entry, for use by the Department of the Army as a part of the McGregor Missile Range, and

WHEREAS, the Department of the Army and the Department of Agriculture on July 3, 1951, entered into a Joint Policy Statement relating to use of National Forest lands for defense purposes, and

WHEREAS, Public Land Orders 1470 and 1547 expired August 21, 1967, except that application for renewal was timely made, and publication of an Extension Order in the Federal Register has not been done, and

WHEREAS, the laws, regulations, and policies governing the multiple use management of National Forests contemplates use of the lands and resources to produce the greatest benefits in goods and services to the people, and

WHEREAS, it has been mutually determined that grazing use by livestock and wildlife is compatible with the use of the land for missile training purposes, and

WHEREAS, it is desirable that the Service continue to administer all National Forest resources in keeping with the Center's requirements for its missile program,

NOW, THEREFORE, the Service and the Center mutually agree as follows:

Section A. The Center agrees:

1. The Service will administer the Lands for all non-defense purposes and all activities which are not related to the use of the Lands for missile range purposes, HOWEVER, the Service will coordinate all uses and activities on the lands with the Center in a manner consistent with the needs of the Center.

2. The Lands will be open to all Forest users on days when no firing is scheduled.

3. The Service will not authorize uses of those lands purchased by the Army within the area without the concurrence of the Center, EXCEPT, for those uses not separable from the area as a whole. There are approximately 1,360 acres of purchased and 18,004 acres of withdrawn Lands out of the total of 19,364 acres of missile range within the National Forest boundary. Uses such as livestock

grazing will be authorized on the area as a whole and the Service will issue a permit for all Government owned lands with fees to be handled as specified in Subsection 4, below.

4. All fees for use of National Forest lands shall be assessed and collected by the Service in accordance with the regulations of the Secretary of Agriculture and deposited into the National Forest Fund, miscellaneous receipts, EXCEPT, those fees earned on lands purchased by the Defense Department shall be transferred to the U. S. Corps of Engineers for deposit where such fees are collected by the Service.

The basis for apportioning fees between the Service and the Center will be the proportion of use attributable to the purchased lands to the proportion of use attributable to the withdrawn lands.

The collection of use fees does not pertain to licenses or permits required by State law.

5. That management of wildlife and its habitat shall conform to the regulations of the Secretary of Agriculture; to all applicable laws, and to existing agreements between the Service and the New Mexico Department of Game and Fish.

Harvest of wildlife will be accomplished in a manner covered by the proclamations and regulations of the New Mexico Department of Game and Fish, EXCEPT, the harvest will not conflict with public safety or the firing schedules set by the Center.

6. That improvements constructed and maintained by the Service, its contractors, or permittees, for resources management purposes will remain in the Lands unless the sites so used are needed for missile range installations. These improvements include, but are not limited to livestock control fences, range and wildlife water catchments, and watershed structures.

7. The Service will administer all archeological and paleontological activities on the Lands in conformance with the Uniform Rules and Regulations prescribed by the Secretaries of the Interior, Agriculture, and Army; and the Antiquities Act (34 Stat. 225; 16 U.S.C. 432-433).

Section B. The Center will therefore:

1. Take action to prevent and suppress fires resulting from the Center's operations and also suppress any fire on the Lands; check for fires after completion of each daily scheduled firing; and report all fires to the Service as soon as possible.

2. Furnish the Service with firing schedules on a regular basis so that the Service may keep its employees, contractors, and permittees advised when entry to the Lands is allowed or denied. The Center will also furnish the Service with the names, addresses, and telephone numbers of the Commanding General and his designated representatives.

3. Take all necessary precautions to minimize damage to soil and vegetative resources in connection with the conduct of defense oriented activities. The Center will coordinate with the Service the development of launching sites, fire towers, radar sites, and other similar construction within the Lands.

4. Submit to the Forest Supervisor, Lincoln National Forest, for his concurrence all proposals for constructing roads prior to undertaking construction.

5. Assume the responsibility for the actions of its employees and contractors in the conduct of Center Activities on the Lands.

The Center will require said personnel to leave gates as found (open or closed) and will not be responsible should gates or fences be left as found.

Section C. The Service agrees:

1. The Center will administer the Lands for all defense purposes and all activities which are directly related to the use of the Lands for missile range purposes, HOWEVER, the Center will coordinate those activities having a permanent impact on the soil and vegetative resource with the Service.

2. That personnel of the Center, in pursuit of their official functions, will continue to have unlimited access to the Lands. Said personnel may open gates, and if necessary, lower fences in order to accomplish their assigned missions or duties. Gates will be left as found (open or closed) and lowered fences will be repositioned by the Center.

3. That the Center reserves the right to deny access to the Lands to anyone should security or safety considerations of the assignment of any mission require such action. The Center may exercise this right without prior notice to the Service, EXCEPT, that the Service will be notified at the earliest opportunity when such a closure is in conflict with previously announced firing schedules. Under no circumstances will persons be granted permission to enter or remain on McGregor Range during periods when firing is being conducted, or scheduled, even should they be willing to assume any and all risks inherent in such activities.

coordinate construction of such facilities with the Service.

Section D. The Service will therefore:

1. Furnish the Commanding General of the Center as to the name of the District Ranger who is currently responsible to the Service for the management of the Lands, and the names and addresses of all permittees and contractors, if any.

2. Assume the responsibility for the actions of its employees, permittees, and contractors authorized by the Service to conduct business on the Lands.

3. In pursuit of range management objectives, issue grazing permits for livestock numbers limited to the grazing capacity as determined by the Service.

4. Coordinate all uses and activities on the Lands in a manner consistent with the needs of the Center.

5. Refrain from touching, tampering with, or disturbing any shell, casing, missile, target, or components thereof which may be found upon the Lands. Upon discovery of any of these items, Service employees, permittees, or contractors will report said discovery to the Commanding General, United States Army Air Defense Center, or his designated agent.

6. Issue all permits and contracts for uses and activities which are not related to defense purposes. Said permits and contracts will contain stipulations consistent with the needs of the Center. Permits may be terminated by the Service, and by request of the Center, should

permittees breach any of the terms or conditions outlined in this MEMORANDUM OF UNDERSTANDING.

7. Protect the Lands and resources from destruction by fire and other forms of depredation including trespass, not incident to military use.

Section E. General

1. This Memorandum of Understanding shall serve to guide the administration of the Lands herein described under the proposed new Public Land Order and shall remain in full force and effect until terminated by mutual agreement or expiration of the new Land Order.

2. The Forest Supervisor, Lincoln National Forest, or his designated representative, will represent the Forest Service in the administration of this Memorandum of Understanding.

3. If amendments to this agreement are needed, a meeting may be called by either party.

4. The legal description of National Forest lands contained within the McGregor Missile Range are shown on Exhibit 1, attached hereto.

UNITED STATES ARMY AIR DEFENSE CENTER
and FORT BLISS, TEXAS

11 Nov. 1971
(Date)

By: L. A. Guenther
Chief, Real Estate Division,
Albuquerque District, Corps of
Engineers, Department of the Army

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

11/5/71
(Date)

By: W. D. Hurst

Regional Forester

A-33

EXHIBIT I

Acreage within Lincoln National Forest, McGregor Range, N.M.

New Mexico Principal Meridian

	Acres	
PLO 1547		
T. 19 S., R. 10 E:		
Section 1 - $SW\frac{1}{4}$, $W\frac{1}{2}W\frac{1}{2}SE\frac{1}{4}$	200.00	(Called $S\frac{1}{2}$ sec. 1 in Ord
*Section 12 - $W\frac{1}{2}W\frac{1}{2}E\frac{1}{2}$	80.00	(Probably $E\frac{1}{2}$)
PLO 1470		
T. 19 S., R. 11 E:		
Section 6 - Lots 6,7, $E\frac{1}{2}SW\frac{1}{4}$, $SE\frac{1}{4}$	324.56	
Section 7 - Lots 1,2,3,4, $E\frac{1}{2}W\frac{1}{2}$, $E\frac{1}{2}$	648.00	
Section 8 - All	640.00	
Section 9 - $S\frac{1}{2}$	320.00	
Section 14 - $SW\frac{1}{4}$	160.00	
Section 15 - All	640.00	
Section 16 - All	640.00	
Section 17 - All	640.00	
Section 18 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	647.60	
Section 19 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	647.20	
Section 20 - All	640.00	
Section 21 - All	640.00	
Section 22 - All	640.00	
Section 23 - All	640.00	
Section 24 - $S\frac{1}{2}$	320.00	
Section 25 - $E\frac{1}{2}$, $NW\frac{1}{4}$, $NW\frac{1}{4}SW\frac{1}{4}$, $S\frac{1}{2}SW\frac{1}{4}$	600.00	
Section 26 - All	640.00	
Section 27 - All	640.00	
Section 28 - All	640.00	
Section 29 - All	640.00	
Section 30 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	645.12	
Section 31 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	644.32	
Section 32 - All	640.00	
Section 33 - All	640.00	
Section 34 - $N\frac{1}{2}$	320.00	
Section 35 - $E\frac{1}{2}$, $NW\frac{1}{4}$, $NW\frac{1}{4}SW\frac{1}{4}$, $S\frac{1}{2}SW\frac{1}{4}$	600.00	
Section 36 - All	640.00	
T. 19 S., R. 12 E:		
Section 29 - $S\frac{1}{2}$	320.00	
Section 30 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	642.08	
Section 31 - Lots 1,2,3,4, $E\frac{1}{2}$, $E\frac{1}{2}W\frac{1}{2}$	645.18	
Section 32 - All	640.00	
Acres in Withdrawals	17,924.06	
*Not in withdrawals	- 80	
Total	18,004.06	

*PLO 1470 withdrew only $W\frac{1}{2}$ of sec. 12 on Public Domain. No reference to these 80 acres of National Forest land in either of the PLO's

A-34

3. Memorandum of Agreement (MOA) Between Fort Bliss U.S. Army and New Mexico State Office Bureau of Land management, U.S.D.I for The Renewal Application for the Withdrawal of McGregor Range, New Mexico

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MEMORANDUM OF AGREEMENT
BETWEEN
FORT BLISS, U.S. ARMY
AND
NEW MEXICO STATE OFFICE,
BUREAU OF LAND MANAGEMENT, U.S.D.I.
FOR THE
RENEWAL APPLICATION FOR THE WITHDRAWAL OF
MCGREGOR RANGE, NEW MEXICO

I. Statement of Purpose

Under provisions of Public Law 99-606, known as the Military Lands Withdrawal Act of 1986, Congress established military use as the priority purpose of McGregor Range, New Mexico for a period of 15 years beginning November 6, 1986. The Act specified that if the Secretary of the Army determined that McGregor Range would continue to be required for military purposes beyond November 6, 2001, that the U.S. Army Air Defense Artillery Center and Fort Bliss (Fort Bliss) would be required to notify the Bureau of Land Management (BLM) of its determination and to have completed a Draft Environmental Impact Statement no later than November 6, 1998. Fort Bliss must also provide an application for continued withdrawal, which will be processed by the BLM and decided on by Congress prior to expiration of the present withdrawal. To determine what will be required as part of this application, and what environmental documentation is appropriate, BLM and Fort Bliss have entered into this Memorandum of Agreement (MOA).

II. Environmental Impact Statement

1. Introduction and Purpose

Fort Bliss and the BLM recognize that an environmental impact statement (EIS) must be prepared by November 6, 1998 in support of Fort Bliss's renewal application for the withdrawal of McGregor Range, New Mexico. The renewal EIS must comply with the provisions of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. Sec. 4321, and all subsequent regulations implementing the Act (See Council on Environmental Quality (CEQ) regulations, 40 C.F.R. Parts 1500-1508), and fulfill applicable legal requirements.

It is the purpose of this section of the MOA to establish an agreement between Fort Bliss and BLM regarding the conditions and procedures to be followed in preparing an EIS to comply with applicable laws and regulations through a joint Fort Bliss and BLM effort. Fort Bliss will be the lead Federal agency for the project and BLM will be a cooperating agency.

To meet its requirement for a renewal EIS on McGregor Range withdrawal, Fort Bliss has determined, and the BLM agrees, that the analysis in the renewal EIS covers the proposed action of continued withdrawal, the alternative of no withdrawal, and all other reasonable alternatives which may include boundary and time adjustments to the existing withdrawal. BLM agrees that Army activities shall be analyzed in a separate EIS on Fort Bliss's Ongoing Missions and Master Plan that will be incorporated into the renewal EIS. The BLM will also be a cooperating agency on the Ongoing Missions and Master Plan EIS, although this MOA addresses only the renewal EIS. Both parties to this MOA agree that the renewal EIS for continued withdrawal will focus on whether Congress should continue the withdrawal of McGregor Range for military purposes and under what conditions the withdrawal should continue.

2. General Provisions

a. Fort Bliss will select the contractor to perform as the third-party contractor for the renewal EIS. Factors Fort Bliss will consider in selecting the contractor will include the following general criteria:

1) Expertise in the areas of environmental concern, including water quality, ground water resources, biology, soils, land uses, air quality, archaeology, and socioeconomic values.

2) Expertise in preparing EISs for defense activities.

3) Ability to produce environmental analyses, demonstrated through experience or expertise.

4) Ability to produce thorough, concise, readable, and informative documents.

5) Evidence of a good working knowledge of NEPA, corresponding Federal and State regulations and applicable local ordinances, and other statutory requirements.

6) Ability to complete work in a timely manner.

b. The EIS contractor shall execute a disclosure statement specifying that it has no financial or other interest in the outcome of the project.

c. Fort Bliss will be the lead Federal agency in the joint, cooperative effort to prepare the EIS, and ultimately will be responsible for assuring compliance with the requirements of NEPA.

d. Fort Bliss and the EIS contractor will be responsible for identifying and complying with Federal, State, and local laws, regulations, and other authorities that are applicable to completion of the project.

e. Fort Bliss will ensure that the EIS contractor will provide any technical and environmental information, data, and reports required for EIS preparation in a format suitable to both agencies.

f. Fort Bliss and BLM shall:

1) Designate a single point of contact on all matters concerning the McGregor Range EIS preparation.

2) Actively participate in all phases of EIS preparation.

3) Establish a mutually acceptable time schedule for the EIS process.

4) Develop an acceptable time schedule for the review of significant parts of the EIS as it is being developed.

5) Attend regular and other meetings with Federal, State, regional, and local agencies and interested individuals and groups for the purpose of increasing communication and receiving comments on the EIS.

6) Ensure cooperative coordination of efforts and exchange of information with the EIS contractor.

g. BLM will use its own funds to carry out its role as a cooperating agency.

3. Procedures

a. Prior to beginning EIS preparation, Fort Bliss will require the EIS contractor to prepare a "project management plan," which shall be provided to the BLM for coordination. The preparation plan will be used by Fort Bliss and the EIS contractor as an outline for EIS preparation along with Army Regulation 200-2 and the CEQ NEPA guidelines. The preparation plan may be modified only by Fort Bliss in the event that action or policy changes occur that affect project scope, or as response to the public participation process. BLM will be notified when significant modifications occur.

b. Fort Bliss and the EIS contractor will share the responsibility for scoping meetings. The EIS contractor and Fort Bliss will make meeting arrangements and prepare all materials necessary for the meetings. BLM will attend as an agency representative. The EIS contractor will prepare a comment analysis after the scoping meetings. Fort Bliss will provide the comment analysis to the BLM prior to approval.

c. Fort Bliss and its EIS contractor will have primary responsibility for writing or rewriting all sections, parts, or chapters of the EIS and for establishing a schedule for completion of chapters consistent with the overall time schedule developed in the preparation plan.

d. Fort Bliss and its EIS contractor will provide the BLM with opportunities to review, comment on, and suggest changes to the EIS prior to public review of the document. The BLM will provide comments within a mutually agreed time period, not to exceed 30 calendar days.

e. Generally, joint meetings between the BLM, Fort Bliss and the EIS contractor shall be held to coordinate the EIS preparation.

f. Fort Bliss, assisted by its EIS contractor, is responsible for printing and distributing the EIS. Fort Bliss will release the draft EIS to the public and to Federal, State, and local agencies for review and comment. Fort Bliss will be responsible for filing the document with the Environmental Protection Agency (EPA). A public comment period of no less than 45 calendar days will be initiated when the Environmental Protection Agency publishes the "Notice of Availability" of the draft EIS in the Federal Register.

g. Fort Bliss will be the recipient of all comments on the draft EIS resulting from the review and comment period. Fort Bliss will provide copies of all comments to the BLM. As appropriate, Fort Bliss and the BLM will consider and address any comments on the draft EIS.

h. After the close of the Draft EIS review and comment period, Fort Bliss and BLM will discuss what issues and comments submitted by the public and Federal, State, and local agencies will require response in the final EIS. Fort Bliss and BLM will determine through consultation if any modifications to the text will be required. Any such modifications will be incorporated in the final EIS by Fort Bliss and the EIS contractor.

i. Upon revision of the text, which will include responses to the comments on the draft EIS, the Fort Bliss and the BLM will review the final EIS. Fort Bliss will file the final EIS with the EPA.

j. After the final EIS is completed and reviewed, an official designated by the Army will sign the Record of Decision (ROD).

III. Application Requirements

1. General Provisions

a. The requirements outlined in 43 C.F.R. Parts 2300-2310 (as of October 1, 1992) shall be followed, but discretion will be applied as appropriate and where provided for by regulation.

b. Information developed as part of the last renewal (1986) and currently available information shall be evaluated and utilized to the maximum extent to fulfill requirements.

c. The McGregor Range Land Withdrawal Management Plan, dated April 12, 1996, will serve as the basis for development of application requirements.

d. Fort Bliss will use the BLM's 1991 Resource Management Plan for McGregor Range as a guide in identifying which aspects of 43 C.F.R. Parts 2300-2310 are appropriate requirements for the McGregor Range withdrawal renewal application.

e. Any information the BLM will request to be included in the renewal application that is not identified in 43 C.F.R. Parts 2300-2310 must be communicated to Fort Bliss before January 31, 1997. The BLM and Fort Bliss will then negotiate any such requests for information to mutually determine what information will be required.

IV. Dispute Resolution

Both parties agree that if a dispute regarding the provisions of this MOA or responsibilities or requirements for the withdrawal application arises, efforts will be made to settle them amicably at the lowest possible level. If efforts to settle at the lowest level are unsuccessful, then the dispute will be elevated to the next higher level of management within each agency. If the next higher level of management for each agency is unable to resolve the dispute, then the dispute will be elevated to the next higher level still, and will continue to be elevated within the agencies until the dispute is resolved.

V. Termination

Each party to this MOA may terminate this agreement after 30 days prior notice, in writing, to the other party. During the intervening 30 days, the parties agree to actively attempt to resolve any disputes or disagreements.

VI. Duration of Agreement

This MOA is effective on the date all parties have signed and will terminate when a ROD is issued, unless terminated earlier pursuant to Section V above.

FOR FORT BLISS:

DATE: 2Ø DEC 96

SIGNED
Commanding General
U.S. Army Fort Bliss, Texas

FOR THE BUREAU OF LAND MANAGEMENT:

DATE: 1-13-97

SIGNED
New Mexico State Director
Bureau of Land Management

4. Interagency Agreement between Department of Army-Fort Bliss and U.S. Department of Agriculture Natural Resources Conservation Service

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No 70-8C30-8-529

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY AIR DEFENSE ARTILLERY CENTER AND FORT BLISS
1733 PLEASONTON ROAD
FORT BLISS, TEXAS 79916-6816

REPLY TO
ATTENTION OF

30 September 1997

INTERAGENCY AGREEMENT
BETWEEN
DEPARTMENT OF ARMY-FORT BLISS
AND
U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

This Interagency Agreement is made in accordance with the Memorandum of Understanding (MOU) between the U.S. Army Environmental Center (USAEC) and the Natural Resources Conservation Service (NRCS) The MOU is entitled "Watershed and Environmental Enhancement of U.S. Army (ARMY) Installations." 1 December 1993, amended 16 June 1995.

In furtherance of the MOU, Article VI, paragraph "b" states the NRCS agrees to support Interagency Agreements (IAGs) by providing technical expertise, review or consultation in areas of ecosystem management, subject to priorities and budget constraints and other limitations placed on funds by the Army. An amendment pursuant to this MOU allows for subsequent development of Interagency Agreements directly between installations and NRCS State Offices.

The U.S. Army carries out part of its mission through the use of substantial land areas throughout the United States. These activities may impact the natural or naturalized ecosystems in a negative way. The U.S. Army-Fort Bliss desires to protect and enhance the natural environment by preventing or mitigating soil erosion, maintaining vegetative cover, improving water quality, restoring impacted areas, and reducing adverse impacts. The Natural Resources Conservation Service (NRCS) provides national leadership in the conservation and wise use of soil, water, and related resources through a balanced ecosystem approach that protects, restores, and improves natural resources.

As the U.S. Army-Fort Bliss fulfills its responsibilities to protect and enhance military lands, improvements are needed which require natural resources planning assistance. NRCS will furnish this professional and technical expertise to Fort Bliss as defined in this Interagency Agreement (IAG).

ARTICLE I: PURPOSE

The purpose of this IAG is to:

Implement training land rehabilitation prescriptions on Fort Bliss.

Solve non-point land management resource concerns that exist at Fort Bliss.

Improve overall management of natural resources in support of training requirements on Fort Bliss.

ARTICLE II: AUTHORITY

This agreement is made under the authority of the Economy Act 1932 (31 U.S.C. 1535), the Soil Conservation Act, P. L. 74-46 (16 USC 590 a-f), and the USAEC/NRCS MOU for the purpose of obtaining "in-house" ecosystem support from NRCS.

Points of Contact for this IAG are:

POC - Fort Bliss
COMMANDER, USAADACENFB
ATZC-DPT-IT
Dave Hall, Integrated Training Area Management (ITAM) Coordinator
Building 2, Room 31
1733 Pleasonton Road
Fort Bliss, Texas 79916-6816
Phone: 915-568-2193
Fax: 915-568-2193

POC - USDA, NRCS (New Mexico)
NEW MEXICO STATE OFFICE, NRCS
Troy Hood, Assistant State Conservationist
Room 305
6200 Jefferson, NE
Albuquerque, New Mexico 87106-3734
Phone: 505-761-4411
Fax: 505-761-4463

ARTICLE III: SCOPE

The provisions of this agreement extend to those activities that impact the need for natural resources planning and application to address and solve problems on Fort Bliss. The resultant works in relation to training areas and requirements will include treatment of severely eroding sites at Fort Bliss. This will help prevent excess movement of sediment and also control erosion within training areas.

ARTICLE IV: THE NRCS AGREES TO:

1. Provide to Fort Bliss assistance for the treatment of training areas on Fort Bliss property. This assistance may include conservation planning, surveys needed for conservation practice designs, engineering designs, contracting for conservation treatment, and inspection assistance on sites identified and prioritized by Fort Bliss. Identified sites will be provided to NRCS on a clearly marked map prior to commencement of planning or other work activities.

2. Appoint a project coordinator who will arrange for NRCS personnel with the needed discipline to conduct the work identified in IV - 1.

3. Provide qualified personnel to conduct the work described in IV - 1.

4. Adhere to Range Safety and Range Standing Operating Procedures (SOP).

ARTICLE V: FORT BLISS AGREES TO:

1. Reimburse NRCS for costs incurred by NRCS for providing the assistance listed in IV. Other costs will include salaries and benefits, travel, and related support costs necessary for the performance of this agreement. Such cost shall not exceed $200,000.00 per fiscal year unless a greater amount is approved in advance.

2. Provide to employees of NRCS or the contractors necessary ingress and egress routes to selected sites.

3. Review NRCS rehabilitation project designs for sites examined and order rehabilitation projects by providing to NRCS a list of sites to be rehabilitated.

4. Provide funding to NRCS as early in the fiscal year as practical by means of Military Interdepartmental Purchase Request (MIPR).

5. Provide Emergency Ordinance Disposal (EOD)/ Safety Briefings.

ARTICLE VI: PAYMENT

1. Fort Bliss will reimburse NRCS for all pre-negotiated costs incurred in carrying out activities agreed to under this agreement, and included deliverables.

2. Payments will be made to NRCS in accordance with the following:

a. Technical assistance - payment will be made quarterly for costs incurred by NRCS during the previous quarter.

b. Financial assistance - payment will be made for each progress payment as billed by NRCS. Payment will be made in accordance with payment due dates stated in the financial assistance contracts. Final payments will be made after the release of claims have been given by the contractor. All contract costs including financial assistance amounts obligated by contracts or purchase orders and costs incurred by the preparation and administration of said contracts or purchase orders will not exceed 5% of the amount of the contract or purchase order. Contract claims that are determined allowable by contracting officer decision or board of contract appeals will be paid by Fort Bliss. Decisions of the contracting officer for claims submitted by contractors will be reviewed with Fort Bliss prior to the issuance of said decision.

3. Billings by NRCS will be sent on FNM-15, Bill. Billings under this agreement will be mailed by NRCS to the following address:

DFAS (OPLOC) LAWTON, FORT SILL, OK.
4700 MOWWAY ROAD
DEPT. 1791
FORT SILL, OK. 73503

ARTICLE VII: AGREEMENT TERMS AND REVIEW

1. This agreement will become effective upon the date of the last affixed signature, and shall remain in force for as long as the underlying MOU is valid. This agreement may also be renewable after appropriate review and determination of effectiveness. This agreement can be terminated by either agency upon 45 days written notice. The designated persons (through the POCs listed herein) responsible for executing and accepting orders will periodically review this agreement and recommend and execute any modifications or adjustments that would be desirable. All changes or modifications to this agreement must be approved in writing by the persons responsible for executing and accepting orders or the POCs designated to act on their behalf.

2. This agreement is executed in accordance with procedures established by the Economy Act (31 U.S.C. 1535) and the previsions of the Federal Acquisition Regulation System. The procedures set forth in the Army Acquisition Letter 94-5, Economy Act Orders Outside DoD, have been followed.

3. Nothing in this agreement will be construed as limiting or affecting the legal authority of Fort Bliss or the NRCS, or as binding upon the Installation or NRCS to perform beyond their respective authorities, or to require any of the parties to assume or expend funds in excess of available appropriations. The NRCS will fulfill its obligations stated in this agreement to the extent that appropriated funds are authorized by law and administratively made available for this purpose. The NRCS may terminate or temporarily suspend the agreement if it cannot fulfill its obligations because of an insufficient appropriation of funds.

4. No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation from its general benefit.

5. The program or activities conducted under this agreement will be in compliance with the non-discrimination provision contained in the Title VI and VII of the Civil Rights Act of 1964, as amended; the Civil Rights Restoration Act of 1987 (Public Law 100-259); and other non-discrimination statues; namely, Section 504 of the Rehabilitation Act of 1973, Discrimination Act of 1975. They will also be in accordance with the regulations of the Secretary of Agriculture (7 CFR-15, Subparts A & B), which provides that no person in the United States shall on the grounds of race, color, national origin, age, sex, religion, marital status, or handicap be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal financial assistance from the Department of Agriculture or any agency thereof.

6. Each employee who is assigned to work under this agreement remains under the administrative control of his/her employing organization and is entitled to receive only the salary and other benefits provided by the employing organization.

ACCEPTANCE for Fort Bliss

For By: James D. Cason BG Acting Cdr Date: 23 Dec 1997

JOHN COSTELLO
Major General, U.S. Army
Commanding

ACCEPTANCE for the Natural Resources Conservation Service

By: [signature] Acting Date: 1/6/98

ROSENDO TREVINO III
State Conservationist
New Mexico

5. Memorandum Of Agreement between Las Cruces District, Bureau of Land Management, U.S. Department of interior And U.S. Army Garrison Command Fort Bliss, Texas

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MEMORANDUM OF AGREEMENT
BETWEEN
LAS CRUCES DISTRICT, BUREAU OF LAND MANAGEMENT,
US DEPARTMENT OF INTERIOR
AND
US ARMY GARRISON COMMAND
FORT BLISS, TEXAS

1. Introduction and Purpose:

a. The US Army Garrison Command, Fort Bliss is re-examining environmental impacts of its ongoing missions and analyzing potential environmental impacts associated with proposed additional requirements. As a result, Fort Bliss is also re-assessing several proposed management actions, including revising the Real Property Master Plan (RPMP), Integrated Natural Resources Management Plan (INRMP), Integrated Cultural Resources Management Plan (ICRMP), and Training Area Development Concept (TADC). Since the Bureau of Land Management (BLM) shares responsibility for management of parts of the Fort Bliss complex, BLM has agreed to participate as a cooperating agency for the final preparation of the Mission and Master Plan Supplemental Programmatic Environmental Impact Statement (SEIS).

b. The purpose of this Memorandum of Agreement (MOA) is to establish an agreement between Fort Bliss and BLM regarding the conditions and procedures to be followed in preparing a Final SEIS that complies with applicable laws and regulations through a joint Fort Bliss and BLM effort. Fort Bliss is the lead Federal agency for the project and BLM will be a cooperating agency. BLM participated in the development of the Draft SEIS currently being staffed for release to the public and will continue to participate in the process that will involve those actions which remain to develop a Final SEIS.

c. BLM agrees that the analysis in the Final SEIS describes potential environmental impacts associated with land use and management determinations regarding installation assets, capabilities, and infrastructure to support current and future missions. The impacts associated with different boundary configurations for McGregor Range are analyzed in the McGregor Range, New Mexico Land Withdrawal Renewal Legislative Environmental Impact Statement and will be referenced in the Final SEIS.

2. General Provision

a. As the lead Federal agency in this cooperative effort to prepare a Final SEIS, Fort Bliss is ultimately responsible for assuring compliance with National Environmental Policy Act of 1969 (NEPA) requirements.

b. Fort Bliss selected Science Applications International Corporation (SAIC) to perform as the third-party contractor for the SEIS. The contract is administered by the US Army Corps of

Engineers, Fort Worth District, Fort Worth, Texas. Factors considered in selecting the contractor included the following general criteria:

(1) Expertise in the areas of environmental concern including water quality, ground water resources, biology, soils, land use, air quality, archaeology and socio-economic values.

(2) Expertise in preparing EISs for defense activities

(3) Ability to produce environmental analyses, demonstrated through experience or expertise.

(4) Evidence of a good working knowledge of NEPA, corresponding Federal and State regulations and other statutory requirements.

(5) Ability to complete work in a timely manner.

c. The SEIS contractor has executed a disclosure statement specifying that it has no financial or other interest in the outcome of the project.

d. Fort Bliss and the SEIS contractor are responsible for identifying and complying with Federal, State and local laws, regulations and other authorities applicable to the completion of the project.

e. Fort Bliss will ensure that the SEIS contractor provides any technical and environmental information, data and reports required for Final SEIS preparation in a format suitable to both agencies.

f. Fort Bliss and BLM shall:

(1) Designate a single point of contact on all matters concerning SEIS preparation.

(2) Develop an acceptable time to schedule for the review and addressing of public comments to the Draft SEIS and preparation of the Final SEIS.

(3) Attend meetings with Federal, state, regional and local agencies and interested parties for the purpose of encouraging communication and receiving comments on the Draft SEIS.

(4) Ensure cooperative coordination of efforts and exchange of information with the SEIS contractor.

g. BLM will use its own funds to carry out its role as a cooperating agency.

3. Procedures

a. Fort Bliss will advise BLM of all significant SEIS events, meetings and milestones within a reasonable time prior to any scheduled event, meeting or milestone.

b. Fort Bliss and the SEIS contractor will share the responsibility for meetings. The SEIS contractor and Fort Bliss will take care of meeting arrangements and prepare all materials necessary for the meetings. BLM will attend meetings as an agency representative.

c. Fort Bliss, assisted by the SEIS contractor, is responsible for printing and distributing the SEIS. Fort Bliss will release the Draft SEIS to the public and to Federal, State and local agencies for review and comment. Fort Bliss will be responsible for filing the document with the US Environmental Protection Agency (EPA). A public comment period of 60 calendar days will be initiated when EPA publishes the Notice of Availability (NOA) of the Draft SEIS in the Federal Register.

d. Fort Bliss will be the recipient of all comments on the Drat SEIS resulting from the review and comment period. Fort Bliss will provide copies of all comments to BLM at the end of the comment period. As appropriate, BLM will consider and address comments submitted.

e. After the close of the Draft SEIS review and comment period, Fort Bliss and BLM will discuss those issues and comments submitted by the public and Federal, State, and local agencies that will require response in the Final SEIS. Fort Bliss and BLM will determine through consultation if any modifications to the text will be required. Any such modifications will be incorporated into the Final SEIS by Fort Bliss and the SEIS contractor.

f. Upon revision of the text which will include responses to the comments on the Draft SEIS, Fort Bliss and BLM will review the Final SEIS. BLM will have 30 days to review the Final SEIS and provide comments subsequent to review times. Fort Bliss will file the Final SEIS with EPA.

g. After the Final SEIS is completed and reviewed, an official designated by the Army will sign the Record of Decision (ROD).

4. Dispute Resolution:

a. Both parties agree that if a dispute regarding the provisions of this MOA arises, efforts will be made to settle it amicably at the lowest possible level. If efforts to settle at the lowest level are unsuccessful, then the dispute will be elevated to the next higher level of management within each agency. If the next higher level of management for each agency is unable to resolve the dispute, the dispute will be elevated to the next higher level still, and will continue to be elevated within the agencies until the dispute is resolved.

b. If a dispute concerns substantive environmental issues addressed in the SEIS rather than procedural issues covered by this MOA, BLM has the option of referring an interagency disagreement to the President's Council on Environmental Quality (CEQ), consistent with the CEQ regulations implementing NEPA, Title 40, Code of Federal Regulations, Part 1054. However, it is recognized that such a referral is reserved as a last resort, when agencies have exhausted all reasonable efforts to resolve a dispute.

FINAL

5. Termination

Each party to this MOA may terminate the agreement after giving 30 days prior notice, in writing, to the other party. During the intervening 30 days, the parties agree to actively attempt to resolve any disputes or disagreements.

6. Duration of Agreement

This MOA is effective on the date it is signed by both parties and will terminate when a ROD is issued, unless it is terminated earlier pursuant to Section 5 above.

Mary M. Dreyer
Reviewing Attorney

30 Oct 06
(Date)

FOR THE US ARMY GARRISON CMD

R. T. Burns
ROBERT T. BURNS
COL, AD
Garrison Commander

FOR BLM:

Edwin L. Roberson
Edwin L. Roberson
Las Cruces District Manager
Bureau of Land Management

6. Memorandum of Agreement Between U.S. Department of Interior Bureau of Land Management Las Cruces District Office And Headquarters, United States Army Garrison Fort Bliss, Texas Concerning Policies, Procedures, and Responsibilities Related to Land Use Planning and Resource Management of McGregor Range

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MEMORANDUM OF AGREEMENT

Between

U.S. Department of the Interior
Bureau of Land Management
Las Cruces District Office

And

Headquarters, United States Army Garrison
Fort Bliss, Texas

Concerning

Policies, Procedures, and Responsibility Related to Land Use Planning and Resource Management of McGregor Range

I. Purpose

This Memorandum of Agreement (MOA) establishes the basic principles and responsibilities of the Department of the Interior, Bureau of Land Management (BLM), and the Department of the Army, Fort Bliss (Fort Bliss), for implementation of BLM's 2006 Resource Management Plan Amendment (RMPA) for the McGregor Range (Range) as mandated by Public Law (P.L.) 106-65. The Plan was developed by BLM in consultation with Fort Bliss as a cooperating agency.

II. Authorities

Military Lands Withdrawal Act of 1999 (P.L. 106-65); National Environmental Policy Act (NEPA) (P.L. 91-90, 42 U.S.C. Section 4321 et seq.); Federal Land Policy and Management Act (FLPMA) (P.L. 94-579, 43 U.S.C. Section 1701 et seq.); Title 10 U.S. Code Sections 2394, 2689, 2483, 2857, and 2671.

III. Procedures

A. General Operating Principles

Unless otherwise described, the point of contact for matters related to this MOA will be the Las Cruces District Manager and the United States Army Combined Arms Support (USACAS) Commander, hereafter referred to as Range Commander. Contact information is provided in Section IV, J. of this MOA. General guidance for operations outlined in this MOA is derived from the Military Lands Withdrawal Act of 1999, FLPMA, NEPA, as well as any and all other applicable laws and regulations.

The BLM will recognize that Fort Bliss missions have priority of use on the Range and will secure Fort Bliss concurrence before authorizing any nonmilitary use. At all times, the U. S. Army (Army), through Fort Bliss, reserves the right to close any or all of the Range in accordance with Section 3014(b), P.L. 106-65.

For purposes of the NEPA compliance, each agency will be responsible for conducting the necessary environmental assessments with respect to proposed actions for which it is the proponent. As a part of the assessment process, each agency shall provide the other agency with an opportunity to comment on all proposed actions on the Range that are significant in scope as determined by the proponent.

When one agency requests the review and comment by the other agency, the requesting agency will indicate a specific time period for review, depending on the urgency of the action. Upon receipt of a review request, the reviewing agency will make every effort possible to meet the other's requested time frame.

1. Access. All access to the Range is coordinated through Range Control, before and after each entry and exit of the Range. Neither Government employees nor the general public will enter the Range until Range Control grants access. All recreational access users must be in possession of a Fort Bliss Training Complex (FBTC) Permit before Range Control will grant access. Public access through the FBTC, without a Range Access Permit, is limited to State Road 506 and County Roads F052, F037, and E001 north of 506, except when closed by the military during specific training missions. All privately-owned or rented vehicles will require a FBTC Vehicle Access Permit.

a. BLM Access to the Range. The BLM employees, volunteers, and contractors may have access to portions of the Range that are not designated hazardous by the Department of Defense. A roster of the BLM employees, volunteers, and contractors, including grazing contractors, will be provided to Fort Bliss and updated as necessary. To avoid interference with Fort Bliss missions and to ensure safety, the BLM employees, volunteers, and contractors will call Range Control for clearance prior to entering and exiting the Range. The BLM employee's Federal Employee Identification Card will serve as the Range Access Permit (together with name on the BLM roster). The BLM will issue authorized volunteers and contractors a Range Access Permit for the period of time that coincides with the term of their respective volunteer agreement or contract. Prior to entry into a hazardous area, the BLM employees, volunteers, and contractors will gain approval from the Range Commander and coordinate safety arrangements.

The BLM Government-owned vehicles (with U.S. Government license plates) do not require a separate FBTC Vehicle Access Permit. To assist with identification, all such vehicles entering the FBTC should display a BLM sign or placard above the dashboard or other visible location. All privately-owned, rented, or leased vehicles will require a FBTC Vehicle Access Permit.

b. Public Access to the Range. The BLM and Fort Bliss will both issue FBTC Permits for public use of the withdrawn public land on the Range. The BLM will supply Fort Bliss with copies of completed FBTC Access Passes and Permits immediately upon issuance to the public.

Prior to issuance of special recreational use permits for activities on withdrawn public land, the BLM will provide a description of proposed activity to the Range Commander. No authorizations will be granted by the BLM if the Range Commander determines that they conflict with Fort Bliss' use of the Range. Providing the activity is approved, the BLM will require authorized users to comply with Fort Bliss security and safety procedures and regulations when gaining access to the Range.

2. Income Received from Public Use of the Range. When the BLM receives income from the use of the Range, other than income derived from grazing, the income will be placed in a fund which can be drawn upon for management of the Range unless otherwise directed by law.

When the BLM authorizes an activity that will occur on both withdrawn public land and Army fee-owned land, cost of administration will be allocated to the BLM from the Army fee-owned land portion. Fort Bliss will be provided the opportunity to direct the use of the net income in proportion to the amount of income generated from Army fee-owned land for the specific activity that generated the funds.

3. Real Property. Within 2 years of signature of this document, jointly the agencies will exchange information on inventory of real property (rangeland improvements, buildings, and structures) on the grazing area of the Range. The inventory will identify Army property, the BLM property, and jointly-owned property. In cases where no records are available showing the ownership of the real property, ownership will be determined by the Fort Bliss Master Planning/Real Property Management Branch and the BLM Associate District Manager. Unless otherwise agreed to, Fort Bliss will be responsible for the maintenance of its real property, and the BLM will be responsible for maintenance of its real property irrespective of the location.

In cases where rangeland improvements, buildings, and structures are no longer useable or beyond repair, they may be removed or reconstructed with mutual concurrence unless otherwise directed by law or regulations.

B. Specific Activity Coordination

1. Lands

a. The BLM Responsibilities. The BLM will be the lead agency for NEPA compliance for nonmilitary projects that involve both withdrawn public land and Army fee-owned land that meet the criteria for the designation of lead agency defined in Council of Environmental Quality Regulation 1505.1. The BLM will issue all public demand nonmilitary leases, easements, rights-of-way, and other land use authorizations on withdrawn public land. (Nonmilitary is defined as projects that are not owned by the U.S. Government, not under administration or under contract to a military agency.) The BLM will send a copy of the land use application to the USACAS for review and concurrence of the proposed action.

b. Fort Bliss Responsibilities. Fort Bliss will review all land use applications submitted by the BLM and determine if the applications conflict with military use of, and responsibilities to, the Range. Fort Bliss will be responsible for NEPA compliance for projects for which Fort Bliss is the lead agency. Fort Bliss will issue all land use authorizations needed on or across Army fee-owned land.

2. Minerals

a. Salable Minerals (sand, gravel, fill dirt, borrow, caliche, and building stone)

(1) The BLM Responsibilities. The BLM is responsible for authorizing and managing salable materials for the Range, but all activities will be with the concurrence of Fort Bliss. Sales will be in compliance with the RMPA. Extraction of salable minerals by the Army for construction needs on the Range will be allowed. For state and county roads on the Range, the BLM would consider applications from state or county entities, or their contractors to extract mineral materials from the Range for use on these state and county roads.

Upon receiving an application for materials, the BLM will provide the Range Commander a description of the proposal and request Fort Bliss review for consistency with military missions and public safety. If Fort Bliss does not concur with the application, the BLM will not authorize or approve such a request.

(2) Fort Bliss Responsibilities. Fort Bliss will review applications for consistency with military missions, safety, and security requirements. Upon completion of the review and concurrence with Fort Bliss, Fort Bliss will notify the BLM if it concurs with the application and provide stipulations or modifications required.

b. Leasable Minerals

(1) The BLM Responsibilities. The BLM will manage the Oil and Gas and Geothermal Programs for the Range. Leasable minerals on the Range are withdrawn. However, the BLM is further required to periodically review expressions of interest from industry and activity in adjacent lands to determine, every 5 years, if the mineral withdrawal decision should be revisited. If so, the BLM will require concurrence from Fort Bliss prior to pursuing a change to the RMPA to allow leasing.

(2) Fort Bliss Responsibilities. Every 5 years, Fort Bliss will review military programs and determine which areas would be compatible with opening for leasable minerals. Fort Bliss, through the Fort Worth, Corps of Engineers, will provide stipulations to the BLM for oil and gas, geothermal exploration, and leasing operations. Fort Bliss will notify the BLM of changes in security and safety requirements. Fort Bliss will assist the BLM, as needed, with

inspection and enforcement and field examinations access, times of entry, safety, and security requirements on a reimbursable basis.

c. Locatable Minerals

(1) The BLM Responsibilities. The BLM will conduct inventories for locatable minerals. In concurrence with Fort Bliss, the BLM will determine, every 5 years, which land on the Range is suitable for opening for locatable minerals.

(2) Fort Bliss Responsibilities. Every 5 years, Fort Bliss will review military programs and determine which areas, if any, would be compatible for locatable minerals.

3. Vegetation Management

a. The BLM Responsibilities. The BLM will be responsible for managing vegetation for nonmilitary use on the withdrawn public land on the Range and will coordinate management with Fort Bliss. The special status species section of this MOA discusses management of special status plant species.

The BLM will be the lead agency for management of the Black Grama Area of Critical Environmental Concern (ACEC), sales of plant products, collection of plant materials, and prescribed burns. The actions will be limited to those areas identified in the BLM's RMPA. Prior to authorizing activities, the BLM will provide Fort Bliss with a description of the proposal and request a Fort Bliss review for compatibility with military missions, security, safety, and Fort Bliss Cultural/Natural RMPs. If Fort Bliss does not concur, the BLM will not authorize such an activity. Administrative costs will be paid by the BLM or the contractor/lessee.

The ACEC will be managed according to the existing cooperative agreement between the BLM, Fort Bliss, and New Mexico State University.

The BLM will be responsible for monitoring vegetation conditions for public uses on withdrawn public land, and public uses on Army fee-owned land for which it is the proponent. The BLM will develop and implement a monitoring plan in consultation with Fort Bliss. The BLM will coordinate monitoring methodology and results with Fort Bliss Directorate of Environment, so that: 1) data can be collected, if possible, in a way useable in natural resources/NEPA programs; and 2) monitoring activities are not duplicated by both agencies.

b. Fort Bliss Responsibilities. Fort Bliss will be responsible for vegetation monitoring and management for military uses on withdrawn public land and Army fee-owned land.

Fort Bliss will review the BLM proposals for vegetation management for consistency with military missions, natural resource management goals, safety, and security requirements. Upon completion of the review, Fort Bliss will notify the BLM if Fort Bliss concurs with the proposal and will provide stipulations or modifications.

4. Rangeland Management

a. Livestock Grazing

(1) The BLM Responsibilities. The BLM is responsible for management of the Livestock Grazing Program on the Range and will continue the existing Livestock Grazing Program on the Range. Livestock grazing will be limited to the grazing area identified in the RMPA.

Based on the principles of multiple use and sustained yield, livestock grazing levels will be established annually to meet the BLM objectives for the desired plant community as defined by New Mexico's Standards for Public Land Health.

Livestock use will be authorized through contracts and based on competitive bidding at public auction. Minimum bids will be established as a result of feasibility cost studies which will determine the cost for continuing operation of the Grazing Program. The contracts will contain the terms and conditions as necessary to meet the requirements of the BLM's RMPA.

Revenues generated from livestock grazing will be distributed between the BLM and Fort Bliss on the percentage of ownership of each grazing unit on an Animal Unit Month basis. Payments to Fort Bliss will be made at the end of the annual grazing term. Fort Bliss will be provided the funds generated from grazing on the Army fee-owned land. The BLM will provide the Range Commander an annual accounting of the revenues and expenditures generated from the livestock contracts.

The BLM will ensure that grazing use will be limited to cattle and horses and is responsible for livestock trespass abatement in nonhazardous areas.

The BLM will keep the Range Commander informed as to the name and address of each grazing contractor and will ensure that grazing contractors comply with Fort Bliss security and safety requirements.

The BLM will coordinate and receive Range Command approval for scheduling grazing auction days and lessee access to the Range.

(2) Fort Bliss Responsibilities. Fort Bliss will coordinate with the BLM for the gathering and removal of livestock from hazardous areas.

b. Rangeland Improvements

(1) The BLM Responsibilities. The BLM will be responsible for the construction and maintenance of livestock control fences within and bordering the livestock grazing units. The BLM may install necessary range improvements to continue grazing within the grazing unit subject to off-road maneuver areas. The BLM will coordinate with the Range Commander for specifications on location, type, and installation of range improvements.

The BLM will be responsible for providing water for wildlife and livestock on the Range. The primary source of water for the wildlife will be Fort Bliss-owned water rights out of the Sacramento River and Carrizo Spring. The Army, in cooperation with the BLM, will retain and exercise complete control of distribution and use of allocated water rights from the Sacramento River and Carrizo Spring.

The BLM has maintenance and construction responsibility to maintain and improve pipelines, tanks, tubs, wells, windmills, wildlife waters, etc., necessary to provide for wildlife and livestock management. Prior to the construction of new rangeland changes that affect water resources on the Range, the BLM will submit the new construction plans and specifications to the Range Commander for concurrence.

(2) Fort Bliss Responsibilities. Fort Bliss will control construction and maintenance of improvements in hazardous and Army fee-owned areas, to include the boundary fence for the Range.

Personnel of Fort Bliss, in pursuit of their official functions or other authorized purposes, will continue to have unlimited access to the land covered by this MOA. Fort Bliss may open gates and, if necessary, lower fences in order to accomplish missions or duties. However, Fort Bliss will leave gates as found (open or closed) and reposition any fences lowered, but Fort Bliss assumes no responsibility with a third party should gates not be left as found or should fences not be repositioned. If routine utilization and/or modification of rangeland improvements are needed to accomplish military operations, Fort Bliss will coordinate with the BLM in advance when practicable.

The Range Commander will review and concur on the BLM proposals for new rangeland improvements on withdrawn land for consistency with military missions, safety, and security requirements. Fort Bliss will notify the BLM of concurrence with the proposal. In case of nonconcurrence, stipulations or modifications will be forwarded within 30 days.

5. Wildlife

a. Game Species Population Management

(1) The BLM Responsibilities. The BLM recognizes New Mexico Department of Game and Fish (NMDGF) as the agency responsible for game species population management on all land on the Range.

The BLM, together with Fort Bliss and the NMDGF, will develop a Wildlife Management Memorandum of Understanding (MOU) to coordinate the management of all wildlife populations.

The BLM will consult with Fort Bliss on all recommendations to the NMDGF on matters concerning wildlife population management, as they affect the BLM resource management objectives and protection of wildlife habitat on withdrawn public land and the Army fee-owned land, to ensure consistency with military missions, safety, and security requirements.

(2) Fort Bliss Responsibilities. Fort Bliss recognizes the NMDGF as the agency responsible for game species population management on all land on the Range.

Fort Bliss will participate with the BLM and the NMDGF in the development and implementation of a Wildlife Management MOU to coordinate the management of all wildlife populations.

Prior to making a recommendation to the NMDGF on game species population management on withdrawn public land and the Army fee-owned land within hazardous areas, Fort Bliss will consult with the BLM to coordinate respective management objectives for the Army fee-owned land and withdrawn public land within hazardous areas.

b. Habitat Management

(1) The BLM Responsibilities. The BLM will be responsible for wildlife habitat management (including, but not limited to, construction and maintenance of wildlife habitat improvement projects and habitat monitoring) on withdrawn public land outside hazardous areas, to the extent of resource availability. The BLM will request approval from the Range Commander to conduct wildlife habitat management activities on Army fee-owned land.

The BLM will establish and conduct wildlife habitat management activities in accordance with the BLM planning decisions, applicable laws, and regulations.

The BLM will develop and implement Habitat Management Plans as identified in the 2006 RMPA in coordination with Fort Bliss.

The BLM will coordinate and obtain concurrence on all habitat management activities on withdrawn public land with the Range Commander for consistency with military missions, safety, security requirements, and Fort Bliss natural resource management objectives.

The BLM will coordinate habitat monitoring, methodology, and results with Fort Bliss Directorate of Environment so that: 1) data can be collected, if possible, in a way useable in natural resources/NEPA programs; and 2) monitoring activities are not duplicated by both agencies.

(2) Fort Bliss Responsibilities. Fort Bliss will be responsible for wildlife habitat management on all Army fee-owned land and withdrawn public land within hazardous areas to the extent of resource availability. Fort Bliss may authorize the BLM to conduct wildlife habitat management activities on the Army fee-owned land.

Fort Bliss will review BLM proposals for wildlife habitat management and provide appropriate stipulations or modifications to ensure consistency with military missions, safety, and security requirements.

Fort Bliss will establish and conduct wildlife habitat management activities in accordance with applicable laws and regulations.

Fort Bliss will coordinate with the BLM regarding all habitat management activities on Army fee-owned land and withdrawn public land within hazardous areas to ensure consistent resource management direction.

Fort Bliss will coordinate habitat monitoring, methodology and results with the BLM so that:
1) data can be collected, if possible, in a way useable in natural resources/NEPA programs; and
2) monitoring activities are not duplicated by both agencies.

c. Special Status Species Management

(1) The BLM Responsibilities. The BLM will be responsible for compliance with applicable laws, regulations, and policy affecting federally-listed endangered, threatened, proposed, and candidate, stated-listed, or the BLM sensitive plants and animals (collectively referred to as special status species) with regard to all actions for which the BLM is the proponent or lead agency. The BLM will request approval from the Range Commander to conduct special status species management activities on Army fee-owned land.

The BLM will be responsible for implementation of recovery plans on withdrawn public land outside hazardous use areas.

Prior to implementation of recovery plans, the BLM will coordinate with the Range Commander to ensure consistency with military missions, safety, and security requirements.

The BLM will provide Fort Bliss data on inventories, consultation proceedings, and other information with regard to special status species on the Range.

(2) Fort Bliss Responsibilities. Fort Bliss will be responsible for compliance with the Endangered Species Act and New Mexico endangered plant and animal laws with regard to all actions for which Fort Bliss is the proponent or lead agency.

Fort Bliss will be responsible for implementation of recovery plans on all Army fee-owned land and withdrawn public land within hazardous areas. Fort Bliss may authorize the BLM to conduct special status species management activities on Army fee-owned land.

Prior to implementation of recovery plans, Fort Bliss will coordinate with the BLM to ensure consistent resource management direction.

Fort Bliss will review the BLM proposals for special status species management activities and provide appropriate stipulations or modifications to ensure consistency with military missions, safety, and security requirements.

Fort Bliss will provide the BLM data on inventories, consultation proceedings, and other information with regard to special status species on the Range.

d. Animal Damage Control

(1) The BLM Responsibilities. The BLM will be responsible for authorizing Animal Damage Control (ADC) activities on withdrawn public land and Army fee-owned land grazed outside of the hazardous areas, in accordance with the Nationwide MOU with the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS) and ADC (aka Wildlife Services (WS)).

The BLM will cooperate with the APHIS and the WS in the development of annual work plans for the ADC on public lands within the Las Cruces District Office to define the ADC methods to be used, identify protocol for the ADC activities, and implement restrictions where necessary to protect human safety or avoid conflicts with multiple-use management.

All the ADC activities on withdrawn public land and/or Army fee-owned land will be implemented in accordance with the approved BLM, APHIS, and WS annual work plan. All proposed ADC activities will be coordinated with Fort Bliss to ensure consistency with military missions, safety, and security requirements.

(2) Fort Bliss Responsibilities. Fort Bliss will be responsible for authorizing the ADC activities on the Army fee-owned land and within the hazardous areas of the Range. Fort Bliss will review the BLM proposals for the ADC activities and provide appropriate stipulations or modifications to ensure consistency with military missions, safety, and security requirements, including requests to expand the ADC activities onto adjacent land outside of the grazing units.

Fort Bliss will coordinate all the Army initiated ADC activities on the Range with the BLM to ensure consistent management direction.

6. Cultural Resources. The term "cultural resources" is understood to have the same meaning as used in the terms "historic resources" or "historic properties" and "Properties of Traditional Religious and Cultural Importance," as used in the National Historic Preservation Act (NHPA) and in its implementing regulation 36 CFR Section 800 and will also include Native American human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony as in the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulation 43 CFR 10.

a. The BLM Responsibilities

(1) The BLM will comply with Section 106 of the NHPA and 36 CFR Section 800 and the NAGPRA and 43 CFR 10 for undertakings for which the BLM and/or third parties are the proponent. For issues of the NAGPRA, the BLM will conduct all required Tribal consultations per the regulations for any of the NAGPRA resources encountered during an undertaking in which the BLM and/or a third party is the proponent, or for any discovery made during the course of NHPA Section 110 projects conducted by the BLM, or for any discovery caused by natural, nonmilitary actions.

(2) The BLM will be the lead agency for permits required by the Archaeological Resources Protection Act (ARPA) for survey, research, excavation, data recovery, and other cultural resources projects for which the BLM is the proponent and for nonmilitary activities on the Range.

(3) The BLM will be the lead agency for investigating and reporting the ARPA violations which are perpetrated by individuals not engaged in military activities on the Range. Fort Bliss Law Enforcement may detain potential violators and contact the BLM Law Enforcement to make an arrest if the BLM determines it necessary. The BLM and Fort Bliss may work jointly on investigations and damage assessments.

(4) The BLM will mitigate the adverse effects caused to cultural resources for activities conducted under the BLM's administration.

(5) The BLM may be a consulting party in military undertakings involving cultural resources on withdrawn lands.

(6) Upon request, the BLM will provide Fort Bliss with draft, review copies of research proposals, survey and other field project reports, and with the results of analytical studies for which the BLM is the proponent. Additionally, the BLM will provide Fort Bliss with final copies of such proposals, reports, and studies.

(7) The BLM will meet with Fort Bliss on an annual basis, or more frequently as appropriate, to share information about planned cultural resources projects. Other topics to be discussed will include means to:

(a) Standardize field methods, recording techniques, and reporting;

(b) Identify ways to make site and artifact file data compatible for interagency use to the maximum practical extent; and

(c) Other cultural resource issues that may arise.

b. Fort Bliss Responsibilities

(1) Fort Bliss will comply with Section 106 of the NHPA and 36 CFR Section 800 and NAGPRA and 43 CFR 10 for those undertakings for which the military is the proponent. For issues of NAGPRA, Fort Bliss will conduct all required Tribal consultations for any NAGPRA resources encountered during an undertaking in which the military is the proponent, or for any discovery made during the course of NHPA Section 110 projects conducted by Fort Bliss.

(2) Fort Bliss will be the lead agency for permits required by the ARPA for all undertakings for which the military is the proponent on the Range.

(3) Fort Bliss will be the lead agency for investigating and reporting the ARPA violations which are perpetrated by individuals engaged in military activities on the Range. Fort Bliss and the BLM may work jointly on investigations and damage assessments.

(4) Fort Bliss will mitigate the adverse effects caused to historic resources by military activities.

(5) Fort Bliss may be a consulting party in the BLM undertakings involving cultural resources.

(6) Fort Bliss will provide the BLM with final copies of reports and studies conducted on the Range.

(7) Fort Bliss may meet with the BLM on an annual basis, or more frequently as appropriate, to share information about planned cultural resources projects. Other topics to be discussed include means to:

(a) Standardize field methods, recording techniques, and reporting;

(b) Identify ways to make site and artifact file data compatible for interagency use to the maximum practical extent; and

(c) Other cultural resources issues that may arise.

7. Recreation

a. General. Recreational users must obtain a FBTC Access Permit prior to accessing the portions of the Range open for public use. The FBTC Access Permit may be issued by the BLM or Fort Bliss personnel. Recreational users must call Range Control each time they desire entry to the Range and report to Range Control upon exit.

(1) The BLM Responsibilities. The BLM is responsible for managing recreational use of the withdrawn public land on the Range.

For information regarding access to the Range for recreation, see Section III.A.1. Access.

The BLM will be responsible for developing a sign location plan and information plan that will provide the public reasonable information on locations and restrictions. Prior to approval of the plan, the BLM will provide the Range Commander with a draft for approval to ensure that the plan will be consistent with military missions, safety, security requirements, and resource management.

The BLM will limit recreational vehicle use on withdrawn public land to designated roads and trails. The BLM will identify designated roads on a case-by-case basis with Fort Bliss concurrence. The designation will consider the need for access for the activity involved. The BLM will maintain a working knowledge of all Fort Bliss public access procedures and inform the public of those procedures as it issues FBTC Access Permits.

(2) Fort Bliss Responsibilities. Fort Bliss is responsible for notifying the BLM of the access procedures for all recreational use of the Range to ensure that safety and security requirements are met.

Fort Bliss will identify hazardous areas and install and maintain signs in those areas prohibiting public entry.

8. Hunting

a. General. Hunters seeking to hunt on those portions of the Range open to public use for hunting, in accordance with the Fort Bliss Hunting Standard Operating Procedures (SOP), must obtain a FBTC Permit prior to accessing the Range. This Permit may be issued by the BLM or Fort Bliss personnel. Additionally, all weapons must be registered with Fort Bliss. Hunters must call Range Control each time they desire entry to the Range and upon exit. For additional information regarding access to the Range for hunting, see Section III.A.1. Access.

(1) The BLM Responsibilities. The BLM will participate together with Fort Bliss and the NMDGF in developing a McGregor Range Hunting Plan (consistent with the Fort Bliss Hunting SOP) to prescribe access and use of those portions of the Range open to public use by hunters.

(2) Fort Bliss Responsibilities. Fort Bliss will be responsible for managing hunters on those portions of the Range open for hunting in accordance with the Fort Bliss Hunting SOP. Fort Bliss will participate with the BLM and the NMDGF in the development of a McGregor Range Hunting Plan and provide appropriate stipulations or modifications to ensure consistency with military missions, safety, and security requirements.

Fort Bliss will identify hazardous areas and install and maintain signs in those areas prohibiting public entry. This in no way affects the Range Commander's right to later deny access to an area that has become a hazardous area.

9. Wilderness Study Area (WSA) Management

a. The BLM Responsibilities. The BLM will manage the WSA included within the Range, under the Interim Management Policy and Guidelines Under Wilderness Review (1987) until the area is either added to the National Wilderness Preservation System or removed from further wilderness consideration.

b. Fort Bliss Responsibilities. Fort Bliss will be responsible for compliance with the Interim Management Policy and Guidelines Under Wilderness Review (1987) until the area is either added to the National Wilderness Preservation System or removed from further wilderness consideration.

Fort Bliss will limit surface use of the WSA to dismounted military use. All vehicles shall be restricted to existing vehicle ways. Fort Bliss will notify the BLM Las Cruces District Manager 30 days prior to conducting any activities within the WSA whenever possible or immediately following the activity.

10. Watershed

a. The BLM Responsibilities. The BLM will be responsible for watershed management activities pursuant to nonmilitary use on the withdrawn public land on the Range and will coordinate these watershed management activities with Fort Bliss.

The BLM will receive approval from the Range Commander to conduct watershed management activities on the withdrawn public land or Army fee-owned land utilized for off-road maneuver by Fort Bliss.

The BLM will develop Watershed Management Plans as identified in the 2006 RMPA in coordination with Fort Bliss.

The BLM will coordinate watershed monitoring, methodology, and results with Fort Bliss Directorate of Environment so that: 1) data can be collected, if possible, in a way useable in natural resources/NEPA Programs; and 2) monitoring activities are not duplicated by both agencies.

b. Fort Bliss Responsibilities. Fort Bliss will be responsible for the watershed management activities pursuant to military use of the Range and for watershed resources on the Army fee-owned land.

Fort Bliss may authorize the BLM to conduct watershed management activities on Army fee-owned land.

Fort Bliss will review the BLM proposals for watershed management and provide appropriate stipulations or modifications to ensure consistency with military missions, safety, and security requirements.

Fort Bliss will coordinate monitoring methodology and results with the BLM so that: 1) data can be collected, if possible, in a way useable in natural resources/NEPA Programs; and 2) monitoring activities are not duplicated by both agencies.

11. Fire

a. The BLM Responsibilities. The BLM will be responsible for monitoring and suppressing all nonmilitary wildfires on withdrawn public land and on the Army fee-owned land.

The BLM and Fort Bliss will work together to develop a coordinated fire management plan for all lands within the Range. This plan will include a full range of fire suppression options as well as fire use.

The BLM will develop a Mutual Aid Agreement with Fort Bliss that emphasizes coordination and cooperation between the two parties for the management of all wildfires on the Range and on the adjoining BLM lands. The BLM will assist training by providing qualified instructors and media aids to help Fort Bliss fire personnel meet National Wildfire Coordinating Group standards for wildland firefighters.

The Lincoln Zone Coordination Center (LNZ) in Alamogordo will initiate suppression actions on all wildfires on the Range that are outside of designated hazardous areas.

Upon receiving a report of a fire, the LNZ will notify the Fort Bliss Fire Chief to establish fire management responsibility and identify hazards that may restrict control measures.

Agency jurisdiction will be assigned upon determining the ignition source. The LNZ may initiate aerial suppression (air tanker/helicopter drops) on those military fires deemed threatening to life and/or with coordination with the Fort Bliss Fire Chief.

The BLM or the LNZ will notify the Fort Bliss Fire Chief of its suppression actions on the Range within 24 hours. Such notification will include the following:

Date and times of action-initial response, containment, control and fire out;
Location (Universal Transverse Mercator (UTM) Easting and Northing), ownership, and size of fire;
Cause of fire;
Type and extent of suppression activities; and
Resources/structures damaged (if any):
- Facilities;
- Structures (livestock, wildlife, or cultural);
- Private or state property;
- Cultural resources;
- Livestock;
- Endangered species/habitat; and/or
- Critical natural resource area.

The BLM may use prescribed broadcast or pile burning to improve rangeland condition and wildfire habitat on withdrawn public land and fee-owned land outside hazardous areas consistent with the General Management Guidelines outlined in the 2006 RMPA. The prescribed burn plans will meet all required BLM formats and regulations. Prescribed burn plans will be developed in coordination with the staff of the Directorate of the Environment for Fort Bliss to ensure consistency with the Army land management objectives, military missions, safety, and security requirements.

b. Fort Bliss Responsibilities. Fort Bliss will have responsibility for suppressing and monitoring fires caused by military activities on the withdrawn public land and the Army fee-owned land.

Fort Bliss will serve as lead agency for monitoring or suppressing all fires in the hazardous areas. The Fort Bliss Fire Chief should contact the LNZ, as soon as possible, to facilitate a coordinated initial response. Each year, Fort Bliss will update the BLM of any new hazardous areas at the annual coordination meetings.

Consistent with P.L. 99-606, Section 3(d), and P.L. 106-65, Section 3014(d), Fort Bliss will request a transfer of funds from the Department of the Army to the BLM as compensation for the BLM's assistance on fire suppression actions on wildfires that resulted from a military activity and that go beyond an initial response time of 24 hours. All costs borne by the BLM in support of military fires after the 24-hour initial response are compensable and subject to reimbursement by the Army. The costs may include vehicle costs, aircraft time, overtime, hazard pay, and per diem.

Upon receiving report of a fire, the Fort Bliss Fire Chief will notify the LNZ and/or the BLM of the fire. The Fort Bliss Fire Chief will provide the LNZ/BLM with as much information as available at that time and of its suppression actions. Within 24 hours of suppression actions being taken on the Range, the Fort Bliss Fire Chief will provide additional information if available. Such final report will include, when possible, but not be limited to, the following:

- Date and times of action;
- Location (UTM Easting and Northing), ownership, and size of fire;
- Cause of fire;
- Type and extent of suppression activities; and
- Resources/structures damaged (if any):
  - Facilities;
  - Structures (livestock, wildlife, or cultural);
  - Private or state property;
  - Cultural resources;
  - Livestock;
  - Endangered species/habitat; and/or
  - Critical natural resource area.

12. Law Enforcement

Fort Bliss and the BLM Law Enforcement officials will each exercise their own full authority on the Range and will work cooperatively to meet each agency's responsibilities.

13. Roads

a. The BLM and Fort Bliss will jointly develop a road maintenance strategy that will specify agency responsibilities for maintenance and maintenance standards and ensure consistency with military missions, safety, security requirements, and the Army fee-owned land management objectives.

b. The BLM Responsibilities. The BLM will coordinate road maintenance responsibilities with Fort Bliss. Roads will be maintained to a standard that is consistent with levels of use, environmental factors, safety requirements, level of funding, resource conditions, the road plan, and the RMPA.

c. Fort Bliss Responsibilities. Fort Bliss will coordinate road maintenance responsibilities with the BLM. Roads will be maintained to the standard that is consistent with levels of use, environmental factors, safety requirements, level of funding, and resource conditions.

IV. General Provisions

A. Terms of Agreement. This Agreement supersedes the MOU previously entered into by the parties on March 1, 1990. As this MOA is required by law, it shall remain in full force and effect in its current form, or as modified in accordance with the stipulations set forth below, for the duration of the withdrawal.

B. Definitions

1. Concurrence. As utilized in this MOA, concurrence is the agreement of the other party involved. If there is no such agreement, then no authorization can be given for such activity.

2. Nonmilitary Use. As utilized in this MOA, a nonmilitary use of the Range is one which is an activity, not under administration of, or under contract to, a military agency.

3. Range Commander. Wherever Range Commander is used in this MOA, the Range Commander serves as the Installation Commander and Garrison Commander's designee and primary point of contact.

C. Periodic Review. In addition to the reviews required under Section 3021 of P.L. 106-65, the participants will review this MOA at least once every 5 years to determine its adequacy, effectiveness, and need for updating.

D. Amendments. Either participant may propose changes to this MOA during its term. Any change will be in the form of an amendment and will not take effect until both participants have agreed and signed the amendment. Any amendment must be within the framework of P.L. 106-65.

E. Renewal. Section 3016 of P.L. 106-65 establishes guidelines for renewal and continued use of the withdrawal as follows:

No later than 3 years prior to the termination of the withdrawal, Fort Bliss shall advise the BLM as to whether Fort Bliss will have a continuing military need for any of the land withdrawn after the termination date.

If Fort Bliss concludes that there will be a continuing military need for any such land after the termination date, Fort Bliss shall file an application for extension of the withdrawal and reservation of such needed land in accordance with regulations and procedures of the Department of the Interior applicable to the extension of withdrawal of land for military use.

F. Cancellations. Section 3016 (d) of P.L. 106-65 establishes guidelines for cancellation or relinquishment of the withdrawal as follows:

1. If during the period of withdrawal and reservation, Fort Bliss decides to relinquish any or all of the land withdrawn and reserved by P.L. 106-65, Fort Bliss shall file a notice of intention to relinquish with the BLM following the procedures set forth in Section 3016 (b) of P.L. 106-65.

2. In addition to the above, Section 3021 (e) of P.L. 106-65 provides that in the event of a National emergency or for the purpose of National defense or security, the BLM, at the request of Fort Bliss, shall close any land that has been opened to mining or to mineral or geothermal leasing. If the closure becomes necessary, a determination of the effect on any ongoing operations will be made at that time.

G. Decontamination. Decontamination of withdrawn public land on the Range will be in accordance with Section 3017 of P.L. 106-65.

H. Meetings and Coordination. The agencies shall meet at least biannually to review the MOA and expected issues. The meeting host shall alternate between the agencies.

The topics discussed at the meeting should include:

Enforcement issues
Fire
NEPA documents
BLM activities planned for next period
Army activities planned for next period
Setting hunting and recreation dates
Cultural resource reports during past period
Problems
Monitoring
Budget/accounting
Natural resources management projects
Water/water management/water monitoring

I. Effect on Other MOAs/MOUs. Unless a specific provision of an existing MOU is specifically superseded by any part of this MOA, the remaining terms of the MOUs are still in effect until that MOU is wholly superseded. These MOUs are dynamic documents, and both parties agree to work together to reach new updated MOUs.

1. WO-19 MOU between the Departments of the Interior and the Army dated September 9, 1966, which provides co-use grazing on the Range, New Mexico.

2. NMSO-30 MOU dated July 22, 1976, on the proposed agreed upon changes to the MOU between the Departments of the Interior and the Army to provide for co-use grazing on the Range, New Mexico.

3. NMSO-36 MOU signed in October 1972 is a Cooperative Plan Agreement for conservation and development of fish and wildlife resources on the Range between the BLM, Fort Bliss, NMDGF, and U.S. Fish and Wildlife Service. Also includes the July 22, 1976, MOU between the BLM and Fort Bliss on proposed changes to the October 1972 MOU.

In order to fully implement the MOA required by P.L. 106-65 between the BLM and Fort Bliss, it is anticipated that additional MOUs will be required to implement specific resource management programs on the Range. Both the BLM and Fort Bliss will sign these MOUs along with the cooperating agency(ies).

J. Principal Contacts

1. The BLM Las Cruces District Manager, (575) 525-4311, 1800 Marquess Street, Las Cruces, New Mexico 88005.

2. Fort Bliss USACAS Battalion Commander (Range Commander), (915) 569-0011/0014, IMSW-BLS-PLR, Fort Bliss 79916-7400.

K. Dispute Resolution. In any and all disputes, the participants in this MOA shall exercise good faith and shall endeavor to resolve all problems amicably and quickly. In the event of any unresolved conflicts, the next higher agency/headquarters shall attempt resolution. Final resolution rests with the Secretary of the Interior and Secretary of the Army.

L. Reservation of Rights. This MOA does not waive any rights or responsibilities the BLM or Fort Bliss may have except as provided by this MOA.

M. Binding Effects. This MOA is binding on the BLM and Fort Bliss and their agents, successors, and assigns.

N. Nondiscrimination. During the performance of this MOA, participants agree to abide by the terms of Executive Order 11246 and will not discriminate against any person because of race, color, religion, sex, or National origin.

O. Officials. No member or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this MOA if made with a corporation for its general benefit.

P. Effective Date. This MOA shall take effect on the date when all parties have signed and will continue until November 6, 2026, unless terminated as described in Section F of this MOA.

APPROVED:

Linda S.C. Rundell Date 11/15/07
Linda S.C. Rundell
State Director, New Mexico
Bureau of Land Management

R.T. Burns Date DEC 07 2007
Robert T. Burns
COL, AD
Garrison Commander

APPENDIX I: Threatened, Endangered, and Species of Concern Management Plans

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1. Aplomado Falcon (*Falco Femoralis*) Endangered Species Management Plan for the Fort Bliss Training Center

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Draft Final

Northern Aplomado Falcon (*Falco femoralis septentrionalis*) Endangered Species Management Plan

Fort Bliss, Texas

Prepared by

Gulf South Research Corporation
8081 GSRI Avenue
Baton Rouge, LA 70820

Prepared for

U.S. Army Corps of Engineers
Tulsa District
1645 South 101 East Avenue
Tulsa, OK 74128-4609

and

Fort Bliss
Directorate of Public Works
Environmental Division

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Appendix A. Contributors to the Aplomado Falcon Endangered Species Management Plan for Fort Bliss

ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
BLM	Bureau of Land Management
DDT	dichlorodiphenyltrichloroethane
ESA	Endangered Species Act of 1973
ESMP	Endangered Species Management Plan
GSRC	Gulf South Research Corporation
INRMP	Integrated Natural Resources Management Plan
LTEC	La Tierra Environmental Consulting
NMCFWRU	New Mexico Cooperative Fish and Wildlife Research Unit at New Mexico State University
spp.	Several species
U.S.	United States
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background

Army Regulation (AR) 200-1 requires the preparation of Endangered Species Management Plans (ESMPs) for species that are listed or proposed for listing under the Endangered Species Act of 1973 (ESA), as well as species with designated Critical Habitat present on Army lands. Compliance with AR 200-1 involves coordination with other Federal agencies responsible for the protection of these species. Failure to implement this management plan can lead to violation of the ESA and could result in the costly disruption of military operations. This plan was developed for northern aplomado falcons (*Falco femoralis septentrionalis*) on Fort Bliss following guidelines set forth in the "Manual for the Preparation of Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status

Aplomado falcons were considered extirpated from the United States (U.S.) by the mid-20th century but sightings in the latter part of the century indicate possible natural recolonization. A reintroduction program releasing captive-reared birds was initiated in south Texas and then expanded to west Texas and New Mexico. In Texas, aplomado falcons are Federally and state listed as endangered, in New Mexico aplomado falcons are Federally listed as an "experimental population, nonessential" and state listed as endangered. Since the late 1990s, aplomado falcons have been observed multiple times on Fort Bliss and surrounding grasslands, though no breeding has been documented and a persistent population has not become established.

Habitat Requirements and Limiting Factors

Aplomado falcons require large expanses of open grasslands with some shrubs or raised structure for nest sites. They utilize inactive nests of other bird species, particularly ravens (*Corvus* spp.) and other raptors, for breeding purposes. In the U.S., the potential for natural reestablishment of aplomado falcons is limited by low immigration rates from small populations in neighboring Mexico. Reintroduction of captive-reared aplomado falcons supplements any natural recruitment into the U.S. Aplomado falcons are threatened by destruction and degradation of grassland habitat through fires, drought, overgrazing, and conversion to agriculture, by the use of some pesticides in Mexico, and potentially by climate change. Reduced abundance of avian prey may also limit aplomado falcon populations in the U.S.

Conservation Goals

The conservation goals for aplomado falcons on Fort Bliss generally focus on preserving and improving grassland habitat and avoiding direct impacts on any aplomado falcons that occur on the installation. Fort Bliss contains approximately 122,940 acres of highly suitable potential habitat, 54,518 acres of moderately suitable potential habitat, 44,441 acres of low suitability potential habitat, and 48,348 acres of marginally suitable potential habitat for aplomado falcons. The following list of conservation goals for Fort Bliss will be adopted as part of this ESMP.

- Maintain existing native grassland on Fort Bliss as a functioning ecosystem and avoid destruction, degradation, or fragmentation of potential aplomado falcon habitat.
- Map and monitor the abundance and habitat use of aplomado falcons and avian prey on Fort Bliss, as well as habitat extent and suitability, and react to changes in occupancy and habitat in an Adaptive Management framework.
- Identify any future mission requirements which necessitate fragmentation or degradation of areas identified as highly or moderately suitable aplomado falcon habitat and seek alternatives as practicable.
- Cooperate with U.S. Fish and Wildlife Service (USFWS), the Partners in Flight program, the Peregrine Fund, state wildlife agencies, and other organizations to collect data and assist in research and reintroduction efforts for aplomado falcons.

Actions Needed

To achieve these conservation goals, Fort Bliss will:

1. Minimize the risk of negative impacts from fire on aplomado falcons and their habitat by implementing an Integrated Wildland Fire Management Plan and by managing the timing, intensity, and location of any prescribed burns.
2. Avoid negative impacts on aplomado falcons and their habitat on Fort Bliss by mapping areas of potential highly and moderately suitable habitat and limiting actions that might degrade that habitat or disturb aplomado falcons.
3. Monitor aplomado falcons, habitat, and prey availability and coordinate with agencies and conservation organizations to refine habitat models, assist reintroduction efforts, and apply the most up-to-date techniques and knowledge.

Total Estimated Cost of Conservation Actions

The initial planning and funding period for the implementation of this ESMP is 5 years (2015 through 2019). Projected annual costs are shown in Table ES-1 and include costs for Senior Biologist and Staff Biologist based on 2013 contractor rates. It is important to note that these costs are presented for aplomado falcons, but some coordination and planning activities for other protected grassland bird species with ESMP's for Fort Bliss, such as Sprague's pipit (*Anthus spragueii*) or Baird's sparrow (*Ammodramus bairdii*), can be accomplished simultaneously. The initial implementation of this ESMP includes coordination with existing plans, such as an Integrated Natural Resources Management Plan (INRMP), Integrated Wildland Fire Management Plan, infrastructure development plans, Bureau of Land Management (BLM) grazing plans, and coordination with training and recreational use. Coordination with training and recreational users will occur each year because training needs or recreational use can vary between years.

Table ES-1. Projected Annual Costs of Implementation of ESMP and Aplomado Falcon Monitoring

Activity	Cost 2015	Cost 2016	Cost 2017	Cost 2018	Cost 2019
Initial ESMP Implementation (including coordination with INRMP, Integrated Wildland Fire Management Plan, invasive species management plan, infrastructure development plans)	$10,000	$0	$0	$0	$0
Coordinate with Training and Recreation Activities	$0	$10,000	$10,400	$10,816	$11,248
Aplomado Falcon Prey and Habitat Surveys	$40,000	$41,600	$43,264	$44,994	$46,794
Aplomado Falcon Surveys	$40,000	$41,600	$43,264	$44,994	$46,794
Report Locations of Aplomado Falcons and Nests	$5,000	$5,200	$5,408	$5,624	$5,849
TOTAL	**$95,000**	**$98,400**	**$102,336**	**$106,428**	**$110,685**

INTRODUCTION

Fort Bliss is a United States (U.S.) Army installation located in Texas and New Mexico, near El Paso, Texas (Figure 1-1). It contains large expanses of potential habitat for the aplomado falcon (*Falco femoralis septentrionalis*), which is Federally listed as endangered. Individual aplomado falcons have occasionally been seen on Fort Bliss, though there is no known history of them nesting on the installation. Due to release and recovery efforts and the ability of aplomado falcons to traverse great distances, they could establish nests and a breeding population on the installation at any time.

The U.S. Army has the dual responsibility to support the military mission while being a responsible steward of natural resources and complying with environmental laws like the Endangered Species Act of 1973 (ESA) (Fort Bliss Directorate of Environment Conservation Division 2001). The Final Northern Aplomado Falcon Endangered Species Management Plan (ESMP) provides guidelines for achieving those aims by minimizing impacts on aplomado falcons and their habitat from U.S. Army actions and by preserving grasslands ecosystems that are important components of aplomado falcon habitat. By complying with the ESA, restrictions on activities and land use on Fort Bliss, such as the designation of Critical abitat within installation boundaries, may be precluded.

The ESMP presents information about aplomado falcon natural history, potential habitat occurring on Fort Bliss, and the presence of aplomado falcons on the installation. It introduces conservation goals for aplomado falcons on Fort Bliss and prescribes management actions and monitoring designed to achieve those goals and meet established objectives. The cost of the conservation efforts and impacts on other installation activities including the military mission are also discussed. A checklist is provided in Section 7.0 to assist military personnel in ensuring that management and monitoring prescriptions are being followed. Contact information for persons and agencies who contributed to the development of this ESMP is provided in Appendix A. Regular surveys for aplomado falcons and their avian prey are ongoing on Fort Bliss and are incorporated into this ESMP.

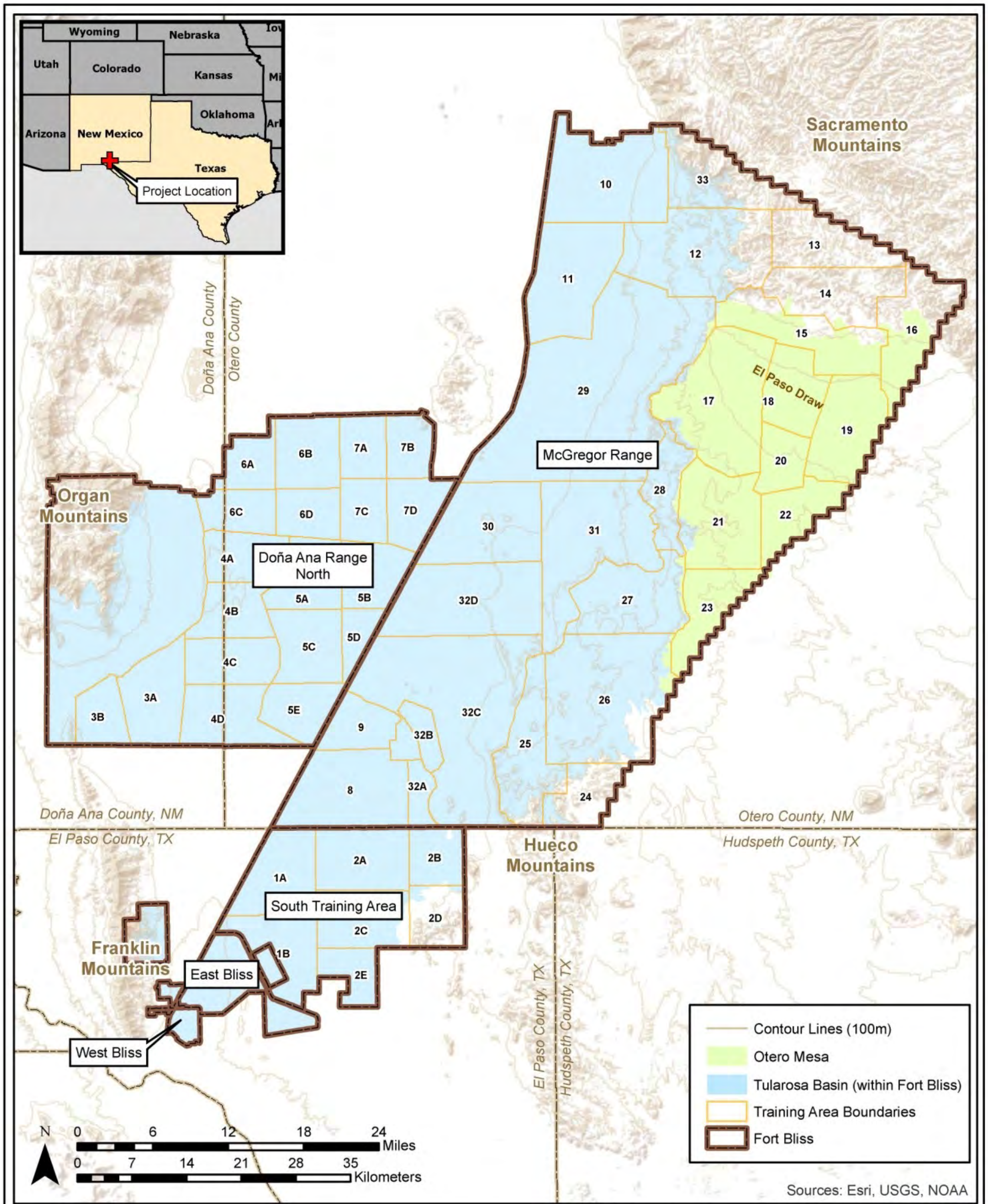

Figure 1-1. Overview of Fort Bliss Training Areas and Geography

GSRC

October 2013

SPECIES INFORMATION

2.1 Appearance

The aplomado falcon is a mid-sized tropical falcon with a disproportionately long tail that distinguishes it from other North American falcons. Aplomado falcons have long legs and wings, but the wings may appear short to observers because the two outermost primaries are shorter than the proximate primaries (Baird et al. 1905, Cade 1982). The upperparts of adults are blue-gray with a distinctive dark facial pattern and a broad, pale superciliary. The underparts are light colored with a distinctive black belt across the abdomen. Following body molt to fresh plumage, which usually occurs in the summer, the light colored areas of the face and underparts become buffy orange or cinnamon colored. In flight, the long, strongly barred tail and narrow pale trailing edge of the wing are diagnostic characteristics. Female aplomado falcons are typically at least 45 percent heavier than males (Hector 1988). Juveniles are brownish gray with distinct, dark streaking on the breast.

2.2 Ecology and Life History

Three subspecies of the aplomado falcon are currently recognized (Brown and Amadon 1968). The northern aplomado falcon differs from the other two subspecies in geographic distribution and plumage. The northern aplomado falcon occurs from the southern U.S. through Mexico to Nicaragua (Howell 1972, Keddy-Hector 2000). The other two subspecies are found further south, in Central and South America.

Aplomado falcons are generally considered resident and nonmigratory in the U.S. (Ligon 1961, Hector 1987, Jenny et al. 2004, and La Tierra Environmental Consulting [LTEC] 2005). Pairs maintain perennial territories, although home ranges can vary greatly over time, particularly during the nonbreeding season (Hector 1987, LTEC 2008a). Observations of banded birds and sightings of aplomado falcons distant from breeding sites indicate that juvenile and post-breeding dispersal may be significant.

In the Chihuahuan Desert, breeding activities occur from January through July (Montoya et al. 1997, Meyer and Williams 2005). Females usually lay two or three eggs and rarely four. The average clutch size of nests in eastern Mexico was 2.6 eggs and was slightly higher (2.8 eggs) in northern Chihuahua, Mexico (Macías-Duarte et al. 2004). Incubation occurs for an average of 32 days and nestlings fledge at 32 to 40 days post-hatch (Hector 1988). Fledglings then remain with the parents for an additional 30 days before dispersing (Hector 1988).

Single breeding season home ranges of radio-tagged aplomado falcons in northern Chihuahua ranged from 1.3 to 8.3 square miles (Montoya et al. 1997). In southern New Mexico, the minimum convex polygon created from sightings of a pair maintaining a territory from September 2000 to August 2002 was 8.6 square miles. However, over a more extended period in which habitat conditions deteriorated, September 2000 to June 2004, that same pair was observed across 25.7 square miles. Montoya et al. (1997) estimated that 10 monitored pairs occupied an average of 15.4 square miles per pair.

In the U.S., the aplomado falcon historically inhabited two geographically and ecologically distinct regions, south Texas and Chihuahuan Desert grasslands. In south Texas, the aplomado falcon was found in mesquite (*Prosopis glandulosa*) and yucca (*Yucca* spp.) grasslands, grasslands with scattered oak (*Quercus* spp.) mottes, and coastal prairie with interspersed yucca-covered dunes (Merrill 1878, Smith 1910, Johnston 1963). This ecosystem is less arid than the Chihuahuan Desert portion of the former U.S. range of aplomado falcons, which stretches from west Texas through southeastern Arizona. In the Chihuahuan Desert portion of its range, aplomado falcons inhabited yucca and mesquite grasslands and riparian woodlands adjacent to grasslands (Ligon 1961, Keddy-Hector 1990, Montoya 1995).

Aplomado falcons will use a variety of open habitats including grasslands, savannahs, cleared pastureland, and cultivated fields (Blake 1977, Keddy-Hector 1990). They predominantly inhabit open land with low herbaceous ground cover and relatively few scattered, tall woody plants that provide perch and nest sites (Hector 1981, Montoya et al. 1997, Young et al. 2004). Aplomado falcons do not typically occupy hilly or mountainous terrain or dense shrublands. In their habitat analysis, Young et al. (2002) conservatively used 10 percent slope as the maximum amount of relief present in potential habitat.

In the Chihuahuan Desert, woody plant densities at nest sites ranged from 42 to 1,097 plants per acre, with one outlier having 2,648 plants per acre (Montoya et al. 1997, Young et al. 2002). The most common shrub at nests was longleaf ephedra (*Ephedra trifurca*), followed by soaptree yucca (*Yucca elata*), acacia (*Acacia* spp.), mesquite, and tarbush (*Flourensia cernua*) (Young et al. 2004). Aplomado falcons commonly use man-made structures for perches or nest sites.

Aplomado falcons are primarily secondary nesters, using abandoned nests constructed by other raptors and ravens (*Corvus* spp.). Natural platforms, such as the crotches of multibranched yuccas, where dead leaves and other debris have collected, may also be used as nests. In rare cases, aplomado falcons nest in low bushes and even on the ground. Aplomado falcons have also used man-made structures including powerline poles as nest sites (Jenny et al. 2004). No information exists regarding the required densities of available nest sites, but it may be a limiting factor in some areas of the aplomado falcons historic range in the southwest, particularly in open grasslands and lands with shallow soils that are incapable of supporting tall shrubs and succulents.

Aplomado falcons primarily prey on small and medium-sized birds (Hector 1985, Montoya et al. 1997, Macías-Duarte et al. 2004). They also opportunistically prey on bats, small rodents, snakes, lizards, and insects (Ligon 1961). In the northern portion of the Chihuahuan Desert, the aplomado falcon is most dependent on avian prey during the winter and early spring when other prey is less available. From late spring through fall the amount of available avian prey for the aplomado falcon is more consistent and consists of larger, insectivorous birds, and alternative prey types, including arthropods, lizards, and small mammals, also are more abundant.

2.3 Range and Populations

In the U.S., the aplomado falcon was once considered a fairly common raptor in coastal prairies of south Texas, as well as the area from the Trans-Pecos region of west Texas through southern New Mexico and southeast Arizona (Bendire 1887, 1892, Strecker 1930, Bent 1938, Ligon 1961, Oberholser 1974, Philips et al. 1964). Figure 2-1 shows the potential range of the aplomado falcon, as designated by U.S. Fish and Wildlife Service (USFWS), in west Texas and New Mexico.

In 1952 there was a verified sighting of an aplomado falcon in the U.S. and the species was not seen again in the U.S. until after its 1986 listing as an endangered species. Sightings of aplomado falcons in New Mexico that are considered questionable were reported in 1968 and 1975, and it has not been seen in Arizona since 1940 (Hector 1986, Keddy-Hector 1990, Cade et al. 1991). In 1992, two areas with breeding aplomado falcons were documented in north-central Chihuahua, Mexico (Montoya et al. 1997). The easternmost occupied site was approximately 124 miles south of Fort Bliss.

Reported sightings of aplomado falcons in the U.S., particularly in New Mexico, increased significantly beginning in the 1990s. These sightings may indicate natural recolonization from Mexico in addition to individuals released in reintroduction efforts (Williams 1997, Meyer and Williams 2005). Releases of captive-reared aplomado falcons have occurred in south Texas, west Texas, and south-central New Mexico. In south Texas, aplomado falcons have established a breeding population; however, in west Texas and New Mexico, reintroduction attempts have not been successful in establishing a breeding population.

2.4 Aplomado Falcon Habitat and Distribution on Fort Bliss

Fort Bliss contains approximately 122,940 acres of highly suitable potential habitat, 54,518 acres of moderately suitable potential habitat, 44,441 acres of low suitability potential habitat, and 48,348 acres of marginally suitable potential habitat for aplomado falcons (Figure 2-2). Aplomado falcon potential habitat on Fort Bliss was assessed using remote sensing data that were adjusted using field protocols developed by the New Mexico Cooperative Fish and Wildlife Research Unit at New Mexico (NMCFWRU) (Young et al. 2002 and 2004). The field protocol uses a standardized worksheet and is based on qualitative and quantitative characteristics of habitat gathered at aplomado falcon nest and detection sites in Chihuahua, Mexico. A biologist familiar with Fort Bliss and aplomado falcon habitat requirements used information from remote sensing and the field protocols to map and categorize the suitability of potential aplomado falcon habitat (Figure 2-2). The impact area within the Centennial bombing range, near the northern end of Training Area 21, was excluded as potential habitat due to the frequency of major disturbance from munitions.

Direct field assessment and delineation of potential aplomado falcon habitat was performed for the McGregor and Doña Ana Ranges and the South Training Area of Fort Bliss using the NMCFWRU protocols (LTEC 2008b, LTEC and Miratek Corp. 2009). The McGregor and Doña

Ana Ranges cover the majority of the installation and contain several clusters of mountains in addition to two distinct geographic areas, the Otero Mesa and the Tularosa Basin (see Figure 1-1). The Otero Mesa is an open area of higher elevation at the eastern edge of the McGregor Range, immediately south of the Sacramento Mountains. The largest expanses of highly and moderately suitable aplomado falcon potential habitat on Fort Bliss occur on the Otero Mesa (Young et al. 2004, LTEC and Miratek Corp. 2009) (see Figure 2-2).

Most of the Otero Mesa was classified as highly suitable potential habitat but was comprised of two generally distinct sections with differing topographic and ecological features. The relatively flat, mostly open grassland in the El Paso Draw drainage makes up the northern portion of Otero Mesa (see Figure 1-1). The drainage consists of mostly open grassland on fine textured soils and is bordered by mesa grasslands with areas of moderate densities of soap tree yucca, sand sage (*Artemesia filifolia*), and mesquite. The El Paso Draw is the broadest and flattest drainage on the Otero Mesa and contains the largest area of mostly shrub-free grassland, and the most productive soils.

The southern portion of the Otero Mesa contains greater topographic relief than the El Paso Draw, with shallow soils on limestone hills and a series of narrow draws with deeper soils. Vegetation communities include mesa and foothills grasslands. Moderate densities of yucca, cane cholla (*Cylindropuntia imbricata*), and bear grass (*Nolina microcarpa*) occur across much of these grasslands.

On Fort Bliss, the Tularosa Basin covers most of the Doña Ana and McGregor Ranges and the majority of it is not suitable aplomado falcon habitat (see Figure 2-2). The unsuitable areas were vegetated mainly by mesquite coppice dune and other shrublands. Despite the relatively small, isolated nature of potential aplomado falcon habitat patches in the Tularosa Basin (see Figure 2-2), their occasional high productivity may make them important potential seasonal sources of prey for aplomado falcons. The dry lake beds (e.g., Coe Lake and Stewart Lake) located in the Tularosa Basin can collect rainwater and turn from barren areas to wetlands teeming with plants and animals following annual rains.

It appears that nests constructed by ravens and raptors exist in sufficient quantity in the potential aplomado falcon habitat mapped on Fort Bliss to support aplomado falcon breeding. On Fort Bliss, red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*Buteo swainsoni*), and Chihuahuan ravens (*Corvus cryptoleucus*) construct nests that could be used by aplomado falcons. Raptor and raven nests occurred mostly in soaptree yucca and less frequently in a variety of other trees, shrubs, and succulents including Torrey's yucca (*Yucca torreyi*), desert willow (*Chilopsis linearis*), mesquite, cottonwood trees (*Populus* sp.), Russian olive (*Eleagnus angustifolia*), and agerita (*Mahonia trifoliata*). These nest substrates are not evenly distributed and often occur in patches on Fort Bliss.

Following the collection of an aplomado falcon in 1917 on what is now Fort Bliss (Bailey 1928), no sightings of aplomado falcons were reported on the installation until the 1990s. A history of aplomado falcon sightings on and around Fort Bliss has been compiled and is summarized in

Figure 2-3 and Table 2-1. Formal aplomado falcon surveys on Fort Bliss began in 1994 (Montoya and Tafanelli 1994) and then were conducted annually from 1996 to 2013 with the exception of 2005 (Gulf South Research Corporation [GSRC] and LTEC 2013a). Most of the survey effort was concentrated on the Otero Mesa and in the Tularosa Basin adjacent to the Otero Mesa. Surveys were conducted according to USFWS methodologies (USFWS 1999 and 2003) and in most cases surveys were repeated three times during a given breeding season.

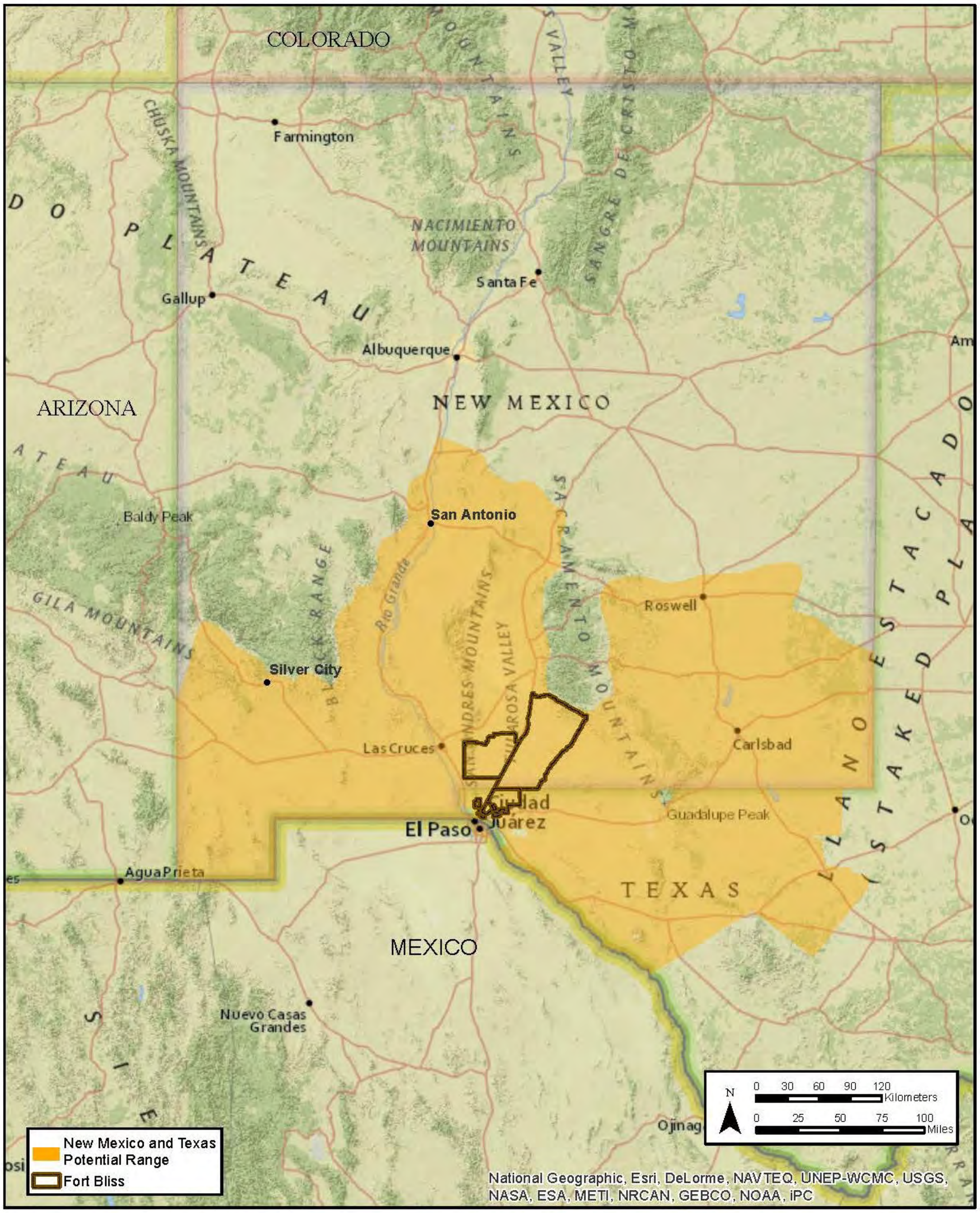

Figure 2-1. Aplomado Falcon Potential Range within West Texas and New Mexico (As designated by USFWS)

GSRC

October 2013

Table 1. Sightings of Aplomado Falcons in the Fort Bliss Area

Date	Number of Birds	Easting	Northing	Notes
June 1917	1	418652	3561387	Approximately 45 miles south of Alamogordo at 5,500 feet elevation
23 May 1997	1	418150	3570132	2.48 miles east of Mack Tanks, McGregor Range
11 September 1999	1	434667	3584845	Formal survey, East of Gyp Tank in El Paso Draw, McGregor Range
18 September 1999	1	433909	3582174	Formal survey, North of Gyp Tank, probably same bird as 11 September 1999
14 November 2001	2	445027	3560088	1.9 miles southeast of Hat Ranch headquarters
11 August 2005	2	432488	3545360	At Bennett Ranch headquarters
13 August 2005	1	432512	3544963	South of Bennett Ranch headquarters, likely one of birds observed on 11 August
03 October 2005	1	433349	3585316	Gyp Tank in El Paso Draw, McGregor Range
08 October 2005	1	414810	3540401	At Texas-New Mexico state line, south of Bennett Ranch
25 Jan. 2006	1	439550	3573650	0.6 mile southwest of Lake Tank
12 April 2006	1	432599	3548535	1.9 miles north of Bennett Ranch
24 May 2006	1	433301	3585216	Incidental, Gyp Tank in El Paso Draw, McGregor Range, probable detection
05 April 2007	1	436893	3545085	Northeast of Bennett Ranch headquarters
28 June to 01 September 2008	2	433851	3581588	Follow-up survey of reported sighting El Paso Draw, McGregor Range
16 July to 11 August 2010	1	438026	3582729	Formal survey, El Paso Draw, McGregor Range
23 July to 11 August 2010	1	438026	3582729	Detected during monitoring of above bird El Paso Draw, McGregor Range

UTMs NAD 83, Zone 13 Shaded rows indicate sightings on Fort Bliss

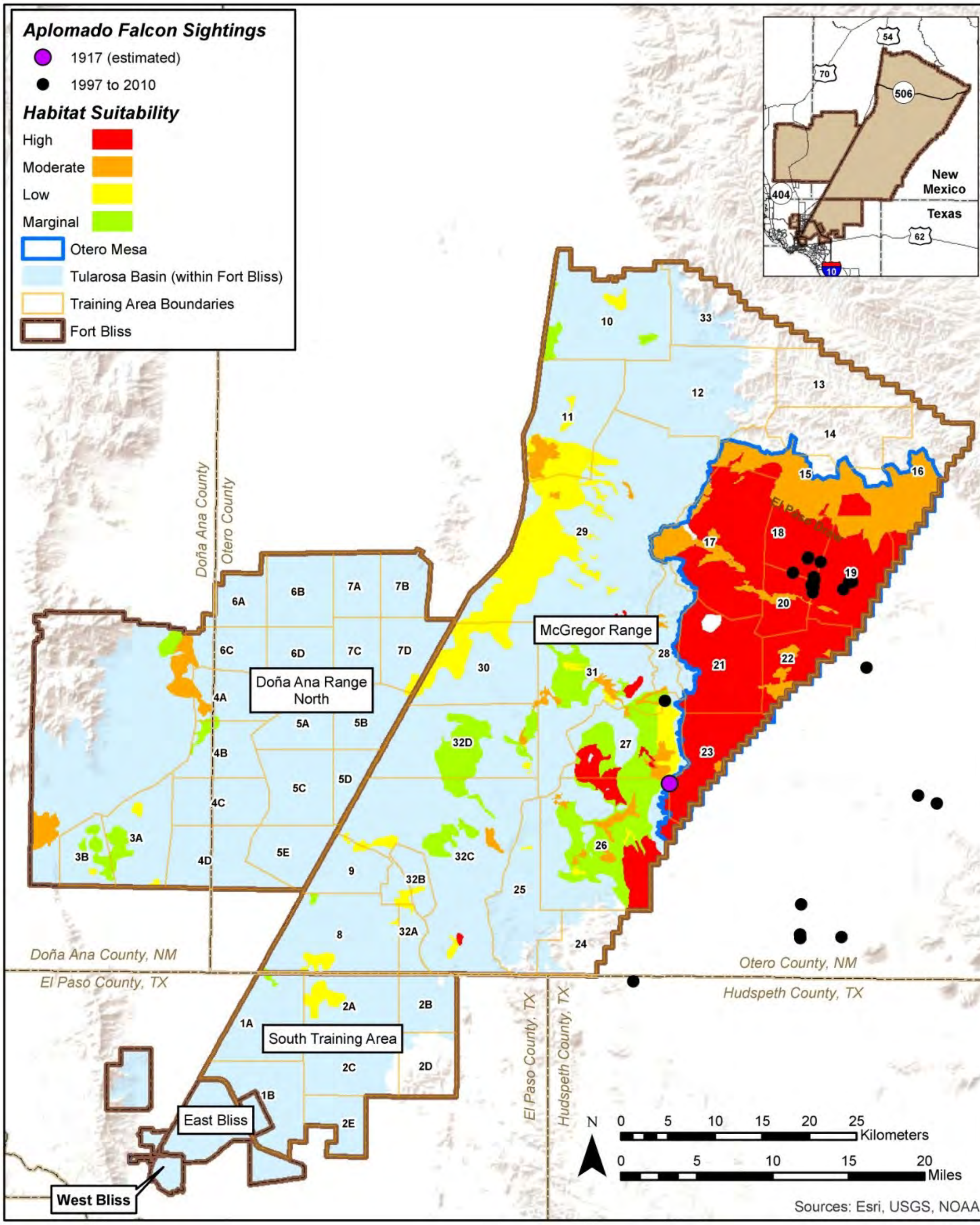

Figure 2-3. Sightings and Habitat Suitability of Aplomado Falcons Near Fort Bliss

October 2013

To date, there has been no evidence of breeding aplomado falcons on Fort Bliss or the rest of Otero Mesa outside of Fort Bliss. No birds were reported as being observed in annual surveys conducted in 2011, 2012 and 2013. More detailed information on aplomado falcon natural history and occurrence on Fort Bliss is provided in the recent survey report (GSRC and LTEC 2013a).

2.5 Conservation Measures

In 1986 the northern subspecies of aplomado falcon (*Falco femoralis septentrionalis*) was listed as endangered by the USFWS under the ESA (USFWS 1986). This action was implemented based on the lack of a resident aplomado falcon population in the U.S. combined with a low estimated probability of natural recolonization. The probability of natural recolonization was believed to be low because the closest extant population, in northern Mexico, was exhibiting low reproductive rates due to thinning of eggshells caused by pesticide entering the food chain (Kiff et al. 1980).

The aplomado falcon is Federally listed as endangered in Texas, and is state listed as endangered in Texas and New Mexico. Following development of a plan to reintroduce aplomado falcons into the U.S., the aplomado falcon was granted the Federal status “experimental population, nonessential” in New Mexico (USFWS 2006). The reintroduction plan adopted the goal of restoring the aplomado falcon to its historic range in the U.S. and was initiated in the 1980s with the releases of captive-bred birds into south Texas (USFWS 1990, Cade et al. 1991, Perez et al. 1996). Additional aplomado falcons were released in the 1990s, with annual releases of more than 100 individuals from 1997 to 1999. Reintroduced birds first produced young in 1995. By 2008, the number of breeding pairs in south Texas increased to 40, and a self-sustaining population appears to have been established. No breeding has been observed in the Chihuahuan desert (Jenny et al. 2004).

Aplomado falcon reintroductions into west Texas and Chihuahuan Desert began in 2002. Under Safe Harbor agreements, 36 captive-reared aplomado falcons were released at hack sites, areas used to acclimatize raptors for release, near Valentine, Texas, roughly 85 miles southeast of Fort Bliss. By 2005, more than 100 aplomado falcons were being released annually in west Texas. In 2006, the first releases in New Mexico were conducted on the privately owned Armendaris Ranch in south-central New Mexico. Since then, releases have been made at additional sites in southern New Mexico on nearby Bureau of Land Management (BLM) property, on State of New Mexico property, and on White Sands Missile Range, which abuts the Doña Ana range of Fort Bliss and is about 90 miles northwest of Fort Bliss headquarters. Pair formation and breeding by released birds occurred in 2009 with at least 10 pairs in west Texas. However, only two pairs were located in the subsequent year and none in the following year. In 2010, a total of 107 aplomado falcons were released at five sites in New Mexico and three sites in west Texas. In 2012, aplomado falcons were released at three sites in New Mexico. No subsequent releases were conducted in west Texas because of extreme drought conditions.

Since releases of captive-bred aplomado falcons began in New Mexico, three breeding attempts have been observed on the Armendaris Ranch. Aplomado falcons have also been seen regularly during non-breeding seasons in the Rio Grande Valley on Bosque del Apache National Wildlife Refuge adjacent to the Armendaris Ranch. Other sightings have occurred at Lake Valley and in the vicinity of Hermanas, New Mexico. Due to an apparent lack of progress establishing a self-sustaining population in the Chihuahuan Desert, a monitoring program was implemented to track birds released in the summer of 2012 using radio telemetry (The Peregrine Fund 2013). By January 2013, all but one of the tagged birds were either confirmed or presumed dead. The lone surviving bird was located in Chihuahua, about 130 miles south of Deming, New Mexico.

2.6 Threats to Aplomado Falcon in North American Range

Aplomado falcons were extirpated from their North American range during the 20th century, and reintroduction efforts in two regions, south Texas and west Texas/Chihuahuan Desert, have sought to reestablish self-sustaining populations. The primary causes of decline include the following:

- Shrub encroachment resulting from fire suppression
- Intense overgrazing
- Agricultural development of grasslands
- Pesticide exposure
- Collection of adults and eggs by humans
- Reduced abundance of avian prey
- Possibly climate change

As Europeans colonized Texas and the southwestern U.S., land management practices led to alterations in the grassland habitats that support aplomado falcons. Suppression of fire in grasslands allowed widespread encroachment of shrubs and woody vegetation, creating a much less open landscape that affected the ability of aplomado falcons to locate and capture prey. After railroads reached southern New Mexico, cattle ranching increased dramatically. Extreme overgrazing of desert grasslands increased erosion and contributed to desertification and encroachment of unpalatable shrub species such as creosote bush (*Larrea tridentate*) and mesquite. Other grasslands were converted to agricultural uses, with the combined effect of a significant reduction in the availability of open grassland habitats and a decline in aplomado falcons in the U.S. and Mexico. The widespread use of the pesticide dichlorodiphenyltrichloroethane (DDT) following World War II was linked with declines in many bird species in North America and coincided with the disappearance of aplomado falcons from their U.S. range. Collection or shooting of falcons, and collection of falcon eggs, has also been implicated in the decline of aplomado falcons, especially in south Texas.

Current threats to aplomado falcons in the U.S. and Mexico include fire suppression, shrub encroachment into grasslands, the continued use of DDT in Mexico, activities that degrade or destroy remaining grassland habitats, and potentially climate change. Overgrazing continues in many areas of the Chihuahuan Desert and climate change models predict increasing desertification in the former North American range of the aplomado falcon. A general decline in the diversity and abundance of birds in North America also represents a reduction in prey for aplomado falcons. Difficulties in establishing a self-sustaining population of aplomado falcons in the west Texas region and Chihuahuan desert represent an obstacle to recovery of the species.

2.7 Threats to Aplomado Falcon on Fort Bliss

The primary threats to aplomado falcon, including on Fort Bliss, involve the destruction or degradation of grassland habitats (USFWS 1999). Direct destruction of grassland habitat on Fort Bliss is minimized through restrictions on digging or construction within grasslands and through responsible fire management. Only 9% of high quality aplomado falcon habitat is utilized for off-road maneuver on Fort Bliss (US army 2010). This 9% is under restriction from concentrations of vehicles or digging, thus any maneuver in these Limited Use Areas is roll-through only. Human-caused fires can directly destroy grassland habitat and may occur during dry periods in the absence of thunderstorms, causing fires to be especially severe. Severely burned areas are unsuitable to the grassland birds on which aplomado falcons prey and may also suffer increased erosion. Conversely, absence or major reduction in fire frequency can degrade aplomado falcon habitat by allowing encroachment of woody vegetation into grasslands (York and Dick-Peddie 1969, Smith 1992).

In order to address habitat destruction from fire, Fort Bliss has designated fire management units and an Integrated Wildland Fire Management Plan is in draft. Fire management and planning will greatly reduce the likelihood of any large-scale fires that could destroy wide tracts of aplomado falcon habitat but will also consider the natural role of fire in reducing woody vegetation and maintaining natural ecosystems. Fire is unlikely to cause direct adult aplomado falcon mortality because of their mobility; however, nests with eggs or young are vulnerable. The location of any active aplomado falcon nests on Fort Bliss will be incorporated into fire management planning. Natural resource managers should assess the fire risk immediately surrounding any aplomado falcon nests to determine how to best avoid an accidental human-caused fire and the best course of action if a fire breaks out nearby. Because it may disturb or disrupt the aplomado falcons, clearing fire breaks near a nest is unadvisable unless it is absolutely necessary. However, focusing suppression efforts to prevent an active fire from reaching a nest should be considered if a aplomado falcons nest on Fort Bliss, and those nests become threatened by a wildfire.

Fire management on Fort Bliss will also consider the natural role of fire in maintaining a grassland ecosystem. Absence of fire allows woody vegetation to invade grasslands and those areas become less suitable as aplomado falcon habitat. Controlled burns should be considered in areas where vegetation surveys and habitat assessments indicate that woody vegetation is reducing the quality or quantity of aplomado falcon habitat with priority given to highly, then moderately suitable potential aplomado falcon habitat on the Otero Mesa.

Cattle grazing at appropriate levels can increase productivity but overgrazing by cattle is another potential cause of degradation of aplomado falcon habitat. Overgrazing can reduce the productivity of grasslands (Smith 1992), causing reductions in avian prey species for aplomado falcons, increased soil erosion, and encroachment of woody species that are unpalatable to cattle. When fires or drought destroy existing grasslands, cattle grazing may become more intense in remaining grassland patches, exacerbating grazing damage. Grazing on Fort Bliss is under the management of the BLM, which sets stocking rates and also has the responsibility of avoiding and reducing impacts on listed species, including the aplomado falcon.
Predation of aplomado falcons may limit the establishment of a self-sustaining population in the region; however, the threats to wild birds on Fort Bliss are minimal. Predation of aplomado falcons is a heightened concern for eggs and nestlings, and for juvenile birds near release sites where they are provided with supplemental food until they disperse. In one study, recently released juvenile birds were given supplemental food at a hack site and raptors and coyotes caused significant mortality (Perez et al 1996). Mortality among wild, post fledging birds is likely to be much lower because they will not be regularly visiting a hack site, and wild birds are likely to be more aware of threats from predators. Adult aplomado falcons will also defend their eggs and nestlings from opportunistic predators so management of predation is not a priority on Fort Bliss unless hack sites are established for the release of captive reared birds.

In the Chihuahuan Desert, the aplomado falcon relies heavily on avian prey and aplomado falcon productivity has been associated with avian prey abundance in northern Chihuahua (Macías-Duarte et al. 2004). Limited prey availability is a potential threat to aplomado falcons and populations of many migratory birds in North America are declining in general (USFWS 1999). Surveys to assess avian prey availability to aplomado falcons were performed in winter 2002 through 2006, and again in winter 2011 and 2012 (GSRC and LTEC 2013a). Those surveys found a high degree of interseasonal variability in bird abundance, which appeared to be correlated with growing season precipitation. Avian prey abundance related to precipitation has been demonstrated in aplomado falcon habitat in Chihuahua (Macías-Duarte et al. 2004) as well as Fort Bliss (LTEC 2003).

Invasive species may also degrade grassland habitats and threaten Aplomado falcons on Fort Bliss. Grazing by the introduced oryx (*Oryx gazella*) can have similar effects as grazing by cattle, but typically occurs with lower intensity. Invasive plants, such as Russian thistle (*Salsola tragus*), African rue (*Peganum harmala*), Lehman lovegrass (*Eragrostis lehmanniana*), brome grasses (*Bromus* spp.), buffelgrass (*Pennisetum ciliare*) and Malta star-thistle (*Centaurea melitensis*) can displace native plant species and reduce suitability of grassland communities for aplomado falcons on Fort Bliss. Fort Bliss and the BLM have policies designed to avoid the introduction of non-native plant seeds, such as mandating that cattle feed be free of non-native seeds. The combination of invasive species, decreased prey abundance, and potential habitat degradation from grazing and altered fire regimes could have a cumulative effect making Fort Bliss less suitable for aplomado falcons over time, and especially unsuitable during dry periods.

Extensive research and modeling on climate change suggest that the climate in west Texas and New Mexico will likely experience increased frequency and duration of droughts. Implementation of an invasive species management plan, aplomado falcon ESMP, an Integrated Wildland Fire Management Plan, and responsible BLM grazing management reduce the likelihood of degradation of potential aplomado falcon habitat on Fort Bliss and preserve the grassland ecosystems on which aplomado falcons rely.

CONSERVATION GOALS

The future recolonization of Fort Bliss by aplomado falcons and the carrying capacity of the installation is uncertain and population goals for aplomado falcons on Fort Bliss are not adopted at this time. Instead, an approach of protecting and limiting impacts to grassland habitat is adopted as part of a community-based conservation approach that will benefit aplomado falcons and other grassland birds, like the Baird's sparrow (*Ammodramus bairdii*) and Sprague's pipit (*Anthus spragueii*). The following list of conservation goals for Fort Bliss will be adopted as part of this ESMP.

- Maintain existing native grassland on Fort Bliss as a functioning ecosystem and avoid destruction, degradation, or fragmentation of high and moderately suitable potential aplomado falcon habitat.
- Monitor aplomado falcons on Fort Bliss
- Monitor aplomado falcon avian prey on Fort Bliss
- Monitor aplomado falcon habitat extent and suitability
- Incorporate monitoring results into an adaptive management framework
- Identify any future mission requirements that necessitate fragmentation or degradation of areas identified as highly or moderately suitable aplomado falcon habitat (see Figure 2-2) and seek practicable alternatives.
- Cooperate with USFWS, the Partners in Flight program, the Peregrine Fund, state wildlife agencies, and other organizations to collect data and assist in research and reintroduction efforts for aplomado falcons.
- Protect potential nesting sites in potential habitat by protecting large standing yuccas, known raptor and raven nest sites and large trees.

MANAGEMENT PRESCRIPTIONS AND ACTIONS

An Adaptive Management framework is recommended for Fort Bliss so that aplomado falcon management can be improved over time and is able to react to changing conditions like potential breeding of aplomado falcons on the installation. Adaptive management is a systematic approach that incorporates monitoring results and analyzes the outcome of projects, programs, surveys, and other experiences to achieve management goals and objectives. Adaptive management involves testing, monitoring, and evaluating applied strategies, then incorporating new knowledge that is based on scientific findings into management approaches. Adaptive management is most commonly thought of as a continuous loop of steps, where lessons learned from Step 5 are carried back to Step 1, and the process repeats:

1) Planning - Defining goals and objectives based on existing data and expert opinion
2) Design - Describing objectives in a quantifiable way and developing mathematical models
3) Action - Implementing management actions
4) Monitoring - Collecting data to evaluate if goals and objectives are being achieved
5) Evaluation - Analyzing data and examining the effects of monitoring actions to return to Step 1 and refine models in Step 2

The incorporation of monitoring results into decision making is a key component of Adaptive Management. For example, on Fort Bliss, the results of aplomado falcon surveys that demonstrate occupancy or nesting attempts might be used to inform decisions about where training activities or prescribed burning should be avoided while aplomado falcons are present. An Adaptive Management approach will also incorporate the results of surveys for other species, especially grassland birds and vegetation surveys, because maintenance of native grasslands is a goal of this ESMP.

Adaptive Management will consider other planning efforts, such as National Environmental Policy Act review of proposed projects, Integrated Wildland Fire Management Plans, invasive species management plans, and integrated pest management plans, so that the goals and objectives in this ESMP can be incorporated into them. Management goals and objectives for Aplomado Falcons on Fort Bliss generally target the main threat to the species, destruction and degradation of habitat (USFWS 1999).

Fort Bliss currently implements limited use areas (LUAs) that protect grasslands, arroyos, and riparian areas of a certain size. LUAs are open to military training activities, but are off-limits to static vehicle positions, concentrations of vehicles, or digging, to include the following types of operations: all logistical, training unit assembly areas; fuel depots; any digging or excavation; field fortifications; bivouac areas; Tactical Operations Centers; and any other proposed concentrations or vehicles or personnel or ground disturbance. A detailed map showing existing LUAs and off-limit areas on Fort Bliss is provided in the 2010 Final *Grow and Force Environmental Impact Statement* (U.S. Army 2010).

The primary military land use on aplomado falcon habitat is on-road maneuver and dismounted (on foot) maneuver. These uses are found in 91% of the high quality aplomado falcon habitat. 9% of the high quality habitat is utilized for off-road maneuver, however all of that is within LUAs and thus concentrations of vehicles and other heavy uses do not occur. Thus these LUAs are used as maneuver through of “roll-through” areas. There are no plans for construction within any of the high quality aplomado falcon habitat areas (U.S. Army 2010).

Habitat on Fort Bliss is also potentially threatened by wildfire, invasive species, and overgrazing. The potential threat from wildfire is addressed in the draft Integrated Wildland Fire Management Plan, which divides Fort Bliss into distinct fire management units. Since seeds of invasive plants can be carried by wind, water, or animals, establishment of invasive plant species is possible throughout the potential aplomado falcon habitat on Fort Bliss. Fort Bliss and BLM have policies in place to reduce the introduction of invasive plant species and Fort Bliss has an invasive species management plan that addresses invasive species issues on the installation. The BLM is responsible for setting stocking rates on Fort Bliss and has a responsibility to minimize and avoid impacts caused by its actions on aplomado falcons.

Prescribed fire can benefit grasslands and the species that depend on them; however, the timing, intensity, and location of prescribed fire must be selected to minimize negative impacts on aplomado falcons and other grassland bird species. In general, Fort Bliss would avoid burning during droughts and where aplomado falcons are known to be present. Controlled burns should seek to recreate, in small patches, a natural disturbance regime that does not kill grasses or sterilize soils, but instead removes accumulations of aboveground biomass, reduces shrub cover and invasive plants, and encourages regrowth of native grasses. Controlled burns should occur in plant communities that are adapted to periodic disturbance by fire and should avoid slopes or soils where fire may increase soil erosion. Controlled burns are most effective at controlling shrub seedlings. Herbicide treatment may be more effective than fire at removing established shrubs and eliminates some of the risks associated with fire. Wildland fire management on Fort Bliss will consider the conservation goals for aplomado falcons and identify active nest sites where fire could negatively impact the species.

On Fort Bliss, habitat degradation or fragmentation of large patches (greater than 62 acres) of grassland habitat should be avoided whenever possible to benefit the avian prey of aplomado falcons. 62 acres was estimated to be the minimum habitat patch size necessary for occupancy by Baird’s sparrow (Davis 2004) and is adopted as a surrogate for grassland bird species. Habitat fragmentation includes creation of any clearings or roads that might receive greater than extremely light and infrequent use. Collocating man-made structures and linear alignments, like roads or power lines, instead of spreading them out across the landscape, can help to minimize unavoidable negative impacts on birds.

The results of ongoing bird surveys should be provided to persons planning activities in potential aplomado falcon habitat so that current territories and any nests can be avoided. Human presence and soil disturbance (e.g., construction, road maintenance, digging) in areas frequented by aplomado falcons (e.g., Toy Tank and other water tanks and corrals) or in any aplomado falcon territories should be avoided as much as practicable, and especially around occupied nests. Aplomado falcons that establish territories on Fort Bliss should be monitored in the early nesting season to ascertain the breeding status and locations of nests. Little information on appropriate buffer zones around nests or territories is available and territory size appears highly variable and dependent on seasonal and regional prey availability (USFWS 1999). Personnel should maintain a sufficient distance from aplomado falcons such that they do not cause a change in behavior, including flushing from a nest or perch or discontinuation of foraging behavior. Potential nest sites such as large, tall standing yuccas should be protected from damage including wildfires by keeping adjacent vegetation clear or low. Other raptor and raven nests are potential aplomado falcon nest sites and these should be protected from damage. Again keep surrounding vegetation immediately adjacent to nest sites cleared. These activities should occur in late summer through the winter prior to nesting season.

Aplomado falcon surveys will be conducted annually and are described in Section 5.0 Monitoring. Vegetation surveys that map potential habitat and distinguish it from areas with shrubs or woody vegetation, or areas heavily infested with invasive plant species, will also be conducted. As data on vegetation cover and type on Fort Bliss are amassed, the delineation of potential aplomado falcon habitat on Fort Bliss will be updated. Personnel that plan construction or human activities on Fort Bliss near documented aplomado falcon sightings will be made aware of any presence of aplomado falcons and the need for limiting impacts. Fort Bliss will update the aplomado falcon ESMP every 5 years, incorporating new research findings about the species, new data specific to Fort Bliss, and any major changes to the military mission that might impact grassland habitats. Take of aplomado falcons will be avoided and Fort Bliss will enter consultations with USFWS if negative impacts on aplomado falcons occur or are anticipated.

During the 5-year updates to the ESMP, monitoring data will be analyzed to assess limiting factors, determine the impacts of management actions, fire, and invasive species, and to select new management projects or actions in an Adaptive Management framework. For example, if vegetation surveys reveal that the amount of highly suitable habitat is declining due to invasive plant species encroachment, then a restoration program with the goal of restoring lost grassland habitat on Fort Bliss will be considered.

MONITORING

Monitoring of aplomado falcons, their habitat, and avian prey species will be performed in an Adaptive Management framework so that monitoring informs defensible management decisions. Monitoring will seek to assess the abundance and breeding status of aplomado falcons on Fort Bliss. It will also track the cover, species composition, and presence of shrub encroachment in grasslands to assess potential habitat for aplomado falcons, as well as the availability of nests and prey, and will also seek to assess the impacts from factors like grazing, climate change, and management actions like prescribed burning or herbicide treatment on potential aplomado falcon habitat.

Monitoring of aplomado falcons and nest availability will follow the methodologies described by USFWS (1999 and 2003) and will adopt the survey routes and locations described in *Aplomado Falcon Survey on the Fort Bliss Training Complex, 2012 (*GSRC and LTEC 2013b). Currently the routes range in length from 10.0 to 15.7 miles, each with 16 to 20 survey points. Surveys will be repeated three times during the breeding season (January through July) and will be timed to monitor the productivity of any active nests.

Fort Bliss will conduct assessments of the quality and extent of potential aplomado falcon habitat on the installation every 5 years. During each review of the ESMP, any significant declines in habitat quantity and quality will trigger a review and possible implementation of management actions to halt such declines. For example, if grassland habitat is declining due to encroachment by shrubs or invasive plant species, a program of prescribed burning can be implemented to limit the growth of woody vegetation and maintain or restore potential aplomado falcon habitat. Monitoring of grassland bird species will follow methods previously established on Fort Bliss and described in *Aplomado Falcon Survey and Habitat Evaluation on Fort Bliss Military Reservation 1995-1996* (Meyer 1997). Grassland bird surveys will occur in early winter (December), late winter (January and February), and early spring (March 10 to April 10).

COSTS AND PERSONNEL

The initial planning and funding period for the implementation of this ESMP is 5 years. Projected annual costs are shown in Table 6-1 and include costs for a Senior Biologist and a Staff Biologist based on 2013 contractor rates. The required resources, such as paper, computers and software, and a field vehicle are not included here because they are part of the overhead included in the contractor rates. The initial implementation of the ESMP includes coordination with existing plans, such as an Integrated Natural Resources Management Plan (INRMP), Integrated Wildland Fire Management Plan, infrastructure development plans, and coordination with training and recreational use. However, coordination with training and recreational use will occur each year because they may vary between years.

Table 2. Projected Annual Costs of Implementation of ESMP and Monitoring

Activity	Cost 2015	Cost 2016	Cost 2017	Cost 2018	Cost 2019
Initial ESMP Implementation (including coordination with INRMP, Integrated Wildland Fire Management Plan, invasive species management plan, and infrastructure development plans)	$10,000	$0	$0	$0	$0
Coordinate with Training and Recreation Activities	$0	$10,000	$10,400	$10,816	$11,248
Grassland Bird and Grassland Habitat Surveys	$40,000	$41,600	$43,264	$44,994	$46,794
Aplomado Falcon Surveys	$40,000	$41,600	$43,264	$44,994	$46,794
Report Locations of Aplomado Falcons and Nests	$5,000	$5,200	$5,408	$5,624	$5,849
TOTAL	**$95,000**	**$98,400**	**$102,336**	**$106,428**	**$110,685**

CHECKLIST

The following checklist is designed to help Fort Bliss natural resources managers ensure that all necessary aspects of the ESMP are implemented during the 5-year life of the plan. The activities are drawn from Sections 4 and 5 of the ESMP. Activities scheduled to occur in 2019 are not included in the cost projections in this ESMP because they will occur after the 5-year life of this plan; however, they are included in the checklist to cue natural resources managers to reinitiate endangered species management planning efforts for aplomado falcons.

Table 3. Checklist

Schedule	Activity	Date	Signature
2015	Implement ESMP and coordinate with existing plans (e.g., INRMP, Integrated Wildland Fire Management Plan, Master Plan, Invasive Species Management Plan, Annual Training Plan)		
2015	Incorporate aplomado falcon habitat maps into Integrated Wildland Fire Management Plan (every 5 years)		
Annually, beginning in 2015	Avoid habitat fragmentation by coordinating conservation with infrastructure planning efforts during ESMP implementation		
Annually, beginning in 2015	Minimize human disturbance in occupied aplomado falcon territories by coordinating with training and recreational use planning efforts		
Annually Early Spring (March 10-April 10)	Aplomado falcon survey		
Annually Mid-Spring (April 10-May 10)	Aplomado falcon survey		
Annually Late Spring (May 10-June 10)	Aplomado falcon survey		
Annually, December through February	Provide recent data on locations of aplomado falcon detections and nests to personnel planning activities in potential habitat		
2019	Re-assess extent and state of potential habitat on Fort Bliss		
2019	Examine survey data for trends habitat extent and effectiveness of management actions		
2019	Update ESMP for aplomado falcons		

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2. Sprague's Pipit (*Anthus spragueii*) Endangered Species Management Plan for the Fort Bliss Training Center

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Final

Sprague's Pipit (*Anthus spragueii*)

Endangered Species Management Plan

For

The Fort Bliss Training Complex

Fort Bliss, Texas

Prepared by

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Prepared for

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ACRONYMS and ABBREVIATIONS

AR	Army Regulation
BLM	Bureau of Land Management
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
GSRC	Gulf South Research Corporation
INRMP	Integrated Natural Resources Management Plan
IWFMP	Integrated Wildland Fire Management Plan
LTEC	La Tierra Environmental Consulting
LUA	Limited Use Area
NMDGF	New Mexico Department of Game and Fish
SAIC	Science Applications International Corporation
U.S.	United States
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background

The United States (U.S.) Army has the dual responsibility of supporting the Fort Bliss mission while being a responsible steward of natural resources and complying with environmental laws like the Endangered Species Act (ESA) of 1973, as amended (U.S. Fish and Wildlife Service 2014). This Final Sprague's pipit (*Anthus spragueii*) Endangered Species Management Plan (ESMP) provides guidelines for achieving those aims by minimizing impacts on Sprague's pipit and their wintering habitat resulting from U.S. Army actions and by preserving grassland ecosystems that are important components of Sprague's pipit wintering habitat. Sprague's pipit does not breed on Fort Bliss and all breeding/summer habitat is in the Great Plains. By complying with the ESA, restrictions on activities and land use on Fort Bliss, such as the designation of Critical Habitat within installation boundaries, may be precluded. This plan was developed for Sprague's pipit on Fort Bliss following guidelines set forth in the "Manual for the Preparation of Endangered Species Management Plans" (Science Applications International Corporation [SAIC] 1995).

Current Species Status

In the U.S., Sprague's pipit is listed as a "Species of Conservation Concern" by the U.S. Fish and Wildlife Service (USFWS) Migratory Bird Management Office (USFWS 2008) and is a candidate species for listing under the ESA of 1973, as amended (16 U.S.C. 1531 et seq., USFWS 2013). The New Mexico Department of Game and Fish (NMDGF) considers Sprague's pipit to be a species of greatest conservation need, but the species has no special legal status (NMDGF 2006).

Fort Bliss contains suitable wintering habitat for Sprague's pipit (Meyer 1997), and in recent years numerous confirmed observations of Sprague's pipit have occurred on the installation between October and April.

Habitat Requirements and Limiting Factors

On Fort Bliss, Sprague's pipit occupies plains-mesa grasslands on Otero Mesa. Suitable wintering habitats are grasslands of intermediate height with few visual obstructions, moderate litter cover, and minimal to no woody vegetation. It also occupies open uplands and open lowland desert grasslands where conditions are suitable. Exotic vegetation may form a component of occupied habitat, but abundance of Sprague's pipit is significantly higher in native grasslands.

Availability of suitable wintering habitats is a limiting factor for Sprague's pipit. Declines in Sprague's pipit populations in North America are attributable to habitat destruction, loss, and fragmentation, which are primarily related to the use of native prairie and grasslands for agriculture (Jones 2010). Intense grazing pressure, altered or suppressed fire regimes, exploration and development of petroleum and natural gas resources, predation and parasitism of nests, spread of exotic plant species, and climatic factors such as drought have also contributed to habitat degradation and reduced population size (Jones 2010).

Conservation Goals

Conservation will focus on the protection and enhancement of existing areas of suitable Sprague's pipit habitat, such as grama grassland, on Fort Bliss. Sprague's pipit conservation goals for Fort Bliss include the following:

- Avoid impacts to vegetation containing suitable habitat
- Identify all areas of suitable habitat and areas that may be managed for improved suitability

Actions Needed

In order to achieve these conservation goals, Fort Bliss will implement or continue to implement the following management actions:

4. Continue to map and monitor the abundance and habitat use by Sprague's pipit on Fort Bliss, as well as habitat extent and conditions
5. Identify any future mission requirements that necessitate fragmentation or disturbance of areas identified as Sprague's pipit habitat and seek practicable alternatives
6. Cooperate with USFWS, the Partners in Flight program, and other organizations to collect and apply research findings and to assist in research on Sprague's pipit
7. Maintain military land use in accordance with the 2010 Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement

Total Estimated Cost of Conservation Actions

The initial planning and funding period for the implementation of this ESMP is 5 years (2015 through 2019). Projected annual costs are shown in Table ES-1 and include costs for a Senior Biologist and a Staff Biologist based on 2013 contractor rates. The initial implementation of the ESMP includes coordination with existing plans, such as an Integrated Natural Resources Management Plan (INRMP), Integrated Wildland Fire Management Plan (IWFMP), infrastructure development plans and coordination with training and recreational use. The assessment of training and recreational use will occur each year because the effect of these activities on Sprague's pipit can vary between years.

Table ES-1. Projected Annual Costs of Implementation of ESMP and Sprague's Pipit Monitoring

Activity	Cost 2015	Cost 2016	Cost 2017	Cost 2018	Cost 2019
Initial ESMP Implementation (including coordination with INRMP, IWFMP, invasive species management plan, and infrastructure development plans)	$10,000	0	0	0	0
Coordinate with Training and Recreation Activities	0	$10,000	$10,400	$10,816	$11,248
Bird and Habitat Surveys	$40,000	$41,600	$43,264	$44,994	$46,794
Report Locations of Sprague's pipit	$5,000	$5,200	$5,408	$5,624	$5,849
TOTAL	**$55,000**	**$56,800**	**$59,072**	**$61,434**	**$63,891**

INTRODUCTION

Sprague's pipit (*Anthus spragueii*) is a candidate for listing under the Endangered Species Act (ESA) of 1973 and is known as a winter inhabitant of Fort Bliss, a United States (U.S.) Army installation that spans the border of Texas and New Mexico (Figure 1-1). Sprague's pipit is a species that is known to occur on Fort Bliss from as early as October and as late as April. The migratory range of Sprague's pipit encompasses the Great Plains of central North America (Figure 1-2), where it is primarily associated with well-drained, native, mixed-grass prairies (Robbins and Dale 1999, Jones 2010).

This Endangered Species Management Plan (ESMP) presents information about Sprague's pipit natural history and the locations of habitat and sightings of Sprague's pipit on Fort Bliss. More detailed information on Sprague's pipit natural history and occurrence on Fort Bliss are provided in the Gulf South Research Corporation (GSRC) and La Tierra Environmental Consulting (LTEC) (2013) Sprague's Pipit Species Report for the Fort Bliss Training Complex. This ESMP introduces conservation goals for Sprague's pipit on Fort Bliss and prescribes management actions designed to achieve those goals. The cost of the conservation efforts and impacts on other installation activities and the Fort Bliss mission are also discussed. A checklist is provided in Section 7.0 to assist Fort Bliss personnel in ensuring that management and monitoring prescriptions are being followed. Contact information for persons and agencies who contributed to the development of this ESMP is provided in Appendix A.

Figure 0-1. Fort Bliss

Figure 0-2. Winter and Breeding Range of Sprague's Pipit

SPECIES INFORMATION

2.1 Appearance

Robbins and Dale (1999) describe Sprague's pipit as a small (4 to 6 inches) bird with dark and buffy streaking in its upperparts, crown, and nape. Its chin, throat, and underparts are whitish, its flanks and breast are buff-colored, and its breast shows fine dark streaking. Its face appears plain with a pale eye ring. The wings and tail are brown and the wings have two indistinct wing-bars, while the outer rectrices are white. The bill is relatively slender, short, and straight with a pale lower mandible. The upper mandible appears dark or black. The tarsi are relatively long, yellow to pinkish-brown in color, with an elongated hind claw. Vocalization is principally limited to one primary call used during aerial display, a thin, relatively high-pitched and descending, repeated *tzsee* sound that continues for 2.5 to 3 seconds. Additionally, one contact call is often used when the bird rises off the ground or circles overhead, which is a single, squeaky *tchik* sound, often repeated several times (Robbins and Dale 1999).

2.2 Ecology and Life History

In the U.S., wintering habitat includes open grasslands of the Gulf States, shortgrass prairie, southern mixed-prairie, and Chihuahuan Desert grasslands. In Texas, pipits were found in grass-forb prairie, heavily grazed grasslands, Bermuda grass pastures, turf grass farms, golf courses, burned pastures, and grass shoulders of roadsides (Emlen 1972, Freeman 1999, Igl and Ballard 1999). In southern Texas, Emlen (1972) found Sprague's pipits almost exclusively in grass-forb prairie (27 individuals per square kilometer), and rarely in shrub grassland (2 individuals per square kilometer). However, Igl and Ballard (1999) observed wintering Sprague's pipits not only in grassland habitat (<10 percent woody plant canopy cover) but also in shrub grassland (grassland with shrubs <3 meters in height and <30 percent canopy cover) and parkland (trees >3 meters tall and <50 percent canopy cover) habitats. Sprague's pipits can be found occasionally using crop fields and turf fields on the wintering grounds.

The Sprague's pipit prefers to forage alone throughout the day in grass several centimeters in height (Robbins and Dale 1999). Its diet is composed mainly of arthropods, especially during the breeding season, although seeds were observed in stomach samples taken during the migration and winter periods (Robbins and Dale 1999). It may be seen loosely associating with conspecific species but no cooperative behavior has been observed (Robbins and Dale 1999). More detailed information regarding the ecology and life history of the Sprague's pipit on Fort

Bliss is presented in the GSRC and LTEC (2013) Sprague's Pipit Species Report for Fort Bliss Training Complex.

2.3 Range and Population Estimates

Historically, Sprague's pipits were common throughout their summer breeding range in the northern Great Plains (Coues 1878, Madden et al. 1999). This breeding range has been reduced as a result of habitat conversion from native prairie, principally to agriculture (Jones 2010, Robbins and Dale 1999). Presently, the breeding range for Sprague's pipit includes the northern U.S. states of Minnesota, North Dakota, South Dakota, and Montana, as well as southern portions of the Prairie Provinces of Canada in the states of Alberta, Saskatchewan, and Manitoba (Jones 2010) (see Figure 1-2). It winters across the southern U.S. from southeastern Arizona and southern New Mexico to southern Oklahoma, Texas, Arkansas, and Louisiana (Robbins and Dale 1999, Jones 2010, American Ornithologists Union 1998). In Mexico, the winter range includes northeastern Sonora, Chihuahua, Coahuila, and Nuevo León south to the northern portions of Michoacán, Puebla, and central Veracruz (Howell and Webb 1999, American Ornithologists Union 1998).

Jones (2010) reports a breeding range population estimate of 870,000 Sprague's pipits, using data from the Breeding Bird Survey. However, this was described as a "rough estimate with unknown, but potentially large, error." The highest wintering densities of Sprague's pipit are reported from north-central Texas; there are also indications that southern coastal Texas habitat contains relatively high densities of Sprague's pipit (Jones 2010).

On Fort Bliss, the portions of Otero Mesa south of El Paso Draw and closer to the escarpment edge, consisting of shallow mesas and narrower draws have been sampled insufficiently or not at all. Grasslands within the Tularosa Basin have been formally surveyed in only one or two seasons. These surveys did not coincide with periods when conditions were favorable (nonbreeding seasons following growing seasons with adequate rainfall). Outside of Fort Bliss, survey data (Jones 2010) revealed a density of 4.4 Sprague's pipits per square kilometer in southern Texas, with even higher concentrations in southwest Texas, and up to 11 birds per square kilometer in northern Mexico. Presence of grassland birds varies greatly from season to season depending on habitat conditions.

2.4 Sprague's Pipit Habitat and Distribution on Fort Bliss

Sprague's pipits were first identified on Fort Bliss during bird surveys from 1995 to 2002. Surveys for Sprague's pipit were performed during the non-breeding season beginning in January 2003 through the spring of 2012 and they were detected annually in varying abundance. Abundance of Sprague's pipit was significantly higher in early winter (December) than late winter (January and February). Based on the surveys, Sprague's pipits are most common in El Paso Draw (Figure 2-1) of Otero Mesa. The majority of the suitable habitat on Fort Bliss occurs on the McGregor Range and specifically within Otero Mesa, with smaller areas of suitable habitat occurring on the Dona Ana Range north and south training area. On Fort Bliss, Sprague's pipit has been detected as early as October 17 and as late as April 25. Surveys that were conducted on Fort Bliss, particularly from Otero Mesa on the McGregor Range, indicate a relatively low population density on the McGregor Range of 3.46 Sprague's pipits per square kilometer. However, in suitable habitat, such as open grassland, the mean winter density was 5.56 birds per square kilometer.

The results of the surveys that detected Sprague's pipit on Fort Bliss are presented in detail in GSRC and LTEC (2013) Sprague's Pipit Species Report for Fort Bliss Training Complex. The locations of Sprague's pipit detections and suitable habitat on Fort Bliss are presented in Figure 2-1. Suitable habitat was classified as grassland with less than 10 percent slope, with a general absence of shrubs or woody vegetation (Figure 2-2) (LTEC and Miratek Corp. 2009).

The majority of the Sprague's pipit habitat on Fort Bliss occurs on Otero Mesa, which has expansive native grass communities that are relatively undisturbed and conservatively grazed under a rotation of 18 months with cattle, followed by 6 months rest. However, the duration of the grazing and the number of livestock is adjusted according to climatic and range conditions. Typically, there is an estimated overall average of about 30 percent utilization of blue grama (J. Christensen, pers. comm.). Because blue grama is the most palatable of the common grass species during the year, it is assumed that equal to or less than this proportion of other common grass species is utilized.

Figure 0-3. Sprague's Pipit Sightings on Otero Mesa

Figure 0-4. Sprague's Pipit Habitat on Fort Bliss

There have been no reports of Sprague's pipit in areas where open grasslands are less expansive and isolated by shrublands. Some grassland tracts in the Tularosa Basin measure as large as 2,471 acres (3.9 square miles), but most are significantly smaller. Many of these grasslands occur in various transition or alternate states from historic native grass communities to shrubland communities, having suffered ecological deterioration due to overgrazing, climatic changes, and increases in atmospheric carbon dioxide (Buffington and Herbel 1965, York and Dick-Peddie 1969, Archer et al. 1995, Frederikson et al. 1997, Van Auken 2000, Natural Resources Conservation Service 2011). During grassland bird and Baird's sparrow (*Ammodramus bairdii*) surveys conducted from 1996 through 2004, only one Sprague's pipit was detected in grassland surrounded by shrubs. It was in an open expanse of grassland 3,988 acres in size on the submesa between Otero Mesa and the Tularosa Basin.

Within Otero Mesa, Sprague's pipits were encountered most frequently in El Paso Draw, the broad, relatively flat drainage that dominates the northern portion of the McGregor Range (see Figures 1-2 and 2-1). However, this area received the most intense survey effort, so the high frequency of sightings could be related to increased survey effort and not an actual higher abundance of Sprague's pipit in this area. Surveys were conducted on Otero Mesa south of El Paso Draw and relatively fewer Sprauge's pipits were detected there. The plateaus and hills south of El Paso Draw contain shallow soils with mesa/foothills grass communities. Because of the edaphic properties south of El Paso Draw, grass cover is sparser and shorter. Sprague's pipits were observed by R. Meyer (LTEC) in these areas following wetter growing seasons. In periods with normal or below-average rainfall the grass cover there is relatively sparse compared with El Paso Draw and few Sprague's pipits were observed.

The El Paso Draw exhibits a combination of relatively flat topography, dominance of loamy soils, and more consistent herbaceous cover. Sprague's pipits are generally less common in areas with greater topographic relief and do not appear to inhabit narrow grassland swales bordered by hills on Fort Bliss. In the southern portion of Otero Mesa, where topographic relief is greater, Sprague's pipits were only located on plateaus or hilltops, even though the draws provided greater herbaceous cover. Sprague's pipits were rarely detected in swales with dense cover on Otero Mesa during Baird's sparrow surveys conducted between 1997 and 2002 (TRC Mariah Associates, Inc. 1998, LTEC 2003). Sprague's pipits were not observed in areas heavily impacted by livestock and were not associated with species that prefer shorter vegetation and more bare ground, such as horned lark (*Eremophila alpestris*).

2.5 Conservation Measures

In the U.S., Sprague's pipit is listed as a candidate species under the ESA of 1973, as amended (16 U.S.C. 1531 et seq., USFWS 2013). The New Mexico Department of Game and Fish (NMDGF) considers the Sprague's pipit to be a species of greatest conservation need but has no special legal status (NMDGF 2006). As with all other migratory birds, the Sprague's pipit, their eggs, and active nests, are protected under the Migratory Bird Treaty Act (U.S. House of Representatives 1918).

A conservation plan developed for USFWS (Jones 2010) presents a prioritized list of actions and needs to achieve long-term conservation of Sprague's pipit:

1. Identify essential habitat throughout Sprague's pipit's range.
2. Identify essential winter areas and Sprague's pipit distributions throughout its wintering range.
3. Identify the types and intensity of current threats during the breeding, migration, and wintering seasons.
4. Determine factors limiting Sprague's pipit populations, and the causes of breeding range contractions. Identify the relative importance of factors altering populations during the breeding and wintering seasons. Assess which environmental factors could be limiting Sprague's pipit's population growth, during all seasons.
5. Determine if Sprague's pipits are positively responding to management actions designed for their conservation in local areas.

Though the author acknowledges that little data are available on Sprague's pipit wintering habitat or its management, many of the management strategies described in Jones (2010) for Sprague's pipit breeding habitat are applicable to wintering habitat and were incorporated into Section 3.0 Conservation Goals, and Section 4.0 Management Prescriptions and Actions.

2.6 Threats to Sprague's Pipit Range-Wide

According to Jones (2010), a number of reasons exist that may currently or potentially cause declines in Sprague's pipit populations:

- Habitat loss
- Habitat degradation
- Habitat fragmentation
- Inappropriate land management

- Nest predation and parasitism
- Energy development
- Climate change
- Drought

The primary threat to Sprague's pipit is a reduction of suitable habitat, and large areas of its former range have been destroyed, often through conversion to agriculture (Herkert 1991, Smith 1996, Samson and Knopf 1994, Ricketts et al. 1999). Since Sprague's pipit requires a combination of habitat factors, absence of any one of those factors can make a habitat patch unsuitable. This makes them susceptible to alterations that are less obvious than the complete conversion of grassland to farmland. This smaller-scale, partial habitat conversion leads to habitat fragmentation, which not only reduces the amount of available habitat, but also increases edge and isolation effects (e.g., nest parasitism and nest predation). Also, alterations in fire regimes and species assemblages often allow the encroachment of woody vegetation, which presents visual obstructions to Sprague's pipit. Even if a grassland plant community becomes co-dominated by sparse woody species, this appears to be significantly lower-quality habitat than grassland mostly devoid of woody vegetation (Jones 2010).

Livestock grazing can have both immediate and long-term impacts on grassland bird communities (Bock et al. 1984, Fleischner 1994, Saab et al. 1995, Whitford 1997) and severe grazing can reduce the diversity and abundance of bird communities (Bock and Bock 1988, Desmond 2004). The immediate effects of grazing on grassland birds include reduced vegetation cover and decreased seed availability. Long-term impacts of overgrazing include increased bare ground and lower grass densities, transitions in species composition, increased erosion and soil degradation, and shrub encroachment. Exotic grasses and weed species that colonize overgrazed areas can render large unsuitable acreages of grasslands (Luce and Keinath 2003).

Many native grasslands were historically grazed by wild ungulates, and Sprague's pipit often responds positively to light or moderate grazing in taller grasslands (Dale 1984 and 1992, Kantrud and Kologoski 1982). However, the intense cattle grazing in short grass prairies that occurred in the nineteenth and twentieth centuries in west Texas and New Mexico degraded large areas of habitat. It is the intensity of grazing and the vegetation's ability to cope with it, not simply the presence of grazing, that determines if deleterious or beneficial effects will be realized.

Grassland birds also face potential threats of more volatile, but generally warmer, drier habitat conditions due to climate change (North American Bird Conservation Initiative 2010). Increasing effects of climate change in Chihuahuan Desert grasslands are projected to include generally drier conditions with greater variability and more extreme weather (Parry et al. 2007).

2.7 Threats to Sprague's Pipit on Fort Bliss

The main threat to Sprague's pipit on Fort Bliss is habitat loss and habitat degradation, particularly from fire, overgrazing, and construction of man-made structures. Direct disturbance of Sprague's pipit from Fort Bliss training and readiness activities or recreational activities is also a threat. Grazing intensity and impacts vary across the McGregor Range depending on distance from water, season, recent climate conditions, and grassland community type. Military presence and training activities on Fort Bliss have increased in recent years. Intensified military activities on Fort Bliss can increase the frequency of fires and disturb Sprague's pipit on the installation. Anecdotal evidence suggests that Sprague's pipit requires large parcels of undisturbed native grasslands and avoids roads on Fort Bliss (R. Meyer, LTEC, pers. comm.). The pipit was not found near buildings or maintained roads on the military range. During long term grassland bird monitoring at sites in El Paso Draw, Sprague's pipit was rarely detected in grasslands with even low densities of yucca and taller, substantial shrubs > 1 meters in height, including mesquite and sumac (*Rhus* spp.) (LTEC and GSRC 2011). Like tall woody plants, manmade structures may compromise Sprague's pipit habitat. On the wintering grounds in Texas and Mexico, Sprague's pipits have been observed at infrequently traveled paved or unpaved secondary and tertiary roads with grass shoulders in agricultural settings (Freeman 1999, B. Ortego, pers. comm. in Jones 2010). However, on Fort Bliss the pipit was rarely encountered on two-tracks with only occasional use, unlike other grassland birds including horned lark, longspurs (*Calcarius spp.),* Savannah sparrow (*Passerculus sandwichensis*), and Baird's sparrow (R. Meyer pers. comm. 2014 and James Christensen pers. comm. 2014).

Invasive species may also degrade grassland habitats and threaten Sprague's pipit on Fort Bliss. Grazing by the introduced oryx (*Oryx gazella*) can have similar effects as grazing by cattle, but typically occurs with lower intensity. Invasive plants, such as Russian thistle (*Salsola tragus*), African rue (*Peganum harmala*), and Malta star-thistle (*Centaurea melitensis*) can displace native plant species and alter grassland communities on Fort Bliss. Detailed information regarding the effects of grazing on the McGregor Range can be found in the 2005 McGregor Range Draft Resources Management Plan Amendment and Environmental Impact Statement Report (Bureau of Land Management [BLM] 2005).

CONSERVATION GOALS

The Sprague's pipit conservation plan states that "management for Sprague's pipit consists primarily of protecting, maintaining, and restoring native mixed-grass prairie in large expanses" (Jones 2010). An approach of limiting negative impacts on Sprague's pipit and protecting and maintaining existing grassland habitat is adopted by this ESMP as part of a ecosystem-based conservation approach that will benefit Sprague's pipit and other grassland birds, like the aplomado falcon (*Falco femoralis*) and Baird's sparrow.

Areas of Fort Bliss that are mapped as potential Sprague's pipit habitat contain the following attributes, which were adopted from Jones (2010), Davis (2004), and USFWS (2010) and derived from the aplomado falcon habitat model:

- Presence of grassland-dominated plant community
- Exclusion of shrubland
- Exclusion of areas with greater than 10 percent slopes

Fort Bliss contains approximately 178,417 acres of potentially suitable habitat (see Figure 2-2) for Sprague's pipit; however, the habitat requirements of Sprague's pipit in their winter range, and in the region around Fort Bliss, are generally only described qualitatively and are not well modeled or researched. Given the uncertainties in population size, habitat requirements, and habitat extent, the following conservation goals for Fort Bliss will be adopted as part of this ESMP:

- Maintain existing native grassland on Fort Bliss as a functioning ecosystem and avoid destruction or degradation of potentially suitable Sprague's pipit habitat
- Avoid habitat fragmentation and introduction of visual obstructions within suitable habitat
- Map and monitor the occurrence of Sprague's pipit on Fort Bliss, as well as habitat extent and conditions of grassland and scrubland habitat
- Identify any future mission requirements that necessitate fragmentation or disturbance of areas identified as Sprague's pipit habitat and seek practicable alternatives
- Cooperate with USFWS, the Partners in Flight program, and other organizations to collect data and apply research findings and to assist in research on Sprague's pipit

MANAGEMENT PRESCRIPTIONS AND ACTIONS

An Adaptive Management framework will be implemented in the management of Sprague's pipit on Fort Bliss so that the program can be improved over time and react to changing conditions. Adaptive management is most commonly thought of as a continuous loop of steps, where lessons learned from Step 5 are carried back to Step 1, and the process repeats:

6) Planning - Defining goals and objectives based on existing data and expert opinion
7) Design - Describing objectives in a quantifiable way and developing mathematical models
8) Action - Implementing management actions
9) Monitoring - Collecting data to evaluate if goals and objectives are being achieved
10) Evaluation - Analyzing data and examining the effects of monitoring actions to return to Step 1 and refine models in Step 2

On Fort Bliss, the results of Sprague's pipit surveys that map habitat occupancy will be used to make informed decisions about where construction of man-made structures will not be implemented so that impacts on Sprague's pipits are avoided. An Adaptive Management approach will also incorporate the results of surveys for other grassland bird species and vegetation surveys, as maintenance of native grasslands is a goal of this ESMP.

Adaptive Management will consider other planning efforts, such as National Environmental Policy Act review of proposed projects, a fire management plan, an invasive species management plan, and an integrated pest management plan, so that the goals and objectives in this ESMP can be incorporated into them. Management goals and objectives for Sprague's pipit on Fort Bliss generally target the main threat to the species, destruction, and degradation of habitat. Habitat on Fort Bliss is primarily threatened by fire, overgrazing, fragmentation, and impacts from human use.

Fire is a potential threat in that untimely fire and unnatural fire regimes caused by Fort Bliss activities may be detrimental to grassland bird habitat. Fire during drought conditions can increase stress to plants and result in grass mortality. Negative effects can be exacerbated with concurrent livestock grazing, particularly on slopes and soils sensitive to disturbance. Frequent fires may also cause grass mortality and changes in species composition. Currently, Fort Bliss has restrictions on ammunition and other ignition sources based on fire danger ratings. Mitigations are incorporated during the times of highest fire dangers. In addition, fire breaks have been created and firebreak roads have been designated and bladed to support prescribed burns designated to protect grassland habitats (U.S. Army 2014).

Prescribed fire can benefit grasslands and the species that depend on them; however, the timing, intensity, and location of prescribed fire must be selected to minimize negative impacts on Sprague's pipit. Any fire prevention or management plans for Fort Bliss should consider the conservation of Sprague's pipit and identify occupied habitat where fire could negatively impact the species.

Currently, human presence is mainly related to livestock care (water line and water storage maintenance, moving cattle) and Fort Bliss activities. Military presence is mainly associated with the Centennial Bombing Range. Levels of ground maneuvers have intensified in recent years on Otero Mesa at the periphery of the open grassland that is Sprague's pipit habitat. Increased off-road travel in open grasslands has accompanied the training exercises.

Disturbance that is short in duration but that might prevent natural foraging behavior should be avoided in areas known to contain Sprague's pipits. However, since Sprague's pipits show little site fidelity between seasons but are often detected in the same area within a season, adopting a previous season's territories as exclusion zones for human activity is not necessarily an effective approach. Instead, the results of ongoing bird surveys should be provided to persons planning activities in potential Sprague's pipit habitat so that certain areas can be avoided. When considering ground maneuvers or other activities that involve human presence, Fort Bliss will adopt 750 feet as the distance out to which impacts on Sprague's pipit extend. Fort Bliss currently implements limited use areas (LUAs) that protect grasslands, arroyos, and riparian areas of a certain size. LUAs are designated areas where only foot traffic is permitted; vehicle and ground disturbance is not allowed in these areas. A detailed map showing existing LUAs and off-limits areas on Fort Bliss is provided in the 2010 Final Grow and Force Environmental Impact Statement (U.S. Army 2010).

Sprague's pipit surveys will continue to be conducted annually, along with commensal bird species such as Baird's sparrow, and are described in Section 5.0 Monitoring. Vegetation surveys that map potential habitat and note encroachment of invasive plant species will also be conducted. As data on vegetation cover and type on Fort Bliss are amassed, the maps of potential Sprague's pipit habitat will be updated. Fort Bliss will update the Sprague's pipit ESMP every 5 years, incorporating new research findings about the species, new data specific to Fort Bliss, and any major changes to the Fort Bliss mission that might impact grassland habitats.

During the 5-year updates to the ESMP, monitoring data will be analyzed to assess limiting factors, determine the impacts of management actions and fire, and select new management projects or actions in an Adaptive Management framework.

MONITORING

The purpose of monitoring is to assess the population size and status of Sprague's pipit on Fort Bliss, the extent of potential and occupied habitat, and the impacts of management actions like prescribed burning.

Fort Bliss will continue annual surveys to monitor the location, presence, and abundance of Sprague's pipit on the installation. It is likely that this effort will be combined with monitoring of other grassland bird species. Monitoring surveys will follow the protocol established during the baseline studies described by Meyer (1997) and will occur in early winter (November 15 to December 31), late winter (January 1 and February 15), and early spring (March 10 to April 10). If possible, surveys for grassland birds will be conducted across all potential habitats and should include areas receiving different levels of grazing pressure and human activity. Monitoring for grassland birds will also occur for 5 years following fire in grassland or shrubland patches.

Fort Bliss will conduct assessments of the quality and extent of potential Sprague's pipit habitat on the installation and the data will be assessed annually and compiled and compared with previous years to attempt to assess trends and changes in habitat. During each review of the ESMP, any significant declines in abundance of Sprague's pipit or in habitat quantity and quality will trigger a review and possible implementation of management actions to halt such declines. For example, if grassland habitat is declining due to encroachment by shrubs, a program of prescribed burning can be implemented to limit the growth of woody vegetation and maintain or restore Sprague's pipit habitat. To gain a full understanding of Sprague's pipit's presence and habitat use of Fort Bliss, all potential habitats should be surveyed during multiple seasons under various habitat conditions.

COSTS AND PERSONNEL

The initial planning and funding period for the implementation of this ESMP is 5 years. Projected annual costs are shown in Table 6-1 and include costs for a Senior Biologist and a Staff Biologist based on 2013 contractor rates. The required resources, such as paper, computers and software, and a field vehicle are not included here because they are absorbed by the contractor's rates. The initial implementation of the ESMP includes coordination with existing plans, such as an Integrated Natural Resources Management Plan (INRMP), Integrated Wildland Fire Management Plan (IWFMP), infrastructure development plans, BLM grazing plans, and coordination with training and recreational use. However, coordination with training and recreational use will occur each year because they may vary between years.

Table 0-4. Projected Annual Costs of Implementation of ESMP and Sprague's Pipit Monitoring

Activity	Cost 2015	Cost 2016	Cost 2017	Cost 2018	Cost 2019
Initial ESMP Implementation (including coordination with INRMP, IWFMP, invasive species management plan, infrastructure development plans)	$10,000	0	0	0	0
Coordinate with Training and Recreation Activities	0	$10,000	$10,400	$10,816	$11,248
Bird and Habitat Surveys	$40,000	$41,600	$43,264	$44,994	$46,794
Report Locations of Sprague's pipit	$5,000	$5,200	$5,408	$5,624	$5,849
TOTAL	**$55,000**	**$56,800**	**$59,072**	**$61,434**	**$63,891**

CHECKLIST

The following checklist (Table 7-1) is designed to help Fort Bliss natural resources managers ensure that all necessary aspects of the ESMP are implemented and updated as needed and reviewed annually during the life of the plan. The activities are drawn from Sections 4.0 and 5.0 of this ESMP. Activities scheduled to occur annually are not included in the cost projections in this ESMP because they will occur after the 5-year life of this plan; however, they are included in the checklist to cue natural resources managers to reinitiate endangered species management planning efforts for Sprague's pipit.

Table 7-5. Checklist

Schedule	Activity	Date	Signature
2015	Implement ESMP and coordinate with existing plans (e.g., IRNMP, IWFMP, Master Plan, Annual Training Plan, invasive species management plan).		
2015	Incorporate Sprague's pipit habitat maps into fire prevention/management plan (every 5 years).		
Annually, beginning in 2015	Avoid habitat fragmentation by coordinating conservation with infrastructure planning efforts during ESMP implementation. If patches of potential habitat are planned for development or fragmentation, seek practicable alternatives.		
Annually	Continue annual surveys and habitat monitoring.		
Annually	Re-assess extent and state of potential habitat on Fort Bliss.		
Annually	Examine survey data for trends in population size or habitat extent, effects of fire, and limiting factors.		
Annually	Update ESMP for Sprague's pipit.		

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3. Endangered Species Management Plan for the Bald Eagle (*Haliaeetus leucocephalus*)

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Endangered Species Management Plan for the Bald Eagle (*Haliaeetus leucocephalus*)

Fort Bliss, Texas

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ACRONYMS/ABBREVIATIONS

AR	Army Regulation
DDT	Dichloro-diphenyltrichloroethane
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
ESMG	Endangered Species Management Guidelines
ESMP	Endangered Species Management Plan
USFWS	U.S. Fish and Wildlife Service
HQDA	Headquarters, Department of the Army
MACOM	Major Army Command
NF	National Forest
NGPC	Nebraska Game and Parks Commission
NMDGF	New Mexico Department of Game and Fish
T&E	Threatened and Endangered

EXECUTIVE SUMMARY

Background: Army regulation (AR 200-3) requires the preparation of Endangered Species Management Plans for listed and proposed listed T&E species and critical habitat present on the installation. All Army lands are subject to this regulation. Compliance with Chapter 11 of AR 200-3 involves coordination with other Federal agencies responsible for the protection of these species. Failure to implement this management plan can lead to violation of the ESA and result in the costly disruption of military operations. This plan was developed following guidelines set in the "Manual for the preparation of installation Endangered species management plans" (Science Applications International Corporation 1995).

Current Species Status: The bald eagle (*Haliaeetus leucocephalus*) was recently downlisted from endangered to threatened by the U.S. Fish and Wildlife Service (USFWS) (Federal Register, 12 July 1995) under the authority of the ESA. Currently, the species is also listed as threatened in the states of Texas and New Mexico. Surveys have confirmed the presence of bald eagles on Fort Bliss from the last week in November through the first week in March with the highest number of observations occurring during January and February (Tafanelli et al. 1996).

Habitat Requirements and Limiting Factors: Bald eagles usually breed in undisturbed coastal regions, near inland lake shores, or rivers where there are large, tall trees for nesting and roosting (AOU 1983). Breeding bald eagles usually require nearby wetland areas with clean water for foraging and prefer to nest in quiet, isolated areas. Fish are the bald eagles' primary food (NGPC 1997).

Bald eagles are not so habitat specific on their wintering grounds. In some areas they winter near open water (Southern 1963, Steenhof et al. 1980) and in other wintering areas they have no association with water (Platt 1976, Grubb and Kennedy 1982). Eagles use communal roost sites on their wintering grounds and may use the same roost for several years (Steenhof 1978). Bald eagles are sensitive to disturbance in their roosting and foraging areas (Stalmaster and Newman 1978, Steenhof 1978).

Bald eagles utilize the northeastern portions of McGregor Range during the winter months (Tafanelli et al. 1996). These eagles are not associated with bodies of water. Deer and cattle carrion appear to be their primary food source. There are no documented bald eagle roost sites on Fort Bliss. However, there is a bald eagle roost site in the Lincoln National Forest (NF) less than 8 km north of Fort Bliss.

Management Objectives: Management actions will be coordinated with land users the Lincoln NF, the Bureau of Land Management (BLM), and the USFWS to maintain bald eagle foraging areas and limit disturbance in those areas, especially during the winter months. Management will be implemented for as long as the species remains listed.

Conservation Goals:

1) Maintain wintering habitat. This will proceed from maintenance of ecosystem integrity, which will result in maintenance of a diverse prey base.

2) Insure that military training impacts remain minimal in the Sacramento foothills.

3) Cooperate with the USFWS, and other agencies to achieve recovery goals set forth in the USFWS bald eagle Recovery Plan (USFWS 1982).

4) Coordinate with the BLM and the Lincoln NF in habitat management actions which would benefit eagles.

Actions Needed: The major steps needed to satisfy management objectives and achieve conservation goals are:

1) Monitor the presence of eagles at the roost the site on a monthly basis during the cold season.

2). Fort Bliss will monitor training plans in the Sacramento foothills to ensure impacts remain minimal. Current training there is limited to foot traffic, on-road travel, and these lands are safety buffer zones for other training activities.

3) Configure potential firewood cutting areas to improve foraging habitat and minimize eagle disturbance.

4) Participate in educating land users about the need to protect T&E species and their habitat on Fort Bliss.

1.0 INTRODUCTION

The purposes of ESMP for the bald eagle (*Haliaeetus leucocephalus*) are: 1) to present information on the bald eagle, a federally listed species present on Fort Bliss; 2) to discuss the threats it faces on the installation; 3) to define conservation goals; 4) and to outline a plan for the management of the species and its habitat that will enable the achievement of conservation goals. Costs of the conservation effort and impacts to other installation activities will also be discussed.

The bald eagles are a large, soaring raptor that feed primarily on fish but are opportunistic and will eat a variety of live prey and carrion. Eagles build large stick nests, usually in tall trees located near open water. The species was once common throughout the U.S. but began experiencing noticeable declines by the 1940's due primarily to pesticide-induced reproductive failure and the loss and degradation of riparian habitat. Human disturbance including shooting, poisoning, and trapping also contributed to the decline of this species.

Drastic population declines were the reason for listing the species as endangered. However, restrictions on the use of DDT, restrictions on the use of lead shot for waterfowl hunting, legal protection of individuals and their habitat, and intensive management have resulted in increasing numbers of breeding bald eagles throughout most of the U.S. (NMDGF 1997). In fact, numbers increased enough that in July 1995, under authority of the ESA, the USFWS reclassified the bald eagle from endangered to threatened (Federal Register, 12 July 1995). Despite this recent population growth, bald eagle populations could suffer declines again in the future without continued management of the species and its habitat.

This ESMP is based on and is consistent with the following law, regulation, and guidelines: ESA; Army Regulation (AR) 200-3; Headquarters, Department of the Army Endangered Species Management Guidelines (HQDA ESMG's) for the bald eagle; and the USFWS southwestern bald eagle Recovery Plan (USFWS 1982). This plan was developed following guidelines set in the "Manual for the preparation of installation Endangered species management plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

<u>Description</u> - The bald eagle is a large soaring bird with a 6.5 to 8.0 foot wingspan. The white head, neck, and tail make adults unmistakable. The bill of the adult is yellow and much heavier than that of the Golden eagle (*Aquila chrysaetos*). Legs of adult bald eagles are feathered halfway down the tarsus while Golden eagles have feathers covering the entire leg. Bald eagles fly with deep strokes and soar with wings flattened. Immatures are dark, mottled irregularly with white until their fourth or fifth year. Immature bald eagles have some white wing linning feathers whereas immature golden eagles have white patches at the base of inner primary flight feathers.

The bald eagle was listed as endangered by the USFWS in 1978 (Federal Register, 14 February 1978). However, as a result of increasing numbers of eagles in recent years, the USFWS downlisted the species from endangered to threatened in 1995 (Federal Register, 12 July 1995). In the spring of 1998 Secretary of Interior Babbitt included the bald eagle as one of several species to be downlisted or delisted (U. S. Interior 1998). More detailed descriptions of the species are provided by Palmer (1988) and Johnsgard (1990).

Distribution - Bald eagles are found throughout North America from the Gulf of Mexico to the Arctic. They are usually found in coastal areas, or near inland lakes, and rivers. The largest breeding populations of bald eagles are found in southern Alaska, along the western coast of Canada and Washington, around the Great Lakes, and in Florida (USFWS 1982). Nests are usually constructed in dominant or codominant trees located 3 km or less from open water. Bald eagles winter along major rivers, reservoirs, or in areas where carrion is available. At the present time, there are no known bald eagle nests on Fort Bliss. The closest known nests are located near reservoirs along the Rio Grande river in southern New Mexico, approximately 60 miles away.

Habitat / Ecosystem - Bald eagles usually breed in undisturbed coastal regions, or near inland lake shores, or rivers where there are large, tall trees for nesting and roosting (AOU 1983). Breeding bald eagles usually require nearby wetland areas for foraging and prefer to nest in quiet, isolated areas where the water is clean. Quality breeding habitat must provide an abundant supply of fish, the primary food for nesting bald eagles.

Bald eagles are not so habitat specific on their wintering grounds. In some areas they winter near open water (Southern 1963, Steenhof et al. 1980) and in other wintering areas they have no association with water (Platt 1976, Grubb and Kennedy 1982). Eagles use communal roost sites on their wintering grounds and may use the same roost for several years (Steenhof 1978). Steenhof (1978) found that roost sites provided protection from the wind and were located in close proximity to their food source. However, eagles that winter away from open water are highly mobile and will travel long distances to locate food (Griffin and Baskett 1985). Fish are the major component of the winter diet in many areas but wintering bald eagles are very opportunistic and will feed on available waterfowl, rabbits, rodents, snakes, and carrion (Steenhof 1978, Grubb and Kennedy 1982).

Surveys were conducted on Fort Bliss during the winters of 1994-1995, 1995-1996, and 1996-1997 to confirm the presence and locations of bald eagles on the installation (Tafanelli et al. 1996, U. S. Army 1998). Another objective of the surveys was to obtain information regarding how frequently they were using the installation. These surveys confirmed the presence of bald eagles in the foothills of the Sacramento Mountains on the northeastern portion of McGregor Range. Eagles were observed using the installation from late November through early March with the highest number of observations occurring in January and February (Tafanelli et al. 1996, U. S. Army 1998). However, there are no known bald eagle roost sites on Fort Bliss. The closest known roost sites are located in the Lincoln NF, approximately 8 km north of the Fort Bliss boundary. The eagles that have been observed on Fort Bliss lands are apparently from the Lincoln NF roost. Bald eagles wintering in the Lincoln NF are not associated with bodies of water, deer and cattle carrion apparently make up an important portion of the species diet. Jackrabbits, cottontails, and other small mammals may also be components of the diet (Tafanelli et al. 1996).

Life History / Ecology - Adult bald eagles are territorial breeders that mate for life. Females lay one clutch of two to three eggs per year in a large stick nest constructed on a cliff or in a tall tree near open water. Adults incubate for 35 days before eggs hatch. After spending up to 90 days in the nest, two young usually fledge and then may have a 30-45 day post-fledging dependency period before dispersal (USFWS 1982). Young eagles do not reach sexual maturity until their fourth or fifth year. Individuals are migratory throughout much of the species' range, moving south during the winter months to find open water.

Reasons for Listing - Population declines of the bald eagle resulted primarily from pesticide induced reproductive failure and the loss and degradation of riparian habitat that the species relies on for breeding. Human disturbance, including shooting, poisoning, and trapping, have also contributed to the decline of this species. Habitat alteration, including logging, nest disturbance and destruction, and environmental contaminants seem to be the most significant threats to the species at the present time (USFWS 1995).

Conservation Measures - A major obstacle to the recovery of this species was removed when the U.S. Government placed restrictions on the use of DDT in the early 1970's. In addition, the USFWS placed the bald eagle on its Endangered Species list and has developed and is implementing a Recovery Plan for the species (USFWS 1982). The plan calls for the protection the species as well as protection of areas used by bald eagles. Together these actions and regulations have played a major role in the recovery efforts.

3.0 CONSERVATION GOALS

1) Maintain wintering habitat. This will proceed from maintenance of ecosystem integrity, which will result in maintenance of a diverse prey base.

2) Insure that military training impacts remain minimal in the Sacramento foothills, particularly during the winter.

3) Cooperate with the USFWS and other agencies to achieve recovery goals set forth in the USFWS bald eagle Recovery Plan (USFWS 1982).

4) Coordinate with the Lincoln NF and the BLM in habitat management actions which would benefit eagles.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The major steps needed to satisfy management objectives and achieve conservation goals are:

1) Annually monitor the presence or absence of eagles on the installation by monitoring use of the roost site. This activity will be coordinated with the Lincoln NF.

2) Current training is limited to foot traffic, on-road travel, and as safety zone for missiles. Ft. Bliss will monitor training plans for the Sacramento foothills, to ensure impacts remains minimal, and try to re-locate any activities, which may degrade the habitat.

3) Configure potential firewood cutting areas to improve foraging habitat and minimize eagle disturbance.

4) Participate in educating land users about the need to protect T&E species and their habitat on Fort Bliss.

5) Consultation under the ESA will occur on any specific action that may affect bald eagles.

5.0 MONITORING PLAN

Fort Bliss DOE staff will cooperate with the US Forest Service to monitor eagle occupancy of the roost site in the Lincoln NF as a reflection of eagles foraging on Army lands.

All data from surveys and monitoring efforts will be maintained permanently by the DOE, Conservation Division personnel at Fort Bliss. Maps depicting survey routes and the location of bald eagle observations will be developed from survey data and made available to land users on a need to know basis. These maps will be incorporated into the installations GIS databases.

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4. Species of Concern Management Plan for the Alamo Beardtongue (*Penstemon alamosensis*)

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Species of Special Concern Management Plan for the Alamo Beardtongue (*Penstemon alamosensis*)

Fort Bliss, Texas and New Mexico

Prepared by

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ACRONYMS/ABBREVIATIONS

ABT	Alamo beardtongue
AR	Army regulation
DOD	Department of Defense
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
SSCMP	Species of Special Concern Management Plan
USFS	U. S. Forest Service
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation (AR) 200-3 encourages installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA) which could result in the costly disruption of military operations. This SSCMP was developed following guidelines set in “Manual for the Preparation of Installation Endangered Species Management Plans” (Science Applications International Corporation 1995).

Current Species Status: The alamo beardtongue (ABT) (*Penstemon alamosensis* Penn and Nisbet) is a species of special concern for Fort Bliss. It is listed in the state of New Mexico as a species of concern. Two populations exist in the Hueco Mountains in the South Training Areas of Fort Bliss. Other populations are found outside the installation in the Sacramento Mountains (Otero County, New Mexico), the Alamo Hueco Mountains (Hidalgo County, New Mexico), the San Andres Mountains (Doña Ana County, New Mexico), and in northern Chihuahua, Mexico.

Habitat Requirements and Limiting Factors: Habitat requirements for the ABT include a limestone substrate and relatively mesic conditions. These requirements are provided by north facing or narrow canyon systems of limestone hills or mountains. Threats to the species include exercises that utilize the cliff face (repelling or rock climbing) and the arroyos (vehicular traffic in an arroyo bed) as well as damage from unauthorized trespass.

Management Objectives: The installation’s objective for ABT is to monitor and protect the known populations in the South Training Areas.

Conservation Goals:
1) The installation’s goal is to maintain the known population at the current level.
2) Locate and protect any additional populations in potential habitat in canyon systems of the Otero Mesa escarpment and in the foothills of the Sacramento Mountains.

Actions Needed: The major steps needed to satisfy management objectives to achieve population goals for ABT are :

1) Canyon systems where the plant is found are sensitive to maneuvers that utilize the cliff face. Also individuals found in arroyo bottoms are sensitive to vehicle maneuvers through the arroyos where they are found.
2) Exclusion of recreation from these sensitive areas is advisable. The canyon systems from which the ABT is known, also contain populations of the Hueco rock daisy (*Perityle huecoensis*), a rare endemic species of special concern for Fort Bliss, as well as many important archeological sites.

3) Monitoring of the known population of ABT should be performed yearly to determine population demographic trends.
4) Other areas of potential ABT habitat should be surveyed for populations of ABT.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the alamo beardtongue (ABT) (*Penstemon alamosensis* Penn and Nisbet), a sensitive species in New Mexico, and a species of special concern for Fort Bliss; (2) to discuss the threats that ABT faces on Fort Bliss; (3) to define ABT conservation goals; and (4) to outline a plan for management of ABT and its habitat that will enable the conservation goals.

ABT is a perennial plant that lives in canyons and the associated arroyos. Populations of ABT are found on the installation in two mesic canyon systems of the Hueco Mountains. It is found in association with another species of special concern, Hueco rock daisy (*Perityle huecoensis*). The specific habitat needs of ABT contributes to the small population size and it is this small population size that warrants the attention of Fort Bliss.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in “Manual for the Preparation of Installation Endangered Species Management Plans” (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - ABT is a grey-green to green perennial herb. Leaves are green before most other species in the spring. Stems are solitary or few and 30 to 100 cm tall. Basal leaves are elliptic or broadly lance shaped, stem leaves are smaller and lance shaped. Flowers are bright red and all borne on a long narrow inflorescence in clusters of one to four flowers (usually two), corollas are to 25 mm long and funnel shaped (New Mexico Native Plant Protection Advisory Group 1983). A more formal definition of the species can be found in (Nisbet and Jackson 1960).

There are two other species of the *Penstemon* genus that co-occur with ABT. *Penstemon cardinalis* is distinguished by a slight constriction around the mouth of the corolla; the tube is broadest just behind the mouth, where the corolla of the ABT is broadest at the mouth. *P. barbatus* has longer corollas, and the upper-lip is extended forward like a visor, and the lower lip sharply bent downward (New Mexico Native Plant Protection Advisory Group 1983). From a distance ABT also resembles the henry sage (*Salvia henryi*), both species bloom at approximately the same time. Both species inflorescence is a spike of red tubular flowers. The leaves of the henry sage, however, are dentate and usually lobed, whereas the ABT has leaves that are neither dentate nor lobed.

Both Worthington (1991) and New Mexico Native Plant Protection Advisory Committee (1983) note that it is likely that ABT will be synonymized with *Penstemon havardii*, a species with broader distribution, when the Flora of the Chihuahuan Desert is published. This work is in the manuscript stage.

Distribution - ABT is found in four mountain ranges in the United States. These ranges are the Sacramento Mountains (Otero County, New Mexico), Alamo Hueco Mountains (Hidalgo County, New Mexico), San Andres Mountains (Doña County, New Mexico), and the Hueco Mountains of

Fort Bliss (El Paso County, Texas). The species also occurs in northern Chihuahua, Mexico. The current distribution of the ABT is the same as its historic distribution.

ABT is part of a canyon flora, in the mountains of the northern Chihuahuan Desert that possibly had broader and more continuous distribution when the climate in the area was cooler and wetter. There are many examples of plants that are endemic to certain mountain ranges in the area, because of the hotter and drier conditions present in the Holocene. The canyon systems provide a refugium for these species from the more extreme climatic conditions (Worthington 1991, Van Devender and Riskind 1979).

<u>Habitat/Ecosystem</u> - ABT is found in gravely arroyos at the bottoms of canyon systems, as well as at the bases of cliffs and on the cliff faces themselves. In the cliff face and cliff bases areas they co-occur with rock daisy (*P. huecoensis*), goldstar (*Heterotheca fulcrata*.), prickly pear (*Opuntia* spp.), wright silktassel (*Garraya wrightii*), mormon tea (*Ephedra trifurca*), lechugilla (*Agave lechugilla*), sotol (*Dasylirion wheeleri*), and banana yucca (*Yucca baccata*). In the arroyo and canyon bottoms habitat they are found along with apache plume (*Fallugia paradoxa*).

<u>Life History/Ecology</u> - ABT is a perennial herb that is one of the first species to put on new leaves in the spring. ABT is known to bloom from April to June (New Mexico Native Plant Advisory Committee 1983). Pollinators are believed to be hummingbirds.

<u>Reasons for Special Concern</u> - ABT is of special concern to Fort Bliss due to its limited distribution and small population. Threats to the population in the Hueco Mountains include utilization of the canyons, where ABT is found, by wheeled and tracked vehicles.

<u>Conservation Measures</u> - ABT is L2 species in New Mexico, meaning that its is a rare plant, and has a very restricted distribution and low population numbers. A R-E-D code of 2-1-2 was assigned to the plant. This code means that the occurrence is confined to several populations, is not endangered, and is rare outside of New Mexico. ABT has also been listed as United States Forest Service (USFS) Sensitive meaning that the USFS considers the species rare and sensitive to land use practices within National Forests (Sivinski and Lightfoot 1995).

In January of 1995 a memorandum from the Directorate of Environment - Cultural and Natural Resources Division (DOE-C), was submitted to the 1st Combined Arms Support Battalion requesting to restrict access to critical areas in the Hueco Mountains in order to protect the cultural resources and sensitive plant species that occur there (Landreth 1995). DOE-C personnel will coordinate conservation efforts with the USFWS during 1998.

In 1991 a survey for ABT (as well as the Hueco rock daisy) was conducted in the limestone hills that are an extension of the Hueco Mountains on Fort Bliss. Two canyons were found to hold populations of ABT (Worthington 1991). A more extensive survey for ABT was completed in 1997 abd 1998 (U. S. Army 1998)

3.0 CONSERVATION GOALS

1. The installation goal is to maintain the populations found in the two canyons in the Hueco Mountains that ABT is currently known from.

2. Locate and protect any additional populations in potential habitat in canyon systems of the Otero Mesa escarpment and in the foothills of the Sacramento Mountains.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The lack of impacts to HRD populations caused by Fort Bliss's missions make the suggestions for management for HRD of two types: 1) monitoring the known populations and 2) coordinating conservation efforts with USFWS to reduce the potential for the listing of the HRD.

5.0 MONITORING PLAN

Permanent plots established in 1997 and 1998 (U. S. Army 1998) will be monitored yearly to determine population trends. Species occurrence locations (Global-positioning system generated) and other species data will be incorporated into the DOE-C's databases. The species taxonomic and legal status will also be monitored during this time and Fort Bliss DOE-C personnel will coordinate conservation efforts with the USFWS. Projected activities for this plan are outlined in Tables 2 and 3 below.

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5. Species of Special Concern Management Plan for the Organ Mountain Evening Primrose (*Oenothera organensis*)

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Species of Special Concern Management Plan for the Organ Mountain Evening Primrose (*Oenothera organensis*)

Fort Bliss, Texas and New Mexico

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
BLM	U.S. Bureau of Land Management
DOE	Fort Bliss Directorate of Environment
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
NMNHP	New Mexico Natural Heritage Program
OMEP	Organ Mountain Evening Primrose
SSCMP	Species of Special Concern Management Plan
WSMR	White Sands Missile Range
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army Regulation (AR) 200-3 encourage installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Department of Interior Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA), which could result in the costly disruption of military operations. This Species of Special Concern Management Plan (SSCMP) was developed following guidelines set in “Manual for the Preparation of Installation Endangered Species Management Plans” (Science Applications International Corporation 1995).

Current Species Status: The Organ Mountain evening primrose (OMEP) (*Oenothera organensis* Munz) was previously listed as C2 species and is now considered a species of special concern for Fort Bliss. It is also a state species of concern in New Mexico. The species is restricted to the Organ Mountains in Doña Ana County, New Mexico. Its range extends from Soledad Canyon in the south to the Needles in the North. Global abundance of the species is estimated at 2,300 individuals and approximately 1380 of those individuals are found on Fort Bliss. Other individuals are found on U.S. Department of Interior Bureau of Land Management (BLM) land, White Sands Missile Range (WSMR), and private land. OEMP is susceptible to damage caused by trespass hikers and cattle. Development of the springs of the Organ Mountains could cause the disappearance of surface water that the OEMP depends on, resulting in the extirpation of various populations.

Habitat Requirements and Limiting Factors: Because OMEP requires very moist conditions (preferably associated with surface water), it is limited to the spring areas in the Organ Mountains.

Management Objectives: Management will be focused on the maintenance of the populations on the installation. Fort Bliss should coordinate with the BLM to avoid the trespass of cattle and people from the BLM lands onto the military areas in the Organ Mountains.

Conservation Goals:
1) Maintain the habitat of OMEP in the wet canyon bottoms of the Organ Mountains.
2) Maintain the populations of OMEP that are currently found on the installation.

Actions Needed: The major steps needed to satisfy management objectives and achieve conservation goals are as follows:
1) Continue monitoring permanent plots at intense enough levels to detect major shifts in the population size of OMEP.
2) Coordinate with the Las Cruces office of the BLM to prevent trespass livestock from entering the installation at Fillmore and Soledad Canyons.

3) Develop a fire management plan for the Organ Mountains that will consider the ecological requirements of the rare and endemic species of the mountains.
4) Restrict the development of the spring areas of the Organ Mountains.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the OMEP, a New Mexico listed sensitive species and species of special concern for Fort Bliss; (2) to discuss the threats that OMEP faces on Fort Bliss; (3) to define the conservation goals; and (4) to outline a plan for management of OMEP and its habitat that will enable the conservation goals.

The OMEP is an herbaceous half-shrub (to 60 cm tall) that lives in the areas around seeps, creeks, or pools in canyons of the Organ Mountains. The species is narrowly endemic to the Organ Mountains. Land owners of OMEP habitat include the BLM, private citizens, WSMR and Fort Bliss. Approximately sixty percent of the global population of OMEP is found on Fort Bliss. The population is small due to the very specific habitat needs of OMEP, which are a consequence of the historical climate changes in southern New Mexico. It is the small sized nature of the population that warrants the attention of Fort Bliss for special concern that the species not to be listed by the USFWS.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in “Manual for the Preparation of Installation Endangered Species Management Plans” (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - The OMEP is a perennial herbaceous multi-stemmed plant that forms clumps that are 100 to 150 cm in diameter and up to 60 cm tall. Stems are rather woody, mostly greenish, hairy, spreading, and branched. Old stems are characterized by an exfoliating epidermis. Basal leaves are up to 15 cm long, arranged in a rosette, elliptic to lanceolate in shape, and toothed on the far edge of the leaf. The cauline (attached to the stem) leaves are lanceolate with crisped margins. Flowers are yellow and consist of four petals (3.5 to 5 cm long) attached to a tube 10 to 19 cm long. Fruit is a cylindrical capsule that is slightly enlarged at the tip, obtusely four angled, 3 to 4 cm long, and about 4 mm thick (Worthington 1981). A more technical description of the species can be found in Munz (1965).

The OMEP is suitably different from other evening primroses and other plants found in the area.

OMEP is not currently a federal listed species but is listed in New Mexico as L2, meaning that the plant is considered rare because of restricted distribution or low numerical density (Sivinski and Lightfoot 1995).

Distribution - OMEP is currently distributed throughout its historic range. This range is the area of the Organ Mountains (Doña Ana County, New Mexico) between Soledad Canyon and the Organ Needles. Currently the entire range of OMEP is covered by land owned by Fort Bliss, WSMR, BLM, and private citizens. OMEP has been found at Ice, Arroyo Salado, Rock Springs, Rucker, Texas, Beasley, Fillmore, Maple, North, Bar, Pete Johnson, and Soledad canyons as well as at the Narrows, Indian Hollow, and Sugarloaf Peak (DeBruin et al 1994

As a note Spellenberg (1978) suggests that OMEP has differentiated from a wider-ranging species of a time when the southwest had a wetter climate. So the distribution of OMEP is very restricted. This restriction is considered to be natural, caused by the change in the climate of the area.

<u>Habitat/Ecosystem</u> - OMEP is restricted to mesic canyon bottoms at elevations of 1700 to 2280 meters. It is found growing in the gravel and rocks that surround the edge of streams, pools, and seeps (Skaggs 1992).

<u>Life History/Ecology</u> - OMEP is a perennial half-shrub with the above ground growth dying back each winter to a perennial root stock. It can be found in bloom from July to September. Plants are self-incompatible and are pollinated by strong-flying hawk-moths (*Hyles lineata, Manduca quinquemaculata, and Sphinx chersis*) (Levin et al 1979). Deer are thought to play an important part in the dispersal of the species. OMEP provides browse for deer, and inadvertently seeds get ingested along with leaves and shoots. Approximately 25% of seeds survive passage through the digestive track of a deer. Thus deer act as a dispersal mechanism between topographically separated colonies. Bird dispersal is unlikely because the OMEP seed is small and did not survive experimental treatments through the digestive tracks of birds. Small mammal dispersal is unlikely due to the small home ranges of animals (Ritter personal communication). However, clonal growth is probably more responsible for the majority of ramets (individuals) (Ladyman personal communication).

<u>Reasons for Listing</u> - OMEP is not a federally listed species; it was considered a candidate species (C2) for listing under previous laws and is now a species of special concern for Fort Bliss. OMEP is L2 species in New Mexico, meaning that its is a rare plant and has a very restricted distribution and low population numbers. A R-E-D code of 2-1-3 was assigned to the plant. This code means that the occurrence is confined to one extended population, is not endangered, and is endemic to New Mexico (Sivinski and Lightfoot 1995). OMEP is a species of special concern at Fort Bliss due to the fact that it is a very narrow endemic and the majority of the range of OMEP is situated on Fort Bliss land.

The canyons inhabited by OMEP can be impacted by a number of disturbances. They are susceptible to catastrophic floods that could wipe out an entire stand as has been documented by Skaggs (1992). Droughts also could have an effect on the species by eliminating the marginal populations (Worthington 1981). Recreational use of the Organs has been historically high and is increasing, both authorized (on BLM land) and unauthorized (through "social trails" on Fort Bliss land). This recreational use of the Organs is concentrated in the riparian areas where OMEP is found. It is unknown what effect increased usage will have (Skaggs 1992). Trespass livestock in Soledad and Fillmore Canyons cause damage in those areas by compacting the soil and trampling plants. Soil compaction affects OMEP by changing the hydrological regime, which is a major threat to the species (The Nature Conservancy of New Mexico 1996). Other changes in the hydrologic regime by new wells or diversion of the springs or runoff water would endanger the plants due to its dependence on surface water (DeBruin et al 1994).

Conservation Measures - A review in 1978 done for the BLM (Spellenberg 1978) suggested that even though there are several eminent threats to OMEP, the species is not in any serious danger of decline. A review in 1981 for the USFWS (Worthington 1981) suggested not listing the plant because it is not threatened or endangered.

A baseline dataset of locations for Fort Bliss stands of OMEP was created between 1990 and 1994 for Fort Bliss by the New Mexico Natural Heritage Program (NMNHP). After this baseline dataset was constructed, permanent monitoring plots were installed in Fillmore, North, Soledad, Rucker, Glendale, Salado, and Beasley Canyons. These plots have been monitored through the summer of 1997. The plots were marked permanently so they can be revisited in the future (Mehlhop et al 1997).

3.0 CONSERVATION GOALS

1. The installation goal for the OMEP is to maintain the current population. To meet this goal Fort Bliss needs to continue monitoring the species to detect any changes in the size of the population.
2. Maintain the habitat of OMEP in the wet canyon bottoms of the Organ Mountains.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The management actions to preserve the OMEP will also benefit the other species of special concern in the Organ Mountains, including Standley's whitlowgrass (*Draba standleyi*), Organ Mountains pincushion cactus (*Coryphantha organensis*), Organ Mountains figwort (*Scrophularia laevis*), nodding cliff daisy (*Perityle cernua*), Organ Mountains chipmunk (*Eutamias quadrivittatus australis*), and several land snails (*Ashmunella organensis, A. auriculata, A. todseni*, and the new species *A. beasleyi*). The Organ Mountains also contain potential habitat suitable for the peregrine falcon (*Falco peregrinus*), a recently delisted raptor. There are historical records of the federally threatened Mexican spotted owl (*Strix occidentalis lucida*) in these mountains. The habitat of these species are not the same as OMEP, but the protection of the important canyon systems and associated water sources in the Organ Mountains will have benefits for all species. An ecosystem-based approach to the protection of the Organ Mountains is biologically appropriate given the great number of species of special concern found there. The military use of the Organ Mountains as a secondary impact area should be easily incorporated in to such an ecosystem based approach.

The border between Fort Bliss and the BLM lands (most importantly Dripping Springs Natural Area and Aguirre Springs Recreational Area) to the west and the north is subject to livestock and recreational trespass. Most livestock trespass occurs in Fillmore and Soledad Canyons, and recreational trespass most often occurs in Fillmore

Canyon. Fillmore Canyon and its watershed contain populations of OMEP as well as most of the other species of special concern and is one of the most outstanding natural botanical areas in New Mexico (DeBruin et al 1994). To protect the Fillmore Canyon area, Fort Bliss will take active steps to exclude the trespass cattle from the area. On two occasions (October 1996 and March 1997), salt licks were found at Fillmore Spring (Ladyman personal communication). The construction and maintenance of a fence on the boundary between the BLM property and Fort Bliss should be considered with the possibility of placing turnstiles to prevent the cutting of the fence by recreational trespassers. Also Fort Bliss will take legal actions to prevent the illegal trespass of cattle.

The relatively wet microhabitat where OMEP occurs was relatively unaffected by the large fire of 1994 (U. S. Army 1998). However, the changes in rates of sedimentation and erosion after the fire could have an effect on populations. Development of a fire plan in the Organ Mountains is far from complete and not necessarily important to the OMEP; however, a fire plan would contribute greatly to the ecosystem management of the Organ Mountains. A let-burn policy for areas inhabited by OMEP for natural fires would be appropriate as a fire should not harm populations.

Monitoring populations and protocols for OMEP have been set up for Fort Bliss by the NMNHP (Melhop et al. 1997). Monitoring of the major populations of OEMP as well as the outlying populations of the species should be continued to determine population changes. If a population decline of 25% is detected in three consecutive years, Fort Bliss should actively investigate the cause of the decline and attempt to protect the population from further decline.

Restrictions upon spring development in the Organs should also be implemented. OMEP is dependent on the surface water that is provided by the springs and any changes in the springs will result in changes in the populations of the OMEP as well.

5.0 MONITORING PLAN

In 1996, twenty-seven permanent monitoring plots for OMEP were installed in Fillmore (10 plots), North (8), Soledad (4), Rucker (3), Glendale (1), Salado (1), and Beasley Canyons (1). Plots were placed in areas of high plant density or in areas at the edge of the range. NMNHP also selected permanent plot locations in areas where data had been taken previous to 1994. The large number of plots found in Fillmore and North Canyons is due to the fact that those canyons are also used in a study of fire effects (U. S. Army 1998).

Permanent plots are marked by a 61cm x 1 cm white rebar post being anchored on the side of the drainage in a location secure from being washed away. The plot is the width of the channel ten meters up- and ten meters down- from the rebar. Number of plants are therefore described as “density per 20m of channel length.” Size class of plants was also recorded. The size classes were: rosette, less than 0.5m across, 0.5 to 1.0m across, and greater than 1.0m across (U. S. Army 1998)

In addition to the permanent monitoring plots, distances between plants were measured in Fillmore, North, Glendale, and Salado Canyons as a second monitoring method that will indicate changes in the status of the population of each canyon. This study has also supplied information on the spatial distribution of the plants. A description (and diagram) of this secondary monitoring scheme can be found in U. S. Army (1998).

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6. Species of Special Concern Management Plan for the Hueco Rock Daisy (*Perityle huecoensis*)

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Species of Special Concern Management Plan for the Hueco Rock Daisy (*Perityle huecoensis*)

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
DOE-C	Directorate of Environment - Cultural and Natural Resources Division
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
GPS	Global Positioning System
HRD	Hueco Rock Daisy
SSCMP	Species of Special Concern Management Plan
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation (AR) 200-3 encourages installations to develop management plans for species of special concern. Compliance with Chapter 11 of AR 200-3 involves coordination with U.S. Fish and Wildlife Service (USFWS). Implementation of this management plan can avoid potential listing of the species under the Endangered Species Act of 1973 (ESA) which could result in the costly disruption of military operations. This Species of Special Concern Management Plan (SSCMP) was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The Hueco rock daisy (HRD) (*Perityle huecoensis*) is a species of special concern for Fort Bliss. The only known populations of the plant are found in the installation's South Training Areas. There are no known populations of HRD found outside Fort Bliss. This species may be vulnerable to damage during exercises that utilize the cliff faces (rappelling or rock climbing for example) of the canyon systems where the populations are located.

Habitat Requirements and Limiting Factors: The HRD grows on limestone cliff sides and bases (1300 to 1500 meters in elevation) in narrow mesic canyons with high north-facing walls.

Management Objectives: The installation's management objectives for the HRD is to maintain the populations that are found in the South Training Areas.

Conservation Goals:
1) The installation goal is to maintain the two known populations at the current population levels.

Actions Needed: The installation training mission has few conflicts with the conservation of HRD. Canyon systems where the plant is found are sensitive to maneuvers that utilize the cliff face. The major steps needed to satisfy management objectives and achieve conservation goals for HRD are:

1) Monitoring of the known populations of HRD should be performed to determine basic population demographic status for the species. Permanently established monitoring plots need to be sampled yearly to investigate population trends.
2) Legal status of the species will be monitored.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the Hueco rock daisy (HRD) (*Perityle huecoensis*), a narrow endemic to the Hueco Mountains of El Paso County, Texas. It is unlisted in Texas but, the only known populations of HRD are found on Fort Bliss; (2) to discuss the threats that HRD faces on Fort Bliss; (3) to define the conservation goals; and (4) to outline a plan for management of HRD and its habitat that will enable the conservation goals.

HRD is a small tufted perennial plant that lives on cliff faces and the base of cliffs in the Hueco Mountains. The only know populations of the species are found in El Paso County, Texas. These populations are found on Fort Bliss in two relatively mesic canyon systems. HRD is found in association with another species of special concern, the alamo beardtongue (*Penstemon alamosensis*). The specific habitat needs of HRD contribute to the small population size; it is this small population size that warrants the attention of Fort Bliss, as well as the fact that the only known populations in the world are found on the installation. To prevent the listing of HRD, Fort Bliss is implementing a management plan for the species.

This document is consistent with AR 200-3. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - HRD is a low tufted perennial plant that sprouts from a woody base. The stems are woody and ten to twenty cm long. Old stems are persistent and co-occurring with the new growth which begins to appear in mid-March to mid-April. The leaves are bright green and 0.7 to 1.2 cm long and 0.7 to 1 cm wide. The flowers are yellow and arranged in heads that are five to six mm across. A more technical description of HRD can be found in Powell (1983).

This rock daisy occurs on cliff sides with rocky goldstar (*Heterotheca fulcrata*). The two species can be distinguished from each other by the fact that the rocky goldstar leaves are densely pubescent (covered with short hairs) and are lanceolate in shape where the HRD leaves are smoother, triangular, deeply dentate, and bright green. The internode distance (space between leaves) is much longer in rocky goldstar than HRD. Both HRD and rocky goldstar have yellow flowers but they can be told apart by flower size, the HRD have much smaller flowers than do the rocky goldstar.

Distribution - HRD is found in two canyon systems of a group of limestone hills that are part of the Hueco Mountains of El Paso County, Texas. The current distribution of the HRD is the same as its Late Holocene distribution. Although in cooler and wetter times (Middle Pleistocene to Middle Holocene) the HRD (or an evolutionary predecessor) could have had a larger range than it does now (Worthington 1991). Canyon systems serve as a refugium for HRD (Worthington 1991) and other species, including the alamo beardtongue, that require more mesic conditions than are usually found in Chihuahuan Desert Scrub.

Habitat/Ecosystem - The Hueco rock daisy grows on limestone cliff sides and bases (1300 to 1500 meters in elevation) in canyons systems with narrow high walls and/or northern exposures. HRD does not grow in areas receiving direct sunlight for a long period of time; it is absent from areas of east exposure (morning sunlight) and west exposure (afternoon sunlight), however in narrow canyons where one cliff shades the other HRD can survive regardless of the exposure. Rocky goldstar, alamo beardtongue, henry sage (*Salvia henryi*) and other species inhabit the cliff faces with HRD, and the species that occur in the canyon bottoms include scrub oak (*Quercus pungens*), skunk bush (*Ptelea trifoliata*), cliff fendlerbush (*Fendlera rupicola*), silk-tassel (*Garrya wrightii*), and sotol (*Dasylirion wheeleri*).

Life History/Ecology - Very little is known about the life history of the HRD. It is a perennial that has a woody base, with new stems beginning to emerge from mid-March to mid-April. Time of flowering is from June to September. It is believed that the seeds of another member of the genus, nodding cliff daisy (*P. cernua*), are distributed down the cliff by falling stem fragments since the stems of the plant are quite brittle (DeBruin et al 1994). It is possible that the HRD could also distribute its seeds in this fashion.

Reasons for Special Concern - The reason for the special concern over the HRD is its small population size. The range of HRD is limited to two canyon systems in the limestone hills of the Hueco Mountains. Of special concern is the fact that Fort Bliss land contains the entire global population of the HRD. A 1991 census found 652 individuals, with the possibility 100 to 200 more plants that could not be located due to the season of the census (Worthington 1991). So any reduction in the size of the population of the HRD could result in the listing of this species as threatened or endangered.

Current survey reports indicate than the entire global population of HRD is found in South Maneuver Area 2D of Fort Bliss, all the possible threats to HRD are from military actions or from trespass onto military land. The cliff habitat of HRD protects the plant from damage from fires and from grazing by wild animals. The plant is not showy and does not face endangerment from collection. However, "pothunters" visiting nearby caves and archaeological sites could cause damage to the plants if they scale the cliffs in search of artifacts. Graffiti has been found on the cliffs in other canyon systems in the hills where HRD grows (Von Finger personal communication). Military exercises, such as rappelling, that use the cliff face could also pose a threat to HRD populations.

Conservation Measures -. In January of 1995 a memorandum from the Directorate of Environment - Cultural and Natural Resources Division (DOE-C), was submitted to the 1st Combined Arms Support Battalion requesting restriction of access to critical areas in the Hueco Mountains in order to protect the cultural resources and sensitive plant species that occur there (Landreth 1995). DOE-C personnel will coordinate conservation efforts with the USFWS during 1998.

The limestone hills west of Hueco Tanks State Historical Park and east of Nations East Well, were surveyed in May, June, and July of 1991 for HRD. In the 1991 survey, 652 individuals were counted. Additionally it was estimated that approximately 100 to 200 plants were missed in that survey (Worthington 1991). Field portions of another survey were completed in 1997 and 1998; the report is under review.

3.0 CONSERVATION GOALS

1. Protect and maintain the current population.

2. Locate and protect any other populations of HRD found on the installation.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The actions prescribed below that provide stewardship for HRD population, will also help protect the alamo beardtongue and archaeological resources also present in the area. Also, it will be recommended to increase signage and fence repairs along the installation boundary where these resources are found and vandalism has been documented.

1. Follow up memorandum, referred to in Conservation Measures above, requesting restriction of access to critical areas in the Hueco Mountains. Such action will reduce the potential for impacts to the HRD population by the military.

2. Conduct yearly monitoring following protocol being developed at DOE in coordination with the U. S. Army Corps of Engineers, Fort Worth (U. S. Army 1998)

3. If a substantial population decline is detected, Fort Bliss will investigate possible causes including collection, predators, pathogens, and pollinator unavailability. DOE will request assistance from appropriate experts.

5.0 MONITORING PLAN

Permanent plots established in 1997 and 1998 will be monitored yearly to determine population trends. Species occurrence locations (Global-positioning system generated) and other species data will be incorporated into the DOE-C's databases. The species taxonomic and legal status will also be monitored during this time and Fort Bliss DOE-C personnel will coordinate conservation efforts with the USFWS.

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7. Species of Special Concern Management Plan for the Desert Night-blooming Cereus (*Peniocereus greggii var greggii*)

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SPECIES OF SPECIAL CONCERN
MANAGEMENT PLAN FOR THE DESERT
NIGHT-BLOOMING CEREUS
(*PENIOCEREUS GREGGII* VAR. *GREGGII*)

Fort Bliss, Texas and New Mexico

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ACRONYMS/ABBREVIATIONS

AR	Army regulation
BLM	U.S. Bureau of Land Management
DNBC	Desert night-blooming cereus
DOE	Directorate of Environment
ESA	Endangered Species Act of 1973
GIS	Geographic Information System
GPS	Global Positioning System
SSCMP	Species of Special Concern Management Plan
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Background: Army regulation (AR) 200-1 encourages installations to develop management plans for species of special concern. Compliance with AR 200-1 requires coordination with the U.S. Fish and Wildlife Service (USFWS). Implementation of this management plan can preclude listing of the species under the Endangered Species Act of 1973 (ESA), which could result in the costly disruption of military operations. This Species of Special Concern Management Plan (SSCMP) was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

Current Species Status: The desert night-blooming cereus (DNBC) [*Peniocereus greggii* (Engelm.) Britt. & Rose var. *greggii*; =*Cereus greggii* in some literature] is a New Mexico L1B species, meaning endangered in the state, but not federally listed. Outside the installation, DNBC is found from southern Arizona to the Big Bend Area of Texas and in Northern Mexico. A single DNBC population (seven individuals) was located on Fort Bliss in June of 1989 on Doña Ana Range on the slopes of the Organ Mountains. On Fort Bliss the DNBC population is still vulnerable to range upgrades and may be vulnerable to wildfires caused by ordnance.

Habitat Requirements and Limiting Factors: DNBC is found in high gravel content soils at elevations between 600 and 1400 meters, however the habitat requirements are not fully known. Collection pressure is the most important threat to the species globally. On Fort Bliss the species may be impacted by military actions.

Management Objectives: Management objectives call for the protection and maintenance of the known population of DNBC on the installation.

Conservation Goals:
1) Maintain and protect the populations found on the installation.
2) Determine the extent of the potential habitat on the installation and protect additional populations if found.

Actions Needed: The potential for military impacts to DNBC populations suggests that the actions needed are monitoring the populations. The steps needed to satisfy management objectives and achieve conservation goals are as follows:
1) Survey Fort Bliss lands within identified potential habitat for DNBC populations.
2) Support the protective measures currently in place for known populations.
3) The known individuals of this species will be properly marked in such a way that military training can avoid them.
4) Debris in the area of the cactus will be reduced to minimize the risk of fire damage.
5) Conduct yearly monitoring according to recently proposed recommendations including aspects of demography and habitat.
6) If a substantial population decline is detected, Fort Bliss will investigate possible causes, including collection, pests, pathogens, and pollinator unavailability. DPW-E will request the assistance of appropriate experts.

1.0 INTRODUCTION

The purposes of this SSCMP are (1) to present information on the desert night-blooming cereus (DNBC) [*Peniocereus greggii* (Engelm.) Britt. & Rose var. greggii], a state of New Mexico listed endangered species that is present on Fort Bliss; (2) discuss the threats that DNBC faces on Fort Bliss; (3) define the conservation goals; and (4) outline a plan for management of DNBC and its habitat that will accomplish the conservation goals.

The DNBC is an inconspicuous cactus with a large showy flower. It grows inside of shrubs such as creosotebush (*Larrea tridentata*) which provide support to its slender branches. The species grows on alluvial fans and terraces composed of sloping high gravel content soils. Populations occur in Texas west of the Pecos River, Southern New Mexico, Southern Arizona, and into the states of Chihuahua and Zacatecas in Mexico.

This document is consistent with AR 200-1. This SSCMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - DNBC is a cactus that grows within the branches of small shrubs. Its stems are erect or sprawling and are up to 2 m. The mature branches of DNBC are strongly ribbed (4-, 5- or 6- ribs). Spines number 11 to 13 per areole and are 3 mm long. The root is turnip-like. The DNBC flowers nocturnally, the flower is white and is approximately 6 cm in diameter with a 10 to 15 cm floral tube. The fruits are bright red (Correll and Johnston 1970).

Distribution - Desert Night-Blooming Cereus is found in New Mexico in Hidalgo, Doña Ana, Luna, and Grant Counties (Sivinski and Lightfoot 1995); in Texas it is found in Brewster, El Paso, Hudspeth, Jeff Davis, Pecos, Presidio, and Terrell counties (TOES 1994). It has been found in Chihuahua and Zacatecas in Mexico (Correll and Johnson 1970) and in Southern Arizona (Weniger 1984). DNBC densities are usually quite low with large distances between the different populations. DNBC is distributed throughout the extent of its historic range, but it appears that its density within the historic range may be decreasing. Populations may also be more fragmented within its historic range because of extirpation by collectors (Sivinski and Lightfoot 1995).

On Fort Bliss land, seven individuals of DNBC were located in June of 1989. All of the original seven individuals were located on a high gravel content wash on the east slope of the Organ Mountains. Six of these individuals were relocated in January of 1990 (Scarbrough 1990). Soil types known to support populations of DNBC in Doña Ana County, New Mexico were identified as potential habitat (Scarbrough 1990, BLM 1995, USDA 1980). Potential habitat is quite large on the installation, but surveys to locate the cactus in other areas during 1996 and 1997 have not produced more records (U. S. Army 1998)

Habitat/Ecosystem - The DNBC is found growing on slopes at elevations of 600 meters to 1400 meters in shallow or deep soils that are well drained. These soils also have a high gravel content and are formed from alluvium, on fans or terraces [Bureau of Land Management (BLM) 1995, United States Department of Agriculture (USDA) 1980]. Common associated species in the region are black grama grass (*Bouteloua eriopoda*), bush muhly (*Muhlenbergia porteri*), and creosotebush (USDA 1980).

DNBC is often found growing inside of a creosotebush or mesquite (*Prosopis glandulosa*) along with a grass (usually bush muhly) clump, which provide support to its rather spindly stems.

Life History/Ecology - Desert night-blooming cereus have flowers that open at night in the months of May and June (BLM 1995). It is believed that DNBC is pollinated by hawkmoths (Buchman and Nabhan, 1996). Fruits are produced between June and July (BLM 1995).

Reasons for Special Concern - The desert night-blooming cereus has never been a common species and its distribution has always been rather widespread. The continuing urbanization of the areas around DNBC habitat poses some danger to the species (BLM 1995). However the most important threat to the DNBC is from collectors. The unique growth form, rather striking flowers, relatively fast growth rates for a cactus, and the ease of growth inside a house make the DNBC a desirable nursery plant. There are several nurseries easily found through mail order and internet sources that feature DNBC seeds and plants grown in cultivation (Digital 1997). However larger specimens available at nurseries are most likely poached from the wild. It is also commonly found in botanical gardens, however these management methods (botanical gardens and garden cultivation) do not maintain the gene frequencies of distinct native populations (Nabhan, Hodgson, and Hernadez 1987). Buchman and Nabhan, 1996, expressed concern that hawkmoths pollinators are succumbing to pesticides. They observed few pollinator visits and examination of fruits indicated that seed set was indeed low.

The unique growth form and rather spectacular flowering habit are not the only reason why DNBC has been collected. Essences derived from DNBC parts are being used in herbal tinctures for relief from stress, and for use in treating palpitations, arrhythmias, and tachycardias. These tinctures can be purchased over the internet as well (Digital 1997).

The O'odham people used the root of the Arizona queen of the night (*Peniocereus greggii* var. *transmontanus*), a variety of the DNBC found in the states of Arizona and Sonora, as a food product and a medicine for a variety of uses including headaches, respiratory ailments, digestion, and most importantly, diabetes. Supposedly after this folk medical knowledge became better known this cactus was overexploited up to 1930. (Nabhan, Hodgson, and Hernadez 1987). It seems reasonable that DNBC could have been overexploited as well.

Growing within bushes or grass clumps is beneficial for the DNBC in that they provide support and protection. However, when cattle are in the area, they may attempt to graze these protective plants and damage the cactus. Continued breakage would eventually exhaust the plant's food reserves and prevent reproduction (BLM 1995).

Because the known population on Fort Bliss is located within a restricted access zone, the cactus is protected from both collecting and cattle grazing. However, the population is within a live fire range. Threats to the species in this area are natural and training-caused fires, road construction and off-road military traffic. Some marked individuals were destroyed by road building activities (U. S. Army 1998); remaining individuals are marked more conspicuously behind siber stakes.

Conservation Measures - The State of New Mexico lists DNBC as a L1B species, meaning endangered because unregulated collection could jeopardize the survival of the species in New Mexico due to restricted distribution and low density across the state. The R-E-D code assigned is 1-3-1 meaning that the occurrence of the species is confined to several populations, that the species is endangered in a portion of its range, and the species is rare outside New Mexico (Sivinski and Lightfoot 1995).

The known individuals of this species are properly marked in such a way that military training and road building activity on Doña Ana Range can avoid them. Debris from around the shrubs that support the DNBC will be removed to reduce the risk of damage from potential fires in the area. These actions will be coordinated with the units using the Range.

3.0 CONSERVATION GOALS

1) The installation conservation goals for the DNBC should be to maintain the known population, and attempt to locate new populations on base.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

The population of DNBC needs to be protected from damage caused by vehicle cross-country maneuvers. A potential protection that would not interfere with the installation's training mission could include, marking the areas around each plant (or group of plants) with signs similar to what DPW-E uses to mark their archeological sites or with engineers' cloth tape. DPW-E will coordinate with Range users to inform them of DNBC areas.

A census of all suitable DNBC habitat would be difficult to complete, given the relatively cryptic nature of the cactus and the large amount of potential habitat found on the installation. Instead of a total census, a more thorough survey of individual maneuver areas or ranges could be completed for each range or maneuver area (that contains potential DNBC habitat) when an assessment for the area is required.

5.0 MONITORING PLAN

Annual monitoring of simple demographic parameters (death, recruitment into the population, or human removal of plants) of the known population of DNBC would be a simple and not very time consuming. Taxonomic and legal listing status of the species will also be monitored yearly.

6.0 REFERENCES

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8. Endangered Species Management Plan for the Sneed Pincushion Cactus (*Coryphantha sneedii var sneedii*)

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Endangered Species Management Plan for the Sneed Pincushion Cactus
(*Coryphantha sneedii* var. *sneedii*)

Fort Bliss, Texas and New Mexico

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ACRONYMS/ABBREVIATIONS

AR	**Army regulation**
BLM	**U.S. Bureau of Land Management**
ESA	**Endangered Species Act of 1973**
ESMP	**Endangered Species Management Plan**
FR	**Federal Register**
GIS	**Geographic Information System**
GPS	**Global Positioning System**
HMP	**Habitat Management Plan**
SPC	**Sneed Pincushion Cactus**
USFWS	**U.S. Fish and Wildlife Service**

EXECUTIVE SUMMARY

Background: Army regulation, (AR) 200-1 requires the preparation of an Endangered Species Management Plan (ESMP) for listed and proposed threatened and endangered species and critical habitat on installations. All Army land uses are subject to this regulation (AR 200-1). Compliance with AR 200-1 requires coordination with the US Fish and Wildlife Service (USFWS). Failure to implement this management plan can lead to violation of the Endangered Species Act of 1973 (ESA) and result in the costly disruption of military operations. This plan was developed following guidelines set in “Manual for the Preparation of Installation Endangered Species Management Plans” (Science Applications International Corporation 1995).

Current Species Status: The Sneed pincushion cactus (SPC) [*Coryphantha sneedii* (Britt. and Rose) Berger var. *sneedii*] is listed as endangered by the USFWS as well as by Texas and New Mexico. Three populations of SPC are known from rocky outcrops on the west portion of Doña Ana Range. One of these populations is in an area designated off limits to all military actions. The other two populations are in areas where vehicle traffic is limited to roads and the plants are located in rocky areas inaccessible to vehicles. The species occurs in similar habitat in nearby mountains outside the installation. Throughout its range, SPC may be under collection pressure, but it is unknown to what extent. On Fort Bliss there is low potential for impacts from natural or ordnance caused fire, since cactus grows on rocky substrates with fuel loads too low to sustain a ground fire. Potential habitat has been identified and most of it was censused in 1997.

Habitat Requirements and Limiting Factors: The primary limiting factor for SPC is that it seems to require outcrops of fusselman dolomite, however the habitat requirements of the cactus are not fully known.

Management Objectives: SPC management objectives are for protection and maintenance of the installation's populations.

Conservation Goals:
1) Maintain and protect the three populations (with appropriate age structure) found on the installation.
2) Determine the extent of the potential habitat on the installation and protect additional populations found.

Actions Needed: The lack of military impacts to SPC populations suggests that the only actions needed are monitoring the populations and responding where possible to any declines. The major steps needed to satisfy management objectives and achieve conservation goals are as follows:
1) Finish censusing the remaining identified habitat.
2) Support the protective measures currently in place for known populations.
3) Conduct yearly monitoring according to recently developed protocol including aspects of demography and habitat.
4) If a substantial population decline is detected, Fort Bliss will investigate possible causes including collection, pests, pathogens, or pollinator unavailability.
5) DPW-E will request assistance from appropriate experts.

1.0 INTRODUCTION

The purposes of this Endangered Species Management Plan (ESMP) are (1) to present information on the Sneed pincushion cactus (SPC) [*Coryphantha sneedii* (Britt. and Rose) Berger var. *sneedii*], a federally listed endangered species, present on Fort Bliss; (2) to discuss the threats that SPC faces on Fort Bliss; (3) to define the installation's conservation goals for SPC; and (4) to outline a plan for management of SPC and its habitat that will enable the conservation goals. These purposes are consistent with the U. S. Fish and Wildlife Service (USFWS) SPC Recovery Plan. Cost of the conservation action and impacts to other installation activities will also be discussed.

The SPC is a small multiple stemmed cactus that grows on dolomite outcrops at elevations from 1300 to 2380 meters. The species is found in the Bishop's Cap Hills of Doña Ana County, New Mexico and the Franklin Mountains of Doña Ana County, New Mexico and El Paso County, Texas. It was listed as endangered in 1979 for reasons of over-exploitation by collectors and habitat destruction due to urban expansion and road construction.

This ESMP is based on and is consistent with the ESA; AR 200-1; and the USFWS SPC Recovery Plan. This ESMP was developed following guidelines set in "Manual for the Preparation of Installation Endangered Species Management Plans" (Science Applications International Corporation 1995).

2.0 SPECIES INFORMATION

Description - Mature plants of SPC are tight clumps of up to a 100 or more stems. The mature clumps measure 30 cm or more in diameter. Often juvenile individuals are encountered and have considerably fewer stems per individual and smaller clump size. Individual stems range from 2.5 cm to 7.5 cm long and are 1 to 3 cm in diameter. Spines are white when mature and pinkish when growing (Benson 1982). Spine tips are often red or brown. Flowers are 1 cm tall and of equal diameter and are pale rose in color with pink filaments and bright orange anthers. The fruits are grayish-green or green tinged with brown or pink when ripe. The fruits are club-shaped up to 1.5 cm long and 6 mm in diameter (Benson 1982). The appearance has been compared to that of a pile of brussel sprouts and peas covered in white cactus spines.

SPC is sympatric with the cob cactus (*Coryphantha strobiformis* var. *strobiformis* which is also known as *C. tuberculosa* or *Mammillaria tuberculosa*), with which it shares more than a superficial resemblance. Several characters may be used to determine the species of an individual. Older stems of the cob cactus have a "corn-cob" appearance at the base, whereas, SPC stems do not exhibit this effect. In general, the spines of SPC are whiter than those of the cob cactus, whose spines are generally darker and have a red under-tone. The mature stems of SPC are smaller and a mature individual of SPC contains more stems than a mature cob cactus (Benson 1982). The radial spines on cob cactus are approximately the same length, whereas on SPC the radial spines are longer on the upper side of the areole. SPC mature fruits are green and cob cactus mature fruits are red (Benson 1982).

Another sympatric species that shares a resemblance to SPC is the New Mexico coryphantha (*Coryphantha vivipara*). Stems of the New Mexico coryphantha are usually solitary and don't form clumps like SPC, although several individuals of New Mexico coryphantha may sprout nearby to each other and appear as a clump, but none of the smaller stems that are characteristic of SPC will be found in a "clump" of New Mexico coryphantha.

A more technical description of SPC is provided by Zimmerman (1985).

SPC was listed as endangered in accordance with the ESA by the USFWS November 7, 1979 [44 Federal Register (FR) 61558]. It is listed as endangered in Texas (Texas Parks and Wildlife 1996) and as a L1A (meaning endangered in New Mexico as well as listed federally) species in New Mexico (Sivinski and Lightfoot 1995).

Distribution - SPC is currently distributed throughout what is believed to be its historic range. The species is only found in the Franklin Mountains of El Paso County, Texas and Doña Ana County, New Mexico and the Bishop Cap Hills of Doña Ana County, New Mexico (USFWS 1986, USFWS 1993). There are three known populations of SPC found on Fort Bliss. The first population was found on a NNW-SSE trending ridge, 3.8 km east of the top of Bishop Cap, at an approximate elevation of 1450 meters (Worthington 1980). This hill is referred to as the "south hill site". The "north hill site" is on the western border of Fort Bliss approximately 2 km northwest of the south hill site. The "Webb Gap site" is located on the east slope of the northernmost extension of the Franklin Mountains and approximately 3 km north of Webb Gap proper (U. S. Army, 1998).

Habitat/Ecosystem - Sneed Pincushion Cactus occurs on calcareous outcrops on steep mountain sides, at elevations from 1300 to 2380 meters. The populations in Doña Ana County on BLM land are all found on Paleozoic Fusselman dolomite outcrops (BLM 1987, Seager 1981). The three populations on the installation are also found on Fusselman dolomite outcrops (U. S. Army, 1998, Seager 1981, Worthington and Freeman 1980). SPC grows in cracks and on vertical cliffs and ledges as well as on horizontal benches of loose rock. The species is found in association with lechuguilla (*Agave lechuguilla*), cob cactus, New Mexico coryphantha, sotol (*Dasylirion wheeleri*), ocotillo (*Fouquieria splendens*), and mariola (*Parthenium incanun*) (Van Devender et. al 1993, BLM 1987, Zimmerman 1985).

Life History/Ecology - Plants of SPC have stems of two distinct types. One stem type remains small and probably serves to start new plants when broken off by animals or shifting rocks. The other stem type is larger, more rigidly attached to the substrate, and produces flowers, fruits, and seeds (USFWS 1986).

Individuals of SPC bloom 3 or 4 years after germination (USFWS 1986). Flowers close at night. Blooming period lasts for 3 to 14 days and occur in April and May (Worthington 1986). SPC are obligate outcrossers and pollination vectors are believed to be bees (Van Devender et. al 1993). Fruits are produced from three to four weeks after flowering (Zimmerman 1985). Seed dispersal agents are rodents (fruits have a prune-like odor when ripe and are green, a color not attractive to birds). Because this cactus grows on slopes, rain may distribute seeds as well (USFWS 1986).

Reasons for Listing - When SPC was first listed as endangered in 1979, the reasons for listing were given as: 1) Exploitation by individual and commercial cactus collectors; 2) Destruction of a significant population by the construction of NM 404 through Anthony Gap; 3) Urban growth of El Paso, TX; and 5) and the use of the Organ Mountains by Fort Bliss as an artillery impact area (44 FR 61558).

Worthington and Freeman (1980) reported that the Anthony Gap populations of SPC were not impacted by the construction of NM 404 through Anthony Gap. They surveyed three areas in Doña Ana Range. They found that the Fort Bliss military training mission was not impacting the known population. They hypothesized that the installation's use of Rattlesnake Ridge as a artillery range would not have extirpated a population of SPC, because Rattlesnake Ridge contained a healthy population of cob cactus, which has a similar growth form to SPC (Worthington and Freeman 1980).

The recovery plan prepared by USFWS (1986) found it difficult to determine the impact that collecting has had on SPC, since the cactus is not popular with general cactus collectors, only with specialists in rare species. The urban expansion of El Paso, Texas is viewed as a threat in the recovery plan. Fort Bliss use of potential habitat (Rattlesnake Ridge) as an artillery range was also viewed as a potential threat to SPC. The recovery plan also states that there are large areas of apparently suitable habitat that are unoccupied by SPC, the reasons behind this are unknown, because the biology and ecology are poorly understood (USFWS 1986).

In 1987, the BLM prepared a Habitat Management Plan (HMP) for SPC. In this HMP they found that collection of SPC is still occurring. The BLM also reiterated that the construction of NM 404 and Army's use of Doña Ana Range had no impact on populations of SPC. The BLM notes that the most significant threat to SPC on public lands is mining operations (BLM 1987).

The Van Devender et al. (1993) Status Report discounts road widening as a threat to SPC because none of the known SPC populations are adjacent to roads, but road re-routing could affect populations. The possibility of urban development affecting SPC also is discounted by Van Devender et al (1993) because populations of SPC are most often found in precarious, vertical, and unstable bedrock situations that are unlikely to be developed for urban, industrial, or recreational purposes.

Currently it is believed that collection is not a major threat to SPC. There are a number of sources of seeds and nursery grown plants. The majority of the populations of SPC are found on public land so the threat of development is minimal. However, SPC populations on BLM land have declined between 31% and 40% since 1987. A third population at Anthony Gap has made a 1% population gain in the same time period. No cause for the decline was discovered (Davis and Atchley in press). SPC populations could be in decline for reasons unrelated to collecting, urban development, or road construction.

On Fort Bliss the populations of SPC are not threatened by collection or development. The military use of the flat lands at the bottom of all three sites does not affect the populations of SPC. It is not known to what extent ordnance initiated or natural fires could harm SPC, however, it is unlikely that fire would readily spread to the slopes where SPC is found due to the low fuel levels, steep slopes, and rockiness of the area. It is not known if the Fort Bliss populations are in a state of decline, as are the populations on BLM land in the Bishop Cap hills area (Davis and Atchley in press).

<u>Conservation Measures</u> - After SPC was listed as endangered in 1979, the USFWS developed and is implementing a recovery plan (USFWS 1986). The plan included the development and implementation of habitat management to alleviate the threats to SPC due to collecting and habitat modification, the enforcement of existing regulations on collecting and trade; the study of SPC population biology, and the development of public awareness, appreciation, and support for the preservation of SPC (USFWS 1986).

The BLM Habitat Management Plan (HMP) calls for informing miners of liabilities under the ESA, monitoring for illegal collecting, inventorying the public lands for other populations of SPC, establishment of permanent monitoring plots and monitoring at a minimum of three years intervals, acquisition of private and State of New Mexico lands, completion of mineral withdrawals in the range of SPC populations, removal of fusselman dolomite from the list of salable minerals, and closing the HMP area to off road vehicle use (BLM 1987).

SPC conservation activities at Fort Bliss began in 1980 with a survey of the limestone substrate habitats of Doña Ana Range. A population was found here. No SPC were found on Rattlesnake Ridge or the north end of the Franklin Mountains. (Worthington and Freeman 1980). A survey in 1991 of portions of the Hueco Mountains found no occurrences of the SPC (Worthington 1991). A survey of suitable habitat areas on Fort Bliss was completed in 1997. Two additional populations were discovered on rocky outcrops of the area. In 1981 Seager determined that Fusselman dolomite appears to be appropriate habitat for this cactus. A preliminary survey of Rattlesnake Ridge revealed no SPC. Potential habitat for this species is approximately 238 hectares on Fort Bliss. The area of occupied habitat is approximately 110 hectares. One of the three populations found on the installation is off limits to training and the other two are located on rocky outcrops away from roads (National Imaging and Mapping Agency 1996).

3.0 CONSERVATION GOALS

1) Maintain and protect the three populations (with appropriate age structure) found on the installation.
2) Determine the extent of the potential habitat on the installation and protect additional populations found.

4.0 MANAGEMENT PRESCRIPTIONS AND ACTIONS

1) Continue to monitor all three populations yearly.
2) Continue to systematically survey potential habitat. Surveys should be conducted in habitats that are similar to Fusselman dolomite in or near the Organ and Franklin Mountains and at appropriate elevations where there are rocky substates.
3) Continue to monitor military training activities and avoid impacts to populations.
4) Consult under the ESA on any action that may affect SPC.

5.0 MONITORING PLAN

For the length of this ESMP, 5 years, the health of the SPC populations found on Fort Bliss will be monitored yearly. In 1997 a total of twenty-two permanent monitoring plots were established on the three sites with populations of SPC. Monitoring sites were located in areas with a variety of topographic and microhabitat features. Plots were located in concentrations of the cactus so that reproductive success and growth characteristics could be monitored more efficiently. The plots are 16m by 16m square. A rock cairn painted bright red and flagging mark each plot. The cairn was plotted on 7.5" quad sheets as well as being recorded with a Trimble GPS unit. The location information is in the Fort Bliss GIS files.

Individual SPC plants in the plot were marked with an aluminum tag with a unique number for the plot. For each individual a distance and bearing to the rock cairn was recorded. Plant characteristics were noted for each individual. The data recorded for each cactus was basal area, maximum stem height, stem numbers, stem maturity, dried flower presence, and amount of dead material. The microsite characteristics where each individual was found were also recorded. This information collected over a period of time will create a clear picture of major trends in the structure of the SPC populations found on post (U. S. Army, 1998).

Additionally surveys of potential SPC habitat will be made every five years, to investigate if any recruitment has occurred in those areas.

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APPENDIX J: Bibliography of Fort Bliss Reports for Completed Studies and Projects

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Appendix K: New Mexico and Texas Comprehensive Wildlife Conservation Strategies and Fort Bliss Compliance

APPENDIX K

New Mexico and Texas Comprehensive Wildlife Conservation Strategies and Fort Bliss Compliance

In 2001, through the efforts of the 3000 member groups of the Teaming With Wildlife Coalition (http://www.teaming.com), the US Congress passed legislation now known as the State and Tribal Wildlife Grants Program (SWG) and created the nation's core initiative for conserving our country's biodiversity and thereby precluding the necessity of listing more species as threatened and endangered. One of the mandates of SWG was that each state must develop and submit a Comprehensive Wildlife Conservation Strategy (CWCS) no later than October 1, 2005. To date, a CWCS has been created by each of the fifty states. Each CWCS is a strategic plan intended as a blueprint to guide collaborative and coordinated wildlife conservation initiatives involving local, state, federal, and tribal governments, non-governmental organizations (NGOs) and interested individuals. Each plan was developed using eight congressionally required elements (AFWA, 2007):

1. **Wildlife.** Information on the distribution and abundance of wildlife, including low and declining populations, that describes the diversity and health of the state's wildlife.
2. **Habitats.** Descriptions of locations and relative conditions of habitats essential to species in need of conservation.
3. **Problems.** Descriptions of problems that may adversely affect species or their habitats, and priority research and survey efforts.
4. **Conservation Actions.** Descriptions of conservation actions proposed to conserve the identified species and habitats.
5. **Monitoring.** Plans for monitoring species and habitats, and plans for monitoring the effectiveness of the conservation actions and for adapting these conservation actions to respond to new information.
6. **Review.** Descriptions of procedures to review the plan at intervals not to exceed 10 years.
7. **Coordination.** Coordination with federal, state, and local agencies and Indian tribes in developing and implementing the wildlife action plan.
8. **Public Participation.** Broad public participation in developing and implementing the wildlife action plan.

Fort Bliss complies and works with USFWS, New Mexico Department of Game and Fish and Texas Parks and Wildlife Department along with several other agencies (Sec 1.4, 1.4.2, and 3.3, INRMP 2015) in order to maintain and conserve wildlife and their habitats on Fort Bliss.
New Mexico's CWCS focuses upon species of greatest conservation need (SGCN), key wildlife habitats, and the challenges affecting the conservation of both (AFWA, 2007). The Texas Conservation Action Plan (TCAP) focuses on building partnerships and identifying barriers and conservation actions that will help to conserve the state's rich diversity of terrestrial and aquatic wildlife and the lands and waters on which they depend for survival (TCAP 2012).
In order to be consistent with the application of both plans to Fort Bliss ecosystems and species conservation, issues identified in the NM CWCS and the Texas CAP that affect Fort Bliss' habitats and wildlife are listed and the corresponding actions taken by Fort Bliss to address those issues follows. Fort Bliss has also created Species of Conservation Responsibility tables for each state. These tables list the SGCN animal and plant species' that are found or are expected to be found on Fort Bliss.

New Mexico Comprehensive Wildlife Conservation Strategy on Fort Bliss

Fort Bliss is a multi-mission U.S. Army installation situated on approximately 1.12 million acres in Texas and New Mexico. Of that total land area, 11 percent of the installation is in El Paso County in west Texas, and the remaining 89 percent is in south-central New Mexico in Doña Ana and Otero counties.

In New Mexico, Fort Bliss occupies land among two terrestrial eco-regions, the Chihuahuan Desert eco-region and the Arizona-New Mexico Mountains eco-region (Figure 1) (NM CWCS, 2005). Nearly all of Fort Bliss in New Mexico falls within the Tularosa Watershed which is a closed basin in hydrologic terms (Fig. 2.2-5, Fig. 2.2-7 INRMP 2015).

For Fort Bliss, New Mexico's Comprehensive Wildlife Conservation Strategy (CWCS) identifies SGCN, key wildlife habitats, and the challenges affecting the conservation of species and habitats within the Chihuahuan Desert eco-region (AFWA, 2007). The only key wildlife habitat within the Chihuahuan Desert eco-region that the NM CWCS addresses and is found on Fort Bliss is the Chihuahuan semi-desert grasslands. The Tularosa Basin is addressed as a key watershed in the NM CWCS.

NM CWCS Issues and Fort Bliss Conservation Actions

Issues identified in the NM CWCS that affect Chihuahuan semi-desert grasslands (bold) and Fort Bliss' corresponding conservation measures that address those issues follows.

1. Habitat conversion

Fort Bliss has experienced significant change and growth within the past decade and a half. Fort Bliss has been identified as one of the nation's premier power platforms for meeting global and national defense demands for a modern, mobile and highly trained Army. Fort Bliss has seen its mission change substantially, both in terms of increased types of weapons being used and increased numbers of troops being trained.

In order to minimize effects to native habitats and ecosystems while meeting the demands of national security, Fort Bliss has recently completed three planning documents (Sec. 1.4 INRMP 2015):

- Fort Bliss Texas and New Mexico Mission and Master Plan Programmatic Environmental Impact Statement (2000)
- Fort Bliss Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement (2007)
- Fort Bliss Army Growth and Force Structure Realignment Final Environmental Impact Statement (2010)

Guidance from these documents and the Fort Bliss INRMP include protection for endangered species habitat by designating off limits areas (OLAs). Entry (military or recreational) is prohibited inside OLAs (U.S. Army 2010i). OLAs include 466 acres that are restricted due to natural resources concerns, primarily endangered species habitat, 14,125 acres of archaeological sites and specific mission activities where training does not occur (impact areas or hazard waste sites). OLAs are marked in the field by signs and siber stakes (distinctly colored fiberglass cylinders atop t-posts).

Protection for sensitive species and their habitats is provided for by designating limited use areas (LUAs). LUAs protect grassland habitats, arroyo/riparian areas and woodlands by limiting new roads, off-road vehicle traffic and military activites on 328,754 LUA acres on Fort Bliss (Sec. 3.1.1 INRMP 2015). LUAs are open to military training activities, but are restricted from:

- Static vehicle positions
- Concentrations of vehicles

- All logistical, training unit assembly areas
- Fuel depots
- Any digging or excavations
- Field fortifications
- Bivouac areas
- Tactical Operations Centers (TOC)
- Any other proposed concentrations of vehicles, personnel or ground disturbing activities

Fort Bliss LUAs include most of the grasslands of Otero Mesa, playas, earthen water collecting tanks (cattle tanks), water troughs and other wildlife watering locations, arroyo-riparian habitat, cultural sites, the four units of the 3,817-acre Black Grama Grassland ACECs, the 11,268-acre Culp Canyon WSA and other sensitive plant population locations (U.S. Army 2010m). LUAs include areas within 300 m of earthen tanks or playas in order to limit disturbance to wildlife (Sec. 3.1.1 INRMP 2015).

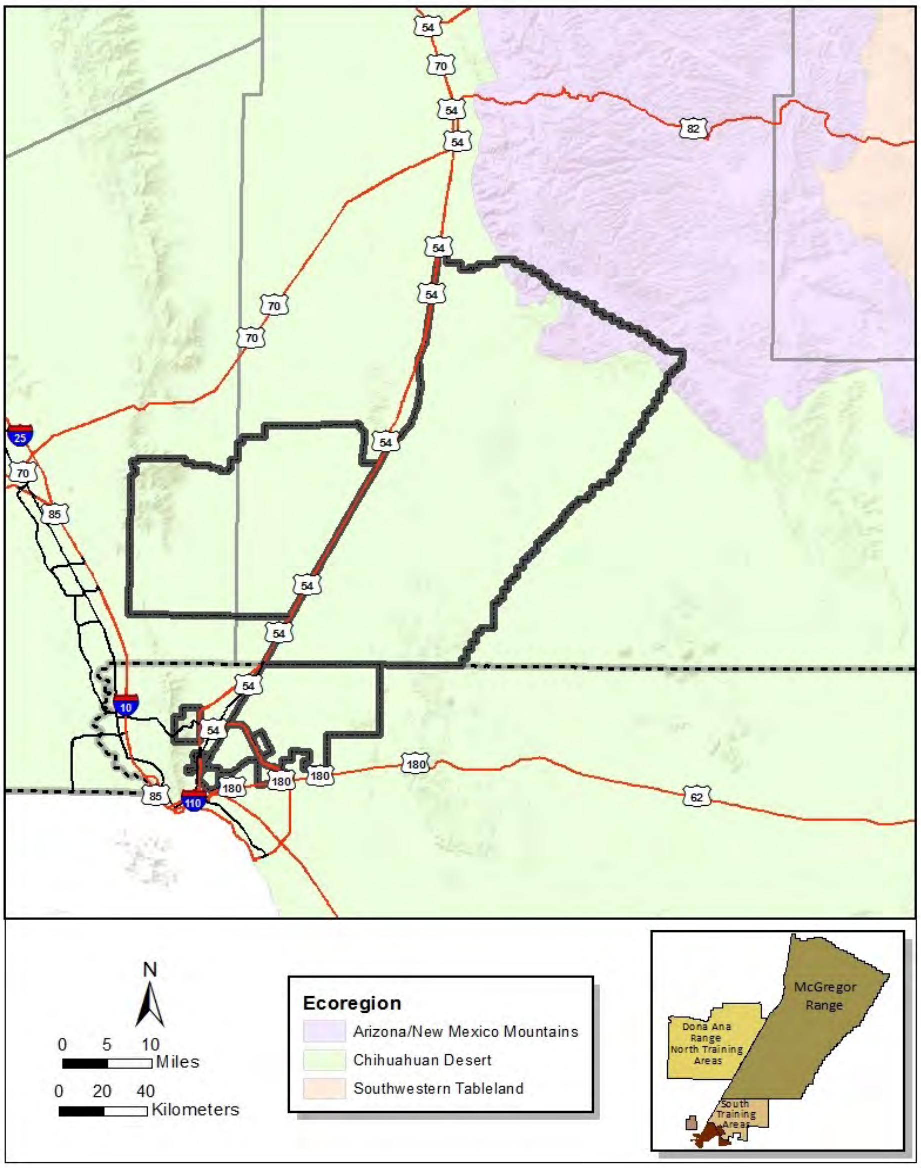

Figure 1 Location of Fort Bliss within Recognized Eco-regions

2. Abiotic resource use (mining and oil)

The military mission of Fort Bliss is not compatible with allowing outside interests to extract minerals or crude oil from the FBTC. For its own use, Fort Bliss maintains a number of gravel and caliche pits for repairing and improving dirt road surfaces. These sites are evaluated and sited using the NEPA process and are used on a recurring basis to reduce environmental impacts to other areas of the FBTC.

One beneficial habitat management practice utilized at Fort Bliss is stockpiling top or surface soils whenever large excavations occur, such as a new borrow pit. The topsoil is pulled off and stockpiled, and then re-used as the last layer of cover after the borrow pit is rehabilitated. This ensures that topsoil containing native seeds and natural biota important in ecological processes are present to help reestablish native vegetative cover in the area (Sec. 4.8 INRMP 2015).

3. Pollution (primarily aquatic habitats)

Fort Bliss has ephemeral aquatic habitats mainly in the forms of playa lakes, arroyos and earthen tanks. These habitats fill or run during the monsoon season and generally dry up within a few months time. These areas are usually dry most of the year. These areas are protected as LUAs and are identified and made known to users of the FBTC (Table 4; Sec.4.4 INRMP 2015).

4. Consumptive biological use (logging and domestic grazing)

Fort Bliss does not manage grazing on the FBTC (Sec 4.13 INRMP 2015). Grazing by cattle occurs on 14 grazing management units (GMUs) on McGregor Range. GMUs are managed by the BLM, per Public Law 106-65. BLM follows accepted standards for rangeland health and uses a rest/rotation grazing system to limit grazing impacts in any one area. An MOU between the U.S. Army and the BLM governs the co-use of these lands. GMUs cover approximately 270,000 acres of McGregor Range. The USFS manages grazing in Training Area 33, which is the portion of McGregor Range within the Lincoln National Forest.

5. Non-consumptive biological use (off road vehicles, military activities, recreation)

It is a primary goal of Fort Bliss to sustain and enhance its training lands by integrating sustainable land and resource management practices amongst all users of the installation (Sec 4.12 INRMP 2015). To that end, training range managers and Soldiers are encouraged to implement practices that prevent environmental degradation during training activities (AR 200-1). Implementing environmentally sound training practices, as well as considering alternatives to these practices as they are developed, limits the potential for serious alterations to natural resources and lands that are critical to providing a sustainable training environment. AR 200-1 prescribes policies, assigns responsibilities, and establishes procedures for protecting the environment and preserving natural and cultural resources. Commanders are responsible for integrating environmental management principles and environmental protection activities and programs, to the fullest extent possible, into the planning and execution of the training mission.

Fort Bliss uses the Land Rehabilitation and Maintenance (LRAM) component of the Integrated Training Area Management (ITAM) to repair damaged lands to facilitate military activities and to prevent further degradation of soil, water, and vegetative resources within areas that are designated for military activities. An important step in this process is to identify areas that are least susceptible to damage by various activities such as bivouacking and off-road training (Sec 4.12 INRMP 2015).

Fort Bliss has identified 563,027 acres for unrestricted off-road vehicle maneuvering. These areas are within the mesquite coppice dune vegetation type and/or in sandy soil types which are considered stable and resistant to further erosion and vehicle impacts. Off-road vehicle (ORV) maneuvering is restricted on 665,052 acres of the FBTC due to erosion and natural resource protection concerns (Table 3.1-2 INRMP 2015).

Public ORV use, when the Army authorizes access, is limited to designated roads and trails. This designation is for public safety and protection of watershed and cultural resources (USDI 1990a; Sec.4.15 INRMP 2015).

6. Invasive and non-native species (including disease, parasites and pathogens)

The Fort Bliss Integrated Pest Management Plan (IPMP) is the primary mechanism for identifying actions to prevent and manage invasive species. Working in conjunction with the INRMP, the IPMP preserves, protects and enhances natural vegetation and habitat. Implementation and updating the IPMP is the responsibility of Fort Bliss DPW-E Conservation Branch. Pest management requirements and activities are coordinated and monitored by the Installation Pest Management Coordinator (IPMC). At this time, the Fort Bliss IPMC is Dr. Rafael Corral, Botanist, DPW-E, Conservation Branch. State-certified contractors perform the actual pest control activities on Fort Bliss (Sec. 4.11 INRMP 2015).

Surveys to inventory for exotic and noxious plant species on Fort Bliss occur annually. Monitoring efforts focus on identifying new populations and monitoring expansion or reduction of current populations. The 2008 invasive species survey for Fort Bliss includes specific management recommendations for species identified on Fort Bliss. Eradication and control measures include chemical and biological control, reintroduction of native species, prescribed burning, and mechanical removal (U.S. Army 2007a). Seven exotic plant species considered invasive occur on Fort Bliss, New Mexico (Table 2.3-4 INRMP 2015) (Sec. 4.8 INRMP 2015). African rue (*Peganum harmala*) exists on the Cantonment and on Otero Mesa and is the only actively controlled invasive species on Fort Bliss. It invades disturbed sites and once successfully established can spread and outcompete native grasses (Sec. 4.10 INRMP 2015).

Currently exotic wildlife species are being actively controlled by hunting on Fort Bliss. The two species that exist on the FBTC are oryx and Barbary sheep (aoudad). Population reduction hunts for oryx occur on Doña Ana Range training areas for Fort Bliss active duty military personnel only and on McGregor Range training areas equally for Fort Bliss active duty military personnel and the public (Sec. 4.6.2.3 INRMP 2015). Barbary sheep hunts are conducted on McGregor Range training areas for both the public and the military.

NMDGF has designated Game Management Units 34, 28 and 19 as Chronic Wasting Disease (CWD) Control Areas. Unit 28 includes Fort Bliss. Fort Bliss DPW-E Conservation Branch biologists and NMDGF cooperate to monitor for this deadly disease. All mule deer and elk harvested on Fort Bliss big game hunts are screened for the disease by Fort Bliss biologists who remove tissue from each brain stem or from the lymphatic system. The tissue samples are collected and sent to NMDGF for laboratory testing for CWD. To date, seven mule deer from Fort Bliss have tested positive for CWD (Sec. 4.6.2.4 INRMP 2015).

7. Modification of natural processes and eco-drivers (drought, fire management, ecological sustainability and integrity, or loss of keystone species)

Fort Bliss plans to sustain the environment and maintain ecological connectivity by reducing its energy and water consumption and developing sustainable, non-polluting energy, water and waste alternatives. Fort Bliss is in the process of preparing an Environmental Impact Statement (EIS) to implement a number of actions with the purpose of achieving Net Zero energy, water and waste goals by 2020, while simultaneously meeting energy mandates for renewable energy production and greenhouse gas (GHG) emissions reduction. The Proposed Action is a mission-enhancing and environmentally beneficial endeavor designed to increase installation sustainability, enhance energy and water security, and foster regional coordination to conserve energy and water, and reduce waste. The Net Zero EIS considers alternatives including implementing conservation policies and procedures throughout the FBTC, constructing a water pipeline onto Fort Bliss, working with the City of El Paso to reclaim gray water for secondary installation uses, construction/operation of a Waste-to-Energy plant on Ft. Bliss, development of geothermal energy and hot water resources on Fort Bliss, and development of up to 300 acres for dry-cooled concentrating solar power technology in the South Training Areas (U.S. Army 2013g).

In order to manage prescribed fires and wildfires, Fort Bliss is in the final stages of completing the Fort Bliss Integrated Wildland Fire Management Plan (IWFMP). This document will help guide wildland fire management on Fort Bliss for the next several years and includes provisions for prescribed burns, managing wildfires while burning within the confines of Fire Management Units, wildfire suppression within Low and High hazard areas and implementing restrictions on live-fire activities within High hazard areas during times of high to extreme fire danger (Sec. 4.17 INRMP 2015).

8. Transportation infrastructure (fragmentation of habitat)

FBTC has an extensive network of hardened access routes for tanks and heavy equipment to move between training areas. There is also an extensive network of “two-track”, non-maintained roads. At this time, the transportation infrastructure that exists is adequate for Fort Bliss traffic and no new roads or access routes are planned for the near future.

Information gaps (as identified in the NM CWCS)

- The intensity, scale, extent and causes of grassland fragmentation in the Chihuahuan Desert are unknown.
- The response of SGCN to human disturbance is poorly understood.
- The effects of habitat fragmentation on SGCN are unknown.
- Environmental conditions or thresholds that limit populations of SGCN are poorly understood.
- Methods to identify early detection landscape degradation attributes that would inform land managers of when grasslands were approaching transitional thresholds are needed, to alleviate the need for expensive restoration projects.
- Specific information on viable approaches to restore semi-desert grasslands to functional mosaics is lacking.
- The extent to which invasive species may alter semi-desert grasslands and limit populations of SGCN is unknown.
- The full extent in which border patrol activities or military maneuvers alters semi-desert grasslands and limits populations of SGCN is unclear.
- Information is needed on grazing management practices that produce sustainable levels, composition, and structure of native grasses.
- The extent to which off-road vehicles use is impacting Chihuahuan semi-desert grassland SGCN populations is unknown.
- Our understanding of the role of fire in sustaining the Chihuahuan semi-desert grasslands and appropriate fire management protocols is poor.
- Short and long-term effects of land management practices or uses (such as energy exploration and development, grazing regimes, invasive species and shrub encroachment management) are unclear. Availability and distribution of this information would allow land managers to make more informed conservation decisions.
- The extent and distributions of chronic wasting disease is currently poorly understood.

CWCS Research, survey and monitoring needs

- Assessing the impacts of livestock grazing on habitat composition and structure and determine how the timing, intensity, and duration of grazing affect SGCN

- Conduct research to enhance the knowledge of the natural history, population biology, and community ecology of SGCN within key habitats, including SGCN distribution, abundance, habitat use, and population trend information
- Consistent landscape health and condition descriptions or protocols, and monitoring standards need to be identified or developed
- Determine conditions that limit populations of SGCN and SGCN response to human disturbances
- Determine how climate change or drought will affect vegetation patterns and community and ecosystem-level dynamics
- Develop collaborative and survey and monitoring protocols for invertebrate SGCN that are not currently being monitored
- Examine type, extent, and structural characteristics of habitat fragmentation and how such habitat alterations influence patch size, edge effect, and use by SGCN
- Investigate early detection methods that indicate when habitats are shifting to another habitat type and indicators of biological integrity
  - Investigate hydrologic relationships in key habitats
  - Investigate invasive species early detection protocols and estimate vectors and pathways of potential invasive species. Determine invasive species effects to key habitats and SGCN
  - Investigate the extent to which off-road vehicle use affects SGCN
  - Quantify the effects of energy exploration and development on habitats and SGCN

Desired Future Outcomes

- Chihuahuan semi-desert grasslands persist in the condition, connectivity, and quantity necessary to sustain viable and resilient populations of resident SGCN and host a variety of land management uses with reduced resource use conflicts.
- Ecological conditions necessary to sustain viable populations of the SGCN in semi-desert grassland habitats are established and garner wide public support.
- Working groups have been established composed of county, municipal, state, and federal land management agencies, and public landowners dedicated to prioritizing and addressing conservation and habitat issues at the grassland-urban interface.
- Partnerships have been established to identify and implement adequate funding for conservation planning; education, and technical, reclamation, survey, or research projects that ensure the future integrity and functionality of semi-desert grasslands for SGCN and resource extraction needs.
- Consistent grassland reclamation standards are established that ensure future habitat integrity and functionality and are adopted by private landowners, counties, municipalities, and federal and state land management agencies.
- Land management plans for federal and state lands include sustainable grazing practices that are fully implemented and enforced.
- A fully funded comprehensive state-wide noxious weed control planning committee and program is established. Colonization of noxious weed species is stopped and extant weed populations are controlled or eliminated.

CWCS Prioritized Conservation Actions

1. Work with land management agencies, private land managers, and the agriculture industry to identify and promote grazing systems on rangelands that ensure long-term ecological sustainability and integrity and are cost effective for livestock interests. Such practices may include collaborative development of grazing management plans, altering

domestic and wildlife stocking rates, time and use, and distribution where forage availability is inadequate, and promoting "grass banking" opportunities that allow degraded rangelands to recover. Fort Bliss does not manage grazing on Fort Bliss lands but is a cooperator with the BLM which manages grazing on withdrawn public lands on14 Grazing Management Units on McGregor Range. Grazing management is detailed in the MOA between Las Cruces District, BLM and Fort Bliss Concerning Management of McGregor Range, 2007 as mandated by P.L. 106-65.

BLM manages grazing on McGregor Range based on principles of multiple use and sustained yield and establishes livestock grazing levels based on objectives for the desired plant community as defined by New Mexico's Standards for Public Land Health.

2. **Work with public and private land managers to reduce shrub encroachment in Chihuahuan semi-desert grasslands. Implementation of this conservation action may include chemical or mechanical manipulation, reseeding with native grasses, or reduction of processes that promote shrub encroachment.** Fort Bliss is developing a program to control shrub encroachment upon desert grasslands mainly through the use of prescribed fire treatments. Fort Bliss and BLM, under the MOA described above, work cooperatively together to implement mechanical and prescribed fire projects on McGregor Range designed to reduce shrub encroachments on mesa grasslands.

3. Work with federal, state, private organizations, research institutions, and universities to design and implement projects outlined in the Research, Survey, and Monitoring Needs or Information Gaps section outlined above. Fort Bliss has been conducting surveys and monitoring for a wide variety of plant and animal species found on Fort Bliss for nearly forty years. See Appendices of this document: Appendices C, D, E, F, G, I, and J for lists of projects that have been completed on Fort Bliss.

4. Work with public and private land managers and the energy industry to encourage energy development in a manner that preserves the integrity and functionality of Chihuahuan semi-desert grasslands and restores disturbed sites. Fort Bliss is working toward a goal that allows for clean energy development on Fort Bliss in order to be energy self-sufficient by 2020. Fort Bliss Net Zero EIS is in draft form at this time. Sites selected for solar, wind and geothermal energy projects on Fort Bliss are within areas that are outside of grasslands and other protected areas.

5. Form partnerships with effected communities and federal land management agencies to facilitate and encourage maintenance and restoration of Chihuahuan semi-desert grasslands. Fort Bliss has MOAs with the USFS, NRCS and BLM to promote the sustainability and preservation of sensitive grassland areas on Fort Bliss and on withdrawn public lands.

6. Collaborate with federal and state agencies to designate areas for off-road vehicle use that avoid disturbance to SGCN or their habitats and discover ways to mitigate such disturbance where it currently occurs. Fort Bliss has a policy for areas designated for ORV use that keeps ORV use confined to areas that are mainly mesquite coppice dunes and on roads in all other areas of Fort Bliss.

7. Collaborate with federal and state land management agencies and other publics to identify legislative actions, land acquisition and easement protection that will conserve the Chihuahuan semi-desert grasslands. Fort Bliss has a policy to manage all of its grassland areas for sustainability and conservation. See Appendices C, G, H and I of this document to see how Fort Bliss is working to conserve grasslands.

8. Work with federal, state, and private organizations to develop public education projects that increase awareness and understanding of the fragility of Chihuahuan semi-desert grasslands and their importance to a wide array of species. Fort Bliss has public outreach programs that educate the public about wildlife and habitat conservation on Fort Bliss and also participates in and works with a host of outside agencies and conservation groups to promote natural resources conservation within a regional context.

A list of SGCN was created from the NM CWCS that occur on Fort Bliss (Table K-1). The state status and federal status are listed, along with the occurrence on Fort Bliss (Table 2.3-6 INRMP 2015). Table K-1 contains the NatureServe State and National Conservation Status Codes as presented in the New Mexico Comprehensive Wildlife Conservation Strategy (NMCWCS 2005). These Codes apply to the vertebrate and invertebrate fauna described in the NM CWCS.
Table K-2 contains rare plant species that are known or expected to occur on Fort Bliss as defined by the New Mexico Rare Plant List (NMRP) and includes State and Global Rankings.

Rank	Definition	
State and National Codes		
	State	**National**
0	Possibly Extirpated	Possibly Extirpated
1	Critically Imperiled	Critically Imperiled
2	Imperiled	Imperiled
3	Vulnerable	Vulnerable
4	Apparently Secure	Apparently Secure
5	Secure	Secure
X	Extinct	
State and Federal Status		
T	Threatened	
E	Endangered	
S	Sensitive Species	
C	Candidate	

Rank	Definition
	State
S1	**Critically Imperiled**- Critically imperiled in NM because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation from New Mexico. Typically 5 or fewer occurrences or very few remaining individuals (<1000).
S2	**Imperiled**- Imperiled in NM because of rarity or because of some factor(s) making it very vulnerable to extirpation from New Mexico. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000)
S3	**Vulnerable -** Vulnerable in NM either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals).
S4	**Apparently Secure-** Uncommon but not rare, and usually widespread in NM. Possibly cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
S5	**Secure-** Common, widespread, and abundant in NM. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
SNR	**Unranked -** NM rank not yet assessed
	Global
G1	**Critically Imperiled-** Critically imperiled globally because of extreme rarity or because of some factor(s) making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1000) or acres (<2,000) or linear miles (<10).
G2	**Imperiled-** Imperiled globally because of rarity or because of some factor(s) making it very vulnerable to extinction or elimination. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or linear miles (10 to 50)
G3	**Vulnerable -** Vulnerable globally either because rare and local through its range, found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extinction or elimination. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals.
G4	**Apparently Secure-** Uncommon but not rare (although it may be rare in parts of its range, particularly on the periphery), and usually widespread. Apparently not vulnerable in most of its range, but possibly cuase for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
G5	**Secure-** Common, widespread, and abundant (although it may be rare in parts of its range, particularly on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
G#G#	**Range Rank -** A numeric range rank (e.g., G2G3) is used to indicate uncertainty about the exact status of a taxon.
?	**Inexact Numeric Rank** - Denotes inexact numeric rank (e.g. G3?)
T#	**Infraspecific Taxon (trinomial) -** The status of the infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above.

Table K-1 Fort Bliss, New Mexico Species of Greatest Conservation Need. This table is based on the species list for the Chihuahuan Desert Ecoregion of the NM CWCS (2006) and identifies species known to occur and expected to occur on the New Mexico portion of Fort Bliss.

Mammals									
Scientific Name	Common Name	Status		Abundance Ranking		Landscape Habitat		Fort Bliss	
		Federal	State	National	State		Notes	Expected	Known
Myotis occultus	Arizona Myotis Bat		S	3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Cynomys ludovicianus	Black-tailed Prairie Dog	C	S	2	1	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Sigmodon ochrognathus	Yellow-Nosed Cotton Rat			3	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Odocoileus hemionus	Mule Deer			5	5	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Ovis canadensis mexicana	Desert Bighorn Sheep		E	3	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y

BIRDS									
Scientific Name	Common Name	Status		Abundance Ranking		Key Terrestrial Habitats		Fort Bliss	
		Federal	State	National	State		Notes	Expected	Known
Haliaeetus leucocephalus	Bald Eagle	T	T	4	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Circus Cyaneus	Northern Harrier			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Buteo regalis	Ferruginous Hawk			4	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Aquila chrysaetos	Golden Eagle			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Falco femoralis	Aplomado Falcon	E	E	2	1	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland		Y	
Cyrtonyx montezumae	Montezuma Quail			5	4	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Callipepla squamata	Scaled Quail			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Grus canadensis	Sandhill Crane			5	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y

BIRDS continued…									
Scientific Name	Common Name	Status		Abundance Ranking		Key Terrestrial Habitats		Fort Bliss	
		Federal	State	National	State		Notes	Expected	Known
Zenaida macroura	Mourning Dove			5	5	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Athene cunicularia	Burrowing Owl			4	5	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Lanius ludovicianus	Loggerhead Shrike		S	4	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Vireo vicinior	Gray Vireo		T	4	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Oreoscoptes montanus	Sage Thrasher			5	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Anthus spragueii	Sprague's Pipit			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Ammodramus bairdii	Baird's Sparrow			3	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Ammodramus savannaru	Grasshopper Sparrow			3	1	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Icterus cucullatus	Hooded Oriole			4	4	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y

Amphibians and Reptiles									
Scientific Name	Common Name	Status		Abundance Ranking		Key Terrestrial Habitats		Fort Bliss	
		Federal	State	National	State		Notes	Expected	Known
Ambystoma tigrinum	Tiger Salamander			5	5	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Terrapene ornata	Ornate Box Turtle			5	5	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Crotaphytus collaris	Collard Lizard			4	5	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Coleonyx brevis	Texas Banded Gecko			5	4	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Lampropeltis alterna	Gray-Banded Kingsnake		E	2	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland		Y	
Lampropeltis triangulum	Milk Snake			4	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland		Y	
Crotalus atrox	Western Diamondback Rattlesnake			5	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Sistrurus catenatus edwardsii	Desert Massasauga			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland		Y	

Invertebrates									
Scientific Name	Common Name	Status		Abundance Ranking		Key Terrestrial Habitats		Fort Bliss	
		Federal	State	National	State		Notes	Expected	Known
Pupilla sonorana	Three-toothed Column Snail			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Metastoma roemeri	Distorted Metastoma Snail			2	2	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Rabdotus dealbatus neomexicanus	Whitewashed Radabotus Snail			4	4	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Sonorella orientis	Organ Mountain Talussnail			3	3	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Sonorella metcalfi	Franklin Mountain Talussnail			2	1	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y
Sonorella todseni	Dona Ana Talussnail		T	1	1	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland		Y	
Ashmunella spp.	Woodlandsnail			1	1	Chihuahuan Piedmont Semi-Desert Grassland; Chihuahuan-Sonoran Desert Bottomland and Swale Grassland			Y

Table K-2 Rare and Endangered Plants of Fort Bliss, New Mexico This table is developed from the EMNRD-Forestry Divisions Endangered Plant Program (19.21.2.8 NMAC) and identifies known species and species expected to occur on the New Mexico portion of Fort Bliss.

Plants									
Scientific Name	**Common Name**	**Status**		**Abundance Ranking**		**Habitat**		**Fort Bliss**	
		Federal	**State**	**Global**	**State**		**Notes**	**Expected**	**Known**
Argemone pleiacantha subsp. Pinnatisecta (A. pinnatisecta)	Sacramento prickly poppy	E	E	G4G5T2	S2	Sacramento Mountains; Loose, gravelly soils of open disturbed sites; canyon bottoms and slopes, sometimes along roadsides; 1,300-2,200 m (4,200 - 7,100 ft)			Y
Echinocereus fendleri var. kuenzleri	Kuenzler's hedgehog cactus	E	E	G4G5T1	S1	Sacramento Mountains; Primarily on gentle, gravelly to rocky slopes and benches on limestone or limy sandstone, in Great Plains grassland, oak woodland, or pinon-juniper woodland. Elevation 1,600-2,000 m (5,200 - 6,600 ft.)		Y	
Escobaria organensis	Organ Mountain pincushion cactus		E	G2	S2	Northern Franklin Mountains and Organ Mountains. On andesite, quartz-monzonite, and to a lesser extent rhyolite and limestone in broken mountainous terrain. Associations Chihuahuan Desert Scrub and open oak and pinon-juniper woodland; 1,350-2,600 m (4,400 - 8,530 ft)			Y
Escobaria sneedii var. sneedii	Sneed's pincushion cactus	E	E	G2T2	S2	Primarily cracks in limestone in areas of broken terrain and steep slopes usually in Chihuahuan desert scrub.			Y

Plants continued…									
Scientific Name	Common Name	Status		Abundance Ranking		Habitat		Fort Bliss	
		Federal	State	Global	State		Notes	Expected	Known
Escobaria villardii	Villard's pincushion cactus		E	G2	S2	Loamy soils of desert grassland with Chihuahuan desert scrub on broad limestone benches in mountainous terrain; 1,370-2,000 (4,500-6,500 ft).	Occurs in the Sacramento Mountains. No plants have been located on Ft. Bliss portion, although it is expected to occur.	Y	
Hexalectris arizonica	Crested Coralroot		E	G5T4T5	SNR	In heavy leaf litter in oak, pine, or juniper woodlands over limestone.	Synonomous with H. spicata		Y
Opuntia arenaria	Sand Prickly Pear		E	G2	S2	Sandy areas, particularly semi-stabilized sand dunes among open chihuhuan desert scrub, often with honey mesquite and a sparse cover of grasses; 1,160-1,300 m (3,800 - 4,300 ft)			Y
Peniocereus greggii	Night-blooming cereus		E	G3G4T2	S1	Mostly in sandy to silty gravelly soils in gently broken to level terrain in desert grassland or Chihuahuan desert scrub. Typically found growing up through and supported by shrubs, especially Larrea divaricata and Prosopis glandulosa.			Y

Texas Conservation Action Plan (TCAP) on Fort Bliss

The Texas portion of Fort Bliss occurs in the Chihuahuan Desert ecoregion (TPWD 2012). Priority habitat types of this ecoregion identified by the Texas Conservation Action Plan (TCAP; TPWD 2012) present in the Texas portion of Fort Bliss are barren/sparse vegetation, desert scrub, grassland, shrubland, and riparian. The ecological drainage unit (EDU) for the area of Fort Bliss located in Texas is the Middle Rio Grande EDU (TPWD 2012).

Issues

Broad issue categories were identified in the 2012 TCAP (TPWD 2012) and are based on potential effects (either direct or indirect) on Species of Greatest Conservation Need (SGCN; TPWD 2012). Habitat fragmentation, habitat loss, and open-space land conversion issues are considered prevalent problems in Texas that may or may not be symptoms and causes of other issues (TPWD 2012). Therefore, these three issues are not specifically addressed as Fort Bliss TCAP issues. The list of issues for the Chihuahuan Desert ecoregion identified in the TCAP that are pertinent to Fort Bliss, Texas is:

1. **Non-native plants**
   Six exotic plant species considered noxious occur on the Texas portion of Fort Bliss. African rue (*Peganum harmala*) is the only actively controlled invasive species on Fort Bliss. It invades disturbed sites and once successfully established can spread and outcompete native grasses. On Fort Bliss, African rue is managed with herbicide application, mechanical removal, and burning. Russian thistle (*Salsola tragus*) is another species that has established on disturbed ground throughout Fort Bliss. Salt cedar (*Tamarix ramosissima*) exists at some stock tanks and at other widely scattered locations on Fort Bliss. Malta starthistle (*Centaurea melitensis*) is another potential problem plant that grows on Fort Bliss along U.S. Highway 54, and may occur along other roadways on the Installation as well. Other exotic species of concern include Johnsongrass (*Sorghum halepense*) which occurs in some drainages, and Bermudagrass (*Cynodon dactylon*).

2. **Non-native animals (Barbary sheep/aoudad)**
   Barbary sheep/aoudad can alter or degrade habitat, compete with native small mammals and ungulates for food, and are disease vectors which can affect native ungulates and domestic livestock (TPWD 2012). Fort Bliss oversees an annual lottery draw hunt for Barbary sheep in the Hueco Mountains to control the population and provide recreation.

3. **Native problematic (brush encroachment)**
   Native shrub species can encroach into grasslands, decreasing habitat for grassland-obligate wildlife species such as Baird’s sparrow, Sprague’s pipit and pronghorn antelope. Shrub species on Fort Bliss that may increase in response to disturbance, moisture regime change, and climate change include mesquite, tarbush, and creosote. Fort Bliss plans to utilize prescribed fires within shrub-invaded grasslands to restore habitat.

4. **Parasite (Barber pole worm [*Haemonchus* spp.] potential in pronghorn antelope populations)**

Barber pole worms are parasitic roundworms that, at high concentrations, can negatively impact pronghorn survival. The status of barber pole worms in pronghorn on Fort Bliss is unknown. Pronghorns have not been found on the Texas portions of Fort Bliss.

5. Pathogens (potential for white-nose syndrome in bat populations in the Hueco Mountains)

White-nose syndrome affects hibernating bats and is possibly spread through human and bat vectors during cave visitation. Mortality is high in infected bats. Preventative measures and overall cause is currently unknown. The status of white-nose syndrome in bat populations on Fort Bliss is unknown.

6. Road construction

New road construction can cause habitat fragmentation, erosion, and resulting dust from poor site selection (e.g., soil types that degrade to dust when driven on) can limit military training. It is prescribed that heavily-used existing roads be re-constructed using hardened base course or similar material to prevent erosion and dust production.

7. Right-of-Way construction (mowing, trimming, use of herbicides)

Mowing and trimming vegetation and use of herbicide spray may cause habitat fragmentation and may pose visual barriers to movement in small species. Mowing may be used along certain areas of firebreak roads to help prevent fire from crossing cleared areas that protect sensitive habitats and cultural resources, but is otherwise not frequently used on Fort Bliss. Herbicide is only used to control African rue on the cantonment and along roadways.

8. Lack of soil management and conservation practices

Soils are one of the necessary natural resource components for sustainable military training. Soil disturbance from human activities causes soil erosion. Soil erosion contributes to the loss of nutrient-rich topsoil needed for vigorous plant growth, increases rehabilitation costs, reduces water quality, produces fugitive dust and can create gullies that pose hazards to troops and equipment. A lack of vegetative ground cover (i.e., bare ground) exposes soil to wind and water erosion forces. Repeated, concentrated use of an area can cause vegetative ground cover loss. Range Operations personnel help to limit impacts by scheduling and spreading training around the FBTC. OLA and LUA restrictions limit impacts on vegetation. The Fort Bliss ITAM program may also suggest that an area be rested from military use to allow vegetation to recover.

One beneficial habitat management practice utilized at Fort Bliss is stockpiling top or surface soils whenever large excavations occur, such as a new barrow pit. The topsoil is pulled off and stockpiled, and then re-used as the last layer of cover after the barrow pit is rehabilitated. This ensures that topsoil containing native seeds and natural biota important in ecological processes are present to help reestablish native vegetative cover in the area (Sec. 4.8 INRMP 2015).

9. Fire suppression and lack of or inappropriate application of prescribed fire

Prescribed burning can reverse brush encroachment upon grasslands. At this time, there are no plans for the use of prescribed fire on the Texas portion of Fort Bliss.

10. Inappropriate recreational use (Off-road Vehicle [ORV] use)

Off-road vehicles can degrade habitat, directly kill wildlife or disturb wildlife behavior, destroy cultural resources, and decrease training area diversity. Recreationists on Fort Bliss are limited to operating ORVs on established roads. Off-road military use is restricted to coppice sand dune areas where there are few detrimental ecological effects.

11. Climate change

Changes in temperature and moisture regimes of the Chihuahuan Desert of Fort Bliss could have widespread, negative effects on the ecosystem and training mission, including changes in species composition, increased drought frequency and severity, increased erosion and susceptibility to erosion, and increased chance of invasive species establishment.

Monitoring species can detect negative effects of climate change. Threatened, endangered, or sensitive plant and animal species on Fort Bliss are monitored regularly through biological surveys. Along with monitoring population numbers, survey report data are used in establishment of OLAs and LUAs and with planning the location and timing of training events.

Information gaps

- Potential impacts of Barbary sheep on small mammal and ungulate populations on Fort Bliss are unknown. Concern in the TCAP for Barbary sheep impacts on native ungulates (TPWD 2012) likely refers to potential resource competition between this species and Desert bighorn sheep (*Ovis canadensis nelsoni*), a species not present on Fort Bliss.
- The status/presence of *Haemonchus* in Fort Bliss pronghorn populations is unknown.

Research, survey and monitoring needs

- Continue surveys and monitoring for SGCN on Fort Bliss to assist in conservation planning.
- Determine potential effects of Barbary sheep/aoudad populations on native small mammal and/or ungulate populations.
- Sample and monitor *Haemonchus* distribution in pronghorn populations and determine source of vulnerabilities, spread, and avenues for containment and recovery if needed (TPWD 2012).
- Survey and monitor bat populations in the Hueco Mountains on Fort Bliss for white-nose syndrome.
- Conduct research to enhance the knowledge of the natural history, population biology, and community ecology of SGCN on Fort Bliss, including SGCN distribution, abundance, habitat use, and population trend information.
- Continue working with partners including White Sands Missile Range, Holloman Air Force Base, U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, New Mexico Game and Fish, Bureau of Land Management, U.S. Forest Service, New Mexico State University, the University of Texas-El Paso, and the Jornada Range Experimental Station to identify information gaps and perform surveys/monitoring geared toward sustainability and multiple land usage.

Desired Future Outcomes

- Habitats persist in the condition, connectivity, and quantity necessary to sustain viable and resilient populations of resident SGCN and host a variety of land management uses with reduced resource use conflicts.

Prioritized Conservation Actions

The numbers in the following list correspond to and address the list of issues identified by the TCAP (TPWD 2012) above:

1. **Non-native plants**
   Use vegetative Best Management Practices (Section 4.8) to include weed and noxious plant control (burning, mowing, chemical treatments).

2. **Non-native animals (Barbary sheep/aoudad)**
   Determine potential effects of Barbary sheep/aoudad populations of Fort Bliss on native small mammal and/or ungulate populations.

3. **Native problematic (brush encroachment)**
   Fort Bliss uses prescribed burning in shrub-invaded grasslands for habitat restoration. Fort Bliss plans to use mechanical treatments of thinning followed by prescribed fire in piñon/juniper stands that have invaded grasslands as per recommendations within the Fort Bliss Integrated Wildland Fire Management Plan (IWFMP 2015).

4. **Parasites (Barber pole worm [*Haemonchus* spp.] potential in pronghorn antelope populations)**
   Potential habitat for pronghorn occurs mainly on the New Mexico portion of Fort Bliss and not in Texas.
   In New Mexico, future sampling for *Haemonchus spp.* in harvested pronghorn during Fort Bliss hunts could help determine the status of this parasite.

5. **Pathogens (potential for white-nose syndrome in bat populations in the Hueco Mountains)**
   Survey and monitor bat populations in the Hueco Mountains on Fort Bliss for white-nose syndrome.

6. **Road construction**
   Continue use of the Fort Bliss Mitigation and Monitoring Plan, the Fort Bliss Mission and Master Plan Final SEIS, and the Fort Bliss Real Property Plan to propose strategic site selection and for implementing sustainable design and construction (Section 3.3.2). SGCN population locations/concentrations are known and avoided.

7. **Right-of-Way construction (mowing, trimming, use of herbicides)**
   Continue use of the Fort Bliss Mitigation and Monitoring Plan, the Fort Bliss Mission and Master Plan Final SEIS, and the Fort Bliss Real Property Plan to propose strategic site selection and implemention of sustainable design and construction (Section 3.3.2). SGCN population locations/concentrations are known and avoided. Herbicide use on Fort Bliss must be reviewed and approved by DPW-E.

8. Lack of soil management and conservation practices

Continue DPW-E review and approval process of all off-road maneuvers and field training exercises through the Range and Facility Management Support System (RFMSS; Section 3.3) and Vegetative BMPs (Section 4.8)

9. Fire suppression and lack of or inappropriate application of prescribed fire

Implement the prescribed fire and fire-fighting recommendations of the Fort Bliss Integrated Wildland Fire Management Plan (IWFMP 2015).

10. Inappropriate recreational use (Off-road Vehicle [ORV] use)

Continue to limit ORV use to existing roads. Continue to educate recreationists about ORV use restrictions on Fort Bliss.

11. Climate change

Increased severity and frequency of drought may cause a loss of ground cover vegetation. Fort Bliss has established Off Limits Areas and Limited Use Areas to protect ecologically sensitive plant communities, such as riparian areas and grasslands. Prohibiting or limiting activity in such areas will prevent loss of vegetative cover important to wildlife, training diversity, and recreation.

Climate change may result in increased fire frequency. Fort Bliss has established fire breaks (wide strips of area cleared of vegetation) to protect cultural and natural resources and control wildfire spread. Some areas of Fort Bliss may benefit from burning. These areas are proposed for treatment in the Fort Bliss IWFMP (2015).

With an increase in drought frequency and a potential decrease in vegetative cover, erosion can become more frequent. A significant loss of topsoil from wind and/or water erosion may alter a vegetation community. Wind-blown, accumulated dust can inhibit military training activities. For instance, roads may become impassable or helicopters may be prevented from landing in areas where dust has accumulated. The Fort Bliss Integrated Training Area Management (ITAM) program monitors trail conditions and does some road condition repair and erosion prevention. Range liaison personnel participate in site selection for military training and can recommend alternate locations for training where a negative vegetation impact, dust creation, or erosion potential is a concern.

Invasive species may increase with a changing climate. Fort Bliss plans to conduct prescribed burning in shrub-invaded grasslands for habitat restoration and invasive species control. Fort Bliss DPW-E also oversees treatment of invasive species on the installation. Currently, African rue is the only species actively treated, but other species are identified and may receive treatment if their numbers increase in the future.

NatureServe Conservation Status Ranks compiled and based on the Texas Conservation Action Plan 2011: Status and Rank Key for use with SGCN and Rare Communities List.

Rank	Definition
	State or Federal Listing Status
LE	Federally endangered species or population
LT	Federally threatened species or population
C	Federal Candidate
SAT	Treated as threatened due to similarity of appearance to a species which is federally listed such that enforcement personnel have difficulty in attempting to differentiate between the listed and unlisted species.
PT	Proposed Threatened
PDL	Proposed Downlisting/Proposed Delisting
E	State endangered species or population
T	State threatened species or population
	Conservation (Vulnerability or Rarity) Ranking
G	Global Conservation Status Rank
N	National Conservation Status Rank
S	Subnational (State/Province) Conservation Status Rank
1	Critically Imperiled - Very high risk of extinction/extirpation or elimination due to very restricted range, very few populations or occurences, very steep declines, very severe threats, or other factors
2	Imperiled- At high risk of extinction/extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
3	Vulnerable - At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
4	Apparently Secure - At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
5	Secure - At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurences, and little to no concern from declines or threats.
X	Extinct/Extirpated
H	Possible Extinct/Extirpated

Rank	Definition
Conservation (Vulnerability or Rarity) Ranking	
Global	
X	Presumed Extinct (Species)-Not located despite intensive searches and virtually no likelihood of rediscovery
	Eliminated (Ecological Community) - Elimated throught its range, with no restoration potential due to extinction of dominant or characteristic species.
H	Possibly Extinct (Species) - Missing; known from only historical occurences but still some hope for recovery.
	Possibly Extinct (Historic, ecological communities) - Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut Forest.
Subnational (State/Province)	
X	Presumed Extirpated - Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
H	Possibly extirpated (historical) - Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such as 20-40 year delay if the only known occurences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurences.
SNR	Unranked - Nation or state/province conservation status not yet assessed
SU	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA	Common, widespread, and abundant in the nation or state/province

Rank	Definition
Rank Qualifiers	
?	Inexact Numeric Rank - Denotes inexact numeric rank (e.g., G2?)
Q	Questionable taxonomy - Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority.
Infraspecific Taxon Conservation Status Ranks	
Infraspecific taxa refer to subspecies, varieties and other designations below the level of the species. Infraspecific taxon status ranks (T-ranks) apply to plants and animal species only; these T-ranks do not apply to ecological communities.	
T#	The Status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperiled subspecies of an otherwidse widespread and common species would be G5T1. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole-for example, a G1T2 cannot occur. A vertebrate animal population, such as those listed as distinct population segments under the U.S. Endangered Species Act, may be considered an infraspecific taxon and assigned a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status. At this time, the T rank is not used for ecological communities.
Variant Ranks	
G#G# or S#S#	Range Rank - A numeric range rank (e.g., G2G3 or S2S3) is used to indicate the range of uncertainty in the status of a species or community. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4)
GU	conflicting information about status or trends. Whenever possible, the most likely rank is assigned and the question mark qualifier is added (e.g., G2?) to express uncertainty, or a range rank (e.g., G2G3) is used to delineate the limits (range) of uncertainty.
GNR	Unranked - Global rank not yet assessed.
Not Provided	Species is known to occur in this nation or state/province. Contact the relevant natural heritage program for assigned conservation status.
Breeding Status Qualifiers	
B	Breeding - Conservation status refers to the breeding population of the species in the nation or state/province.
N	Nonbreeding - Conservation status refers to the non-breeding population of the species in the nation or state/province.

Table K-3. Texas Species of Greatest Conservation Need. This list was created from the Chihuahuan Desert and Arizona-New Mexico Mountains ecoregion in the TCAP (2012) and edited to identify species expected and known to occur on the Texas portion of Fort Bliss.

Mammals (*W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrl.ttu.edu/tmot1/Default.htm (accessed 2011 and 2014))									
Scientific Name	**Common Name**	**Status**		**Abundance Ranking**		**General Habitat Type(s) in Texas***		**Fort Bliss**	
		Federal	**State**	**Global**	**State**		**Notes**	**Known**	**Expected**
Ammospermophilus interpres	Texas antelope squirrel			G4G5	S4	Desert scrub, Shrubland	Known from Franklin Mountains (Harris, 2000)		Y
Antilocapra americana	Pronghorn			G5	S3	Grassland, Desert scrub			Y
Antrozous pallidus	Pallid bat			G5	S5	Caves/Karst, Desert scrub, Grassland, Shrubland		Y	
Chaetodipus eremicus	Chihuahuan Desert pocket			G5	S5	Riparian, Desert Scrub, Grassland			Y
Corynorhinus townsen	Townsend's big-eared bat			G4T4	S3?S4?	Caves/Karst, Desert scrub, Grassland, Shrubland		Y	
Dipodomys spectabili	Banner-tailed kangaroo rat			G5	S4	Desert scrub, Shrubland			Y
Eptesicus fuscus	Big brown bat			G5	S5	Forest, Barren/Sparse Vegetation, Caves/Karst, Artificial Refugia		Y	
Euderma maculatum	Spotted bat		T	G4	S2	Riparian, Barren Sparse Vegetation		Y	
Mustela frenata	Long-tailed weasel			G5	S5	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide		Y
Myotis californicus	California myotis			G5	S4	Desert Scrub, Grassland, Woodland, Artificial refugia		Y	
Myotis ciliolabrum	Western small-footed myotis			G5	S3	Caves/Karst, Desert Scrub, Barren/Sparse Vegetation			Y

Mammals (*W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrl.ttu.edu/tmot1/Default.htm (accessed 2011 and 2014))

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas*	Notes	Fort Bliss	
		Federal	State	Global	State			Known	Expected
Myotis velifer	Cave myotis			G5	S4	Caves/Karst,			Y
Myotis yumanensis	Yuma myotis			G5	S4	Desert Scrub, Riparian, Caves/Karst, Artificial Refugia			Y
Mytois thysanodes	Fringed myotis			G5	S3	Forest, Woodland, Desert Scrub, Grassland, Cave/Karst, Barren/Sparse Vegetation			Y
Notisorex crawfordii	Desert shrew			G5	S4	Desert Scrub, Riparian, Woodland, Freshwater Wetland, Grassland			Y
Nyctinomops macrotis	Big free-tailed bat			G5	S3	Desert Scrub, Barren/Sparse Vegetation		Y	
Onychomys arenicola	Mearn's grasshopper			G4G5	S4S5	Desert Scrub			Y
Parastrellus hesperus	Canyon Bat (western			G5	S5	Riparian, Barren Sparse Vegetation			Y
Peromyscus nasutus	Northern rock mouse			G5	S4	Barren/Sparse Vegetation		Y	
Puma concolor	Mountain lion			G5	S2	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide		Y
Spilogale gracilis	Western spotted skunk			G5	S5	Agricultural, Grassland, Forest, Woodland, Desert Scrub			Y
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5	Cave/Karst, Artificial Refugia	Statewide	Y	
Taxidea taxus	American badger			G5	S5	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest			Y
Thomomys bottae texensis	Limpia Creek pocket gopher			G5T2	S2	Desert Scrub, Grassland	same as Thomomys bottae limpia?		Y
Vulpes velox macrotis	Swift fox			G3	S3?	Grassland	common nomenclature change (2009)		Y

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Birds (*The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American

		Status		Abundance Ranking				Fort Bliss, TX	
Scientific Name	Common Name	Federa	State	Global	State	Habitat Type(s)	Notes	Known	Expected
Callipepla squamata	Scaled Quail			G5	S4B	Desert Scrub, Grassland, Shrubland	Year-round	Y	
Cyrtonyx montezumae	Montezuma Quail			G4G5	S3B	Grassland, Shrubland	Year-round	Y	
Circus cyaneus	Northern Harrier			G5	S2B,S3N	Grassland, Shrubland	Year-round	Y	
Parabuteo unicinctus	Harris's Hawk			G5	S3B	Desert Scrub, Grassland, Shrubland	Year-round	Y	
Buteo nitidus	Gray Hawk		T	G5	S2B	Woodland, Forest	Year-round, LRGV	Y	
Buteo swainsoni	Swainson’s Hawk			G5	S4B	Desert Scrub, Grassland, Shrubland	Breeding	Y	
Buteo albonotatus	Zone-tailed Hawk		T	G4	S3B	Barren/Sparse Vegetation, Riparian	Breeding		Y
Buteo regalis	Ferruginous Hawk			G4	S2B,S4N	Grassland	Winter and breeding in HIPL	Y	

Birds (*The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the

		Status		Abundance Ranking				Fort Bliss, TX	
Scientific Name	**Common Name**	**Federal**	**State**	**Global**	**State**	**Habitat Type(s)**	**Notes**	**Known**	**Expected**
Aquila chrysaetos	Golden Eagle			G5	S3B	Desert Scrub, Grassland, Shrubland	Year-round	Y	
Falco sparverius	American Kestrel			G5	S4B	Grassland, Savanna/Open Woodland	Year-round; paulus & southwest population	Y	
Falco femoralis	Aplomado Falcon	E	E	G4	S1	Grassland, Shrubland	Year-round		?
Falco peregrinus	Peregrine Falcon	LT	T	G4	S3	Barren/Sparse Vegetation, Riparian	Year-round, subspecies *anatum*	Y	
Charadrius alexandrinus	Snowy Plover			G4	S3B	Saltwater Wetland, Coastal	Year-round	Y	
Charadrius montanus	Mountain Plover	PT		G3	S2	Agricultural, Grassland	Winter		?
Numenius americanus	Long-billed Curlew			G5	S3B,S5N	Grassland, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Agricultural	Year-round	Y	
Coccyzus americanus occidentalis	Yellow-billed Cuckoo (western)	C		G5	S4S5B	Woodland, Riparian	Breeding, Pecos River Valley and westward	Y	

Birds (*The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists'									
		Status		Abundance Ranking				Fort Bliss, TX	
Scientific Name	**Common Name**	**Federal**	**State**	**Global**	**State**	**Habitat Type(s)**	**Notes**	**Known**	**Expected**
Athene cunicularia	Burrowing Owl			G4	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Year-round	Y	
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	Y	
Lanius ludovicianus	Loggerhead Shrike			G4	S4B	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	Y	
Vireo bellii	Bell's Vireo			G5	S3B	Desert scrub, Shrubland, Riparian	Breeding	Y	
Aimophila cassinii	Cassin's Sparrow			G5	S4B	Grassland, Shrubland	Breeding		?
Aimophila ruficeps	Rufous-crowned Sparrow			G5	S4B	Grassland	Year-round	Y	
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B	Grassland, Agricultural	Year-round	Y	?
Chondestes grammacus	Lark Sparrow			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	Y	

Birds (*The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists'									
		Status		Abundance Ranking				Fort Bliss, TX	
Scientific Name	Common Name	Federal	State	Global	State	Habitat Type(s)	Notes	Known	Expected
Ammodramus bairdii	Baird's Sparrow			G4	S2	Grassland	Winter		?
Calcarius mccownii	McCown's Longspur			G4	S4	Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	Y	
Piranga rubra	Summer Tanager			G5	S5B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	Y	
Passerina ciris	Painted Bunting			G5	S4B	Shrubland, Agricultural	Breeding	Y	
Sturnella magna	Eastern Meadowlark			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies *lilliana* added for CHIH	Y	

Reptiles and Amphibians (*http://www.herpsoftexas.org/)									
		Status		Abundance Ranking				Fort Bliss, TX	
Scientific Name	Common Name	Federal	State	Global	State	General Habitat Type(s) in Texas*	Notes	Known	Expected
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			G5	SU	woodland, forest, freshwater wetland			Y
Crotalus atrox	Western diamondback rattlesnake				S4	barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst		Y	
Crotalus viridis	Prairie rattlesnake					grassland, barren/sparse vegetation, deset scrub, savanna	added	Y	
Heterodon nasicus	Western hognosed snake					desert scrub, grassland, shrubland	added		Y
Phrynosoma cornutum	Texas horned lizard		T	G4G5	S4	desert scrub, grassland, savanna		Y	
Phrynosoma hernandesi	Mountain shorthorned lizard		T	G5	S3	desert scrub, grassland, savannawoodland	also known as Greater short-horned lizard		Y
Sistrurus catenatus	massasauga					grassland, barren/sparse vegetation, shrubland, coastal,	added		Y
Terrapene ornata	Ornate box turtle			G5	S3	grassland, barren/sparse vegetation, deset scrub, savanna, woodland			Y
Trimorphodon vilkinsonii	Chihuahuan Desert Lyre Snake		T	G4	S3*	Barren/Sparse Vegetation, Desert Scrub			Y

Invertebrates									
		Status		Abundance Ranking				Fort Bliss, TX	
Scientific Name	Common Name	Federal	State	Global	State	General Habitat Type(s) in Texas*	Notes	Known	Expected
Ashmunella pasonis	Franklin Mountain woodlandsnail			G2G3	S1?*	Savanna/Open Woodland	Terrestrial - Mollusks - Land Snails		Y
Bombus sonorus	Sonoran bumblebee			GU	SU*	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant		Y
Cibolacris samalayuc	A grasshopper			G2?	S2?*	Grassland	Terrestrial - Insects - Grasshoppers		Y
Cicindela togata "play	White-cloaked tiger beetle			G5T4	S2*	Barren/Sparse Vegetation	Terrestrial - Insect - Beetles		Y
Isoperla jewetti	Grande stripetail			G1	S1*	Riparian, Riverine	Aquatic - Insects - Stoneflies		Y
Radiocentrum ferrissi	Fringed mountainsnail			G1	S1*	Woodland	Terrestrial - Mollusks ; Fossils in the Franklin Mountains and presumed extinct		Y
Sonorella metcalfi	Franklin Mountain talussnail			G2	S1	Barren/Sparse Vegetation	Terrestrial - Mollusks - Land Snails	Y	

Plants									
		Status		**Abundance Ranking**				**Fort Bliss, TX**	
Scientific Name	**Common Name**	**Federal**	**State**	**Global**	**State**	**General Habitat Type(s) in Texas***	**Notes**	**Known**	**Expected**
Astragalus waterfallii	Waterfall's milkvetch			G3	S3	Desert Scrub (rocky limestone substrates)	Terrestrial		Y
Brickellia baccharidea	resin-leaf brickellbush			G3	S1	Desert scrub; Shrubland	Terrestrial		Y
Chamaesyce geyeri var. wheeleriana	Wheeler's spurge			G5T2	S1	Barren/Sparse Vegetation (reddish windblown sand in dunes & coppices mounds)	Terrestrial		Y
Cleomella longipes	stalked rhombopod			G3G4	S3	Barren/Sparse Vegetation; Riparian (ephemeral drainages and streams/rivers); Freshwater Wetlands (seeps, ciengegas)	Terrestrial		Y
Colubrina stricta	Comal snakewood			G2	S1	Shrubland	Terrestrial		Y
Coryphantha robustispina subsp. uncinata	Scheer's cory cactus			G4T3	S3	Grasslands; desert scrub	Terrestrial	Y	
Escobaria dasyacantha var. dasyacantha	dense cory cactus			G3T3	S3	Grasslands; Woodlands; Shrublands; Desert Scrub	Terrestrial		Y
Mammillaria wrightii subsp. Wrightii	Wright's fishhook cactus			G4T3	S1	Grasslands	Terrestrial		Y
Opuntia arenaria	sand prickly-pear			G2	S2	Barren/Sparse Vegetation (dunes, sandhills, sandy arroyos)	Terrestrial	Y	
Peniocereus greggii var. greggii	desert night-blooming cereus			G3G4T2	S2	Shrubland; Grassland	Terrestrial		Y
Penstemon alamosensis	Alamo beardtongue			G3	S1	Grassland; Shrubland (rock crevices, mesic canyon bottoms)	Terrestrial	Y	
Perityle huecoensis	Hueco rock-daisy			G1	S1	Barren/Sparse Vegetation (mostly shaded limestone cliff faces in mesic canyons)	Terrestrial	Y	
Sicyos glaber	smooth-bur cucumber			G3	S1	Woodland; Forest	Terrestrial	Y	

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APPENDIX L: Hunter Harvest Surveys

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Mule Deer Harvest Summary for McGregor Range and South Training Areas

Year	Hunt Code	Licenses	Total Hunters	Harvested # (%)	Max Main Beam Length	Avg. Main Beam Length	Max Antler Points	Avg. Antler Points	Max Greatest Spread	Avg. Greatest Spread	Sample Size[A]
	DER-1-170	10	7	3 (43)	--	--	3	2.33	--	--	3
	DER-1-171	10	6	5 (83)	--	--	4	2.8	--	--	5
2007	Subtotals	20	13	8 (62)	--	--	4	2.63	--	--	8
	South TA	8	8	1 (13)	--	--	4	3.5	--	--	1
	Totals	28	21	9 (43)	--	--	4	2.72	--	--	9
	DER-1-170	10	6	4 (67)	--	--	5	4.13	--	--	4
	DER-1-171	10	7	6 (86)	--	--	5	3.42	--	--	6
2008	Subtotals	20	13	10 (77)	--	--	5	3.7	--	--	10
	South TA	8	7	1 (14)	--	--	5	5	--	--	1
	Totals	28	20	11 (55)	--	--	5	3.82	--	--	11
	DER-1-170	10	7	3 (43)	22.00	16.19	4	3.25	26.50	21.25	2
	DER-1-171	10	8	3 (38)	21.75	18.06	7	4.83	22.00	18.75	3
2009	Subtotals	20	15	6 (40)	22.00	17.31	7	4.2	26.50	19.75	5
	South TA	--	--	--	--	--	--	--	--	--	--
	Totals	--	--	--	--	--	--	--	--	--	--
	DER-1-262	10	9	5 (56)	19.00	14.90	6	2.90	21	17.43	5
	DER-1-263	10	8	5 (63)	22.63	20.79	5	4.50	24.63	20.58	5
2010	Subtotals	20	17	10 (59)	22.63	17.84	6	3.70	24.63	19.00	10
	South TA	8	8	3 (38)	21.00	21.00	5	4.50	22.75	22.75	1
	Totals	28	25	13 (52)	22.63	17.99	6	3.77	24.63	19.34	11
	DER-1-256	20	17	2 (12)	24.00	16.75	5	4.25	18.00	17.00	2
	DER-1-257	20	18	8 (44)	23.25	17.05	6	3.50	24.00	18.66	8
2011	Subtotals	40	35	10 (29)	24.00	17.00	6	3.65	24.00	18.33	10
	South TA	8	8	0 (0)	--	--	--	--	--	--	--
	Totals	48	43	10 (23)	24.00	17.00	6	3.65	24.00	18.33	10
	DER-1-256	20	18	5 (28)	22.38	18.24	6	4.20	23.00	19.15	5
	DER-1-257	20	18	4 (22)	22.25	20.14	5	4.50	24.50	22.00	4
2012	Subtotals	40	36	9 (25)	22.38	19.08	6	4.33	24.50	20.42	9
	South TA	8	7	0 (0)	--	--	--	--	--	--	--
	Totals	48	43	9 (21)	22.38	19.08	6	4.33	24.50	20.42	9
	DER-1-256	20	16	2 (13)	16.50	11.38	3	2.50	16.88	13.06	2
	DER-1-257	20	17	6 (35)	23.75	18.23	5	4.17	22.13	17.65	5
2013	Subtotals	40	33	8 (24)	23.75	16.27	5	3.75	22.13	16.50	7
	South TA	8	8	0 (0)	--	--	--	--	--	--	--
	Totals	48	41	8 (20)	23.75	16.27	5	3.75	22.13	16.50	7

[A] Number of animals in sample

Table 4.4-2 Pronghorn Antelope Harvest Summary for McGregor Range

Year	Hunt Code	Licenses	Total Hunters	Harvested # (%)	Max Horn Length	Avg. Horn Length	Max Prong Length[A]	Avg. Prong Length[A]	Sample Size	Broken Horns	Broken Prongs
2006	ANT-1-105	5	5	4 (80)	14.00	12.06	--	--	4	0	--
	ANT-3-100	3[B]	3	3 (100)	15.50	14.83	--	--	3	0	--
	ANT-3-101	10	10	8 (80)	15.50	12.67	--	--	6	0	--
	Totals	**18**	**18**	**15 (83)**	**15.50**	**12.98**	**--**	**--**	**13**	**0**	**--**
2007	ANT-1-101	5[B]	4	3 (75)	15.88	14.48	--	--	4	0	--
	ANT-3-102	10	10	10 (100)	16.50	13.16	--	--	10	0	--
	ANT-3-103	10	9	3 (100)	15.75	12.97	--	--	9	0	--
	Totals	**25**	**23**	**22 (96)**	**16.50**	**13.26**	**--**	**--**	**23**	**0**	**--**
2008	ANT-1-101	5[B]	3	2 (67)	15.38	14.16	--	--	2	0	--
	ANT-3-102	10	7	6 (86)	17.00	14.61	5.38	5.19	6	0	0
	ANT-3-103	10	9	6 (67)	16.25	13.71	--	--	6	0	--
	Totals	**25**	**19**	**14 (74)**	**17.00**	**14.16**	**5.38**	**5.19**	**14**	**0**	**0**
2009	ANT-1-101	5[B]	4	4 (100)	14.00	13.31	4.38	3.58	4	0	0
	ANT-3-102	10	10	10 (100)	16.25	13.69	4.13	3.28	10	0	2
	ANT-3-103	10	10	11 (100)	15.75	12.91	5.25	3.08	10	0	3
	Totals	**25**	**24**	**24 (100)**	**16.25**	**13.30**	**5.25**	**3.26**	**24**	**0**	**5**
2010	ANT-3-101	5[B]	5	5 (100)	14.00	13.25	4.13	2.64	5	0	0
	ANT-3-102	10	10	9 (90)	15.38	13.79	6.00	4.81	9	0	0
	ANT-3-103	10	10	10 (100)	14.00	12.50	4.63	3.78	10	0	0
	Totals	**25**	**25**	**24 (96)**	**15.38**	**13.11**	**6.00**	**3.47**	**24**	**0**	**0**
2011	ANT-3-188	10	9	8 (89)	14.50	13.23	5.75	4.51	8	0	1
	ANT-3-189	5	5	3 (60)	14.75	12.63	6.00	4.40	3	0	0
	ANT-3-190	10	8	7 (88)	15.50	13.66	5.25	4.28	7	0	0
	Totals	**25**	**22**	**18 (82)**	**15.50**	**13.30**	**6.00**	**4.39**	**18**	**0**	**1**
2012	ANT-3-188	10	9	5 (56)	14.63	13.15	5.25	4.38	5	0	1
	ANT-3-189	5	4	1 (25)	14.50	--	4.00	--	1	0	0
	ANT-3-190	10	8	3 (38)	14.25	12.04	5.25	3.54	3	0	0
	Totals	**25**	**21**	**9 (43)**	**14.63**	**12.93**	**5.25**	**4.06**	**9**	**0**	**1**
2013	ANT-3-188	10	10	4 (40)	16.25	12.22	4.50	3.25	4	0	0
	ANT-3-189	5	3	2 (66)	15.25	13.31	2.88	2.69	2	0	0
	ANT-3-190	10	8	3 (38)	14.50	12.21	3.63	2.83	3	0	0
	Totals	**25**	**21**	**9 (43)**	**16.25**	**12.46**	**4.50**	**2.99**	**9**	**0**	**0**

[A] Broken prongs not included

[B] Number of AMU 29 hunters assigned to McGregor Range

Table 4.4-3 Javelina Harvest Summary for McGregor Range

Year	Hunt Code	Licenses	Total Hunters	Harvested # (%)
2007	JAV-1-103	3	1	0 (0)
2008	JAV-1-103	5	2	0 (0)
2009	JAV-1-105	5	4	1(25)
2010	JAV-1-105	5	2	0(0)
2011	JAV-1-105	5	3	2 (67)
2012	JAV-1-105	5	4	4 (100)
2013	JAV-1-105	5	2	1 (50)

Table 4.4-4 Oryx Harvest Summary for McGregor Range and Doña Ana Range–North Training Areas

License Year	Range	Hunt Code	Licenses	Total Hunters	Harvested # (%)	Harvested M # (%)	Harvested F # (%)	Max Horn Length M	Avg. Horn Length M	Max Base Circ M	Avg. Base Circ M	Max Horn Length F	Avg. Horn Length F	Max Base Circ F	Avg. Base Circ F	Sample Size[A]	One Broken Horn[B]	Both Horns Broken[C]
2002-03	Doña Ana	ORX-5-510 ORX-5-511	6	6	6 (100)	3 (50)	3 (50)	37.00	36.12	7.25	6.69	36.00	35.04	6.88	6.33	3M/3F	0.00	0.00
2003-04	Doña Ana	ORX-5-510 ORX-5-511	7	5	4 (80)	2 (50)	2 (50)	37.00	36.63	7.00	7.00	36.00	35.88	6.25	6.13	2M/2F	1M/2F	0
2004-05	Doña Ana	ORX-5-510 ORX-5-511	10	9	9 (100)	6 (67)	3 (33)	--	--	--	--	--	--	--	--	--	--	--
2005-06	Doña Ana	ORX-5-510 ORX-5-511	19	19	17 (89)	8 (47)	9 (53)	37.75	31.15	7.50	6.88	39.75	35.53	6.25	5.93	8M/9F	0	0
2006-07	Doña Ana	ORX-5-510 ORX-5-511	37	37	37 (100)	18 (49)	19 (51)	39.50	33.55	8.50	6.95	41.50	35.05	6.25	5.47	17M/19F	0	0
2007 - 2008	Doña Ana	ORX-5-510 ORX-5-511	24	23	21 (91)	8 (38)	13 (62)	40.50	34.68	7.25	6.89	38.25	35.32	6.50	5.83	8M/13F	1F	0
	McGregor	ORX-5-512	25	24	23 (96)	12 (52)	11 (48)	37.50	32.04	7.88	7.01	41.00	33.38	6.25	5.88	12M/11F	2M/1F	0
	McGregor	ORX-5-514 ORX-5-515	27	24	23 (96)	15 (65)	8 (35)	38.25	33.06	8.25	7.29	37.63	29.91	6.25	5.55	13M/8F	4M/4F	2M
	Totals		**76**	**71**	**67 (94)**	**35 (52)**	**32 (48)**	**40.50**	**33.61**	**8.25**	**6.78**	**41.00**	**33.49**	**6.50**	**5.77**	**33M/32F**	**6M/6F**	**2M/0F**
2008 - 2009	Doña Ana	ORX-5-510 ORX-5-511	29	29	29 (100)	13 (45)	16 (55)	38.25	32.92	7.50	6.86	42.00	33.79	6.50	5.64	13M/16F	1M/2F	0
	McGregor	ORX-5-512 ORX-5-513	50	47	40 (85)	18 (45)	22 (55)	37.50	32.50	7.75	7.03	39.00	32.29	6.50	5.78	17M/22F	1M	1M
	McGregor	ORX-5-514 ORX-5-515	50	48	39 (81)	19 (49)	20 (51)	36.25	30.83	7.75	6.89	40.50	32.17	6.50	5.91	18M/19F	0	1M/1F
	Totals		**129**	**124**	**108 (87)**	**50 (46)**	**58 (54)**	**38.25**	**31.97**	**7.75**	**6.93**	**42.00**	**32.67**	**6.50**	**5.79**	**48M/57F**	**2M**	**2M/1F**
2009 - 2010	Doña Ana	ORX-5-510 ORX-5-511	34	33	33 (100)	16 (48)	17 (52)	38.25	32.15	7.50	6.77	42.00	33.71	6.50	5.88	16M/17F	2M	0
	McGregor	ORX-1-224 ORX-1-225	49	43	43 (100)	25 (58)	18 (42)	40.50	30.37	8.25	6.96	39.25	35.00	7.00	6.35	25M/18F	1F	0
	McGregor	ORX-1-226 ORX-1-227	32	28	26 (93)	16 (62)	10 (38)	39.00	32.56	7.75	7.20	38.00	32.30	6.50	5.86	16M/9F	1F	0
	Totals		**112**	**104**	**102 (98)**	**57 (56)**	**45 (44)**	**40.50**	**31.48**	**8.25**	**6.97**	**42.00**	**33.95**	**7.00**	**6.07**	**57M/44F**	**2M/2F**	**0**

(Continued) Table 4.4-4 Oryx Harvest Summary for McGregor Range and Doña Ana Range–North Training Areas

License Year	Range	Hunt Code	Licenses	Total Hunters	Harvested # (%)	Harvested M # (%)	Harvested F # (%)	Max Horn Length M	Avg. Horn Length M	Max Base Circ M	Avg. Base Circ M	Max Horn Length F	Avg. Horn Length F	Max Base Circ F	Avg. Base Circ F	Sample Size[A]	One Broken Horn[B]	Both Horns Broken[C]
2010 - 2011	Doña Ana	ORX-5-510 ORX-5-511	60	59	50 (85)	24 (48)	26 (52)	38.50	34.26	9.00	7.06	39.50	34.96	6.75	5.80	22M/26F	1M/2F	1M/1F
	McGregor	ORX-1-224 ORX-1-225	50	46	40 (93)	25 (63)	15 (37)	38.50	32.80	7.88	7.03	38.00	34.29	6.75	5.93	25M/14F	1F	1F
	McGregor	ORX-1-226 ORX-1-227	50	43	41 (95)	18 (44)	23 (56)	41.50	34.10	7.88	7.13	39.63	33.61	6.50	6.01	18M/22F	3M/1F	1F
	Totals		**160**	**148**	**131 (89)**	**67 (51)**	**64 (49)**	**41.50**	**33.65**	**9.00**	**7.07**	**39.63**	**34.33**	**6.75**	**5.91**	**65M/62F**	**4M/4F**	**1M/3F**
2011 - 2012	Doña Ana	ORX-1-9008 ORX-1-9009 ORX-1-9012 ORX-1-9013	10	9	9 (100)	5 (56)	4 (44)	38.50	35.45	7.50	6.45	37.38	35.91	6.38	5.50	5M/4F	1M	0
	McGregor	ORX-1-226 ORX-1-227	50	46	38 (83)	19 (50)	19 (50)	35.75	31.05	7.50	6.53	39.25	34.61	6.38	5.85	18M/19F	4M/3F	1M
	McGregor	ORX-1-224 ORX-1-225	50	46	30 (65)	13 (43)	17 (57)	37.00	31.20	7.25	6.61	39.50	31.77	6.50	5.85	12M/17F	1M/3F	1M
	Totals		**110**	**101**	**77 (76)**	**37 (48)**	**40 (52)**	**38.50**	**31.73**	**7.50**	**6.55**	**39.50**	**33.53**	**6.50**	**5.82**	**35M/40F**	**6M/6F**	**2M**
2012 - 2013	Doña Ana	ORX-1-9013 ORX-1-9014	10	10	9 (90)	2 (22)	7 (78)	34.00	34.00	7.00	7.00	39.63	35.40	6.125	5.80	1M/6F	--	1M/1F
	McGregor	ORX-1-226 ORX-1-227	50	47	38 (81)	16 (42)	21 (55)	37.50	32.20	7.25	6.73	41.00	35.37	7.75	6.07	12M/20F	3M/6F	4M/1F
	McGregor	ORX-1-224 ORX-1-225	50	49	39 (80)	15 (38)	24 (62)	34.75	27.82	9.00	6.62	40.00	34.14	6.75	5.97	12M/21F	1M/5F	3M/2F
	Totals		**110**	**106**	**86 (81)**	**33 (38)**	**52 (60)**	**37.50**	**30.17**	**9.00**	**6.68**	**41.00**	**34.82**	**7.75**	**5.99**	**25M/47F**	**4M/11F**	**8M/4F**
2013 - 2014	McGregor	ORX-1-226 ORX-1-227	51	48	22 (46)	11 (50)	11 (50)	36.13	30.09	7.50	6.81	38.00	26.00	6.00	5.43	8M/9F	2F	3M/2F
	McGregor	ORX-1-224 ORX-1-225	49	40	23 (58)	12 (52)	11 (48)	37.00	31.28	8.00	6.80	37.75	31.83	6.50	5.97	10M/10F	--	2M/1F
	Totals		**100**	**88**	**45 (51)**	**23 (51)**	**22 (49)**	**37.00**	**30.75**	**8.00**	**6.80**	**38.00**	**29.07**	**6.50**	**5.71**	**18M/19F**	**2F**	**5M/3F**

[A] Number of animals in sample
[B] No data for second horn was treated as broken horn
[C] Animals with both horns broken were not included
[D] Was planned for February but moved to March due to a military training conflict

Table 4.4-5 Barbary sheep Harvest Summary for McGregor Range

Year	Hunt Code	Licenses	Total Hunters	Harvested # (%)	Harvested M # (%)	Harvested F # (%)	Max Horn Length M	Avg. Horn Length M	Max Base Circ M	Avg. Base Circ M	Max Horn Length F	Avg. Horn Length F	Max Base Circ F	Avg. Base Circ F	Sample Size[B]	One Broken Horn[C]	Both Horns Broken[D]
2007	No Code[A]	5	4	4 (100)	2 (50)	2 (50)	28.00	--	--	--	11.50	7.50	--	--	1M/1F	0	0
2008	No Code[A]	5	5	3 (60)	3(100)	0	31.00	27.13	15.13	14.33	--	--	--	--	3	0	0
2009	BBY-1-102	5	5	5(100)	4 (80)	1 (20)	28.50	26.06	14.00	12.16	16.25	16.12	--	--	4M/1F	0	0
2010	BBY-1-102	5	4	2(50)	2 (100)	0	32.38	31.63	13.25	13.06	--	--	--	--	2M	0	0
	BBY-1-102	5	5	2 (40)	2 (100)	0	30.13	27.53	12.38	11.81	--	--	--	--	2M	0	0
	BBY-1-103	5	3	0 (0)	--	--	--	--	--	--	--	--	--	--	--	--	--
2011	**Subtotals**	**10**	**8**	**2 (25)**	**2 (100)**	**0**	**30.13**	**27.53**	**12.38**	**11.81**	**--**	**--**	**--**	**--**	**2M**	**0**	**0**
	South TA	8	8	1 (13)	1 (100)	0	17.00	--	10.00	--	--	--	--	--	1M	0	0
	Totals	**18**	**16**	**3 (19)**	**3 (100)**	**0**	**30.13**	**24.02**	**12.38**	**11.21**	**--**	**--**	**--**	**--**	**3M**	**0**	**0**
	BBY-1-102	5	4	2 (50)	1 (50)	1 (50)	32.13	--	12.75	--	19.75	--	8.38	--	1M/1F	1	0
	BBY-1-103	5	5	2 (40)	2 (100)	0	33.75	30.88	13.75	12.75	--	--	--	--	2M	1	0
2012	**Subtotals**	**10**	**9**	**4 (44)**	**3 (75)**	**1 (25)**	**33.75**	**31.29**	**13.75**	**12.75**	**19.75**	**--**	**8.38**	**--**	**3M/1F**	**2**	**0**
	South TA	8	7	0 (0)	--	--	--	--	--	--	--	--	--	--	--	--	--
	Totals	**18**	**16**	**4 (25)**	**3 (75)**	**1 (25)**	**33.75**	**31.29**	**13.75**	**12.75**	**19.75**	**--**	**8.38**	**--**	**3M/1F**	**2**	**0**
	BBY-1-102	5	5	0 (0)	0	0	--	--	--	--	--	--	--	--	--	--	--
	BBY-1-103	5	4	4 (100)	4 (100)	0	30.00	29.00	12.13	12.03	--	--	--	--	4M	0	0
2013	**Subtotals**	**10**	**9**	**4 (44)**	**4 (100)**	**0**	**30.00**	**29.00**	**12.13**	**12.03**	**--**	**--**	**--**	**--**	**4M**	**0**	**0**
	South TA	8	8	3 (38)	3 (100)	0	22.50	18.83	11.00	9.50	--	--	--	--	3M	0	0
	Totals	**18**	**17**	**7 (41)**	**7 (100)**	**0**	**30.00**	**24.64**	**12.13**	**10.95**	**--**	**--**	**--**	**--**	**7M**	**0**	**0**

[A] Hunt used to be an over-the-counter license and Fort Bliss drew opportunities. In 2009 NMDGF changed to a standard draw with a specific hunt code.
[B] Number of animals in sample
[C] No data for second horn was treated as a broken horn.

Table 4.4-6 Elk Harvest Summary for McGregor Range and Doña Ana Range–North Training Areas

Year	Hunt Code	Licenses	Total Hunters	Harvested # (%)	Max Main Beam Length	Avg. Main Beam Length	Max Antler Points	Avg. Antler Points	Max Greatest Spread	Avg. Greatest Spread	Sample Size [A]
2009	ELK-1-364	8	8	7 (88)	46.00	43.02	6	5.86	17.00	13.82	7
	ELK-1-365	8	7	5 (71)	51.88	45.46	7	6.33	15.00	14.13	3
	Totals	**16**	**15**	**12 (80)**	**51.88**	**42.89**	**7**	**5.90**	**17.00**	**13.47**	**11**
2010	ELK-1-364	8	8	6 (75)	38.50	35.80	6	5.17	16.38	10.77	6
	ELK-1-365	8	7	4 (57)	46.63	43.91	6	5.38	16.13	14.66	4
	Totals	**16**	**15**	**10 (67)**	**46.63**	**39.21**	**6**	**5.25**	**16.38**	**12.41**	**10**
2011	ELK-1-348	10	9	7 (78)	43.00	40.69	6	5.50	16.75	14.75	2
	ELK-1-349	10	9	2 (22)	39.00	34.50	6	4.67	15.38	9.58	3
	Totals	**20**	**18**	**9 (50)**	**43.00**	**36.98**	**6**	**5.00**	**16.75**	**11.31**	**5**
2012	ELK-1-348	10	9	5 (56)	43.00	35.81	6	5.25	14.00	12.25	2
	ELK-1-349	10	9	6 (67)	42.75	33.06	6	4.75	12.00	9.41	2
	Totals	**20**	**18**	**11 (61)**	**43.00**	**34.44**	**6**	**5.00**	**14.00**	**10.83**	**4**
2013	ELK-1-348	10	9	6 (67)	41.50	37.03	6	5.25	--	--	4
	ELK-1-349	10	8	1 (13)	36.63	36.63	5	5.00	--	--	1
	Totals	**20**	**17**	**7 (41)**	**41.50**	**36.93**	**6**	**5.20**	**--**	**--**	**5**

APPENDIX M: Fort Bliss Integrated Wildland Fire Management Plan

Fort Bliss Integrated Wildland Fire Management Plan

March 2015

Typical wildland environment found on the Fort Bliss Training Center

Fort Bliss Integrated Wildland Fire Management Plan

US Army Garrison Fort Bliss, Texas and New Mexico

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Executive Summary

The goal of this Integrated Wildland Fire Management Plan (IWFMP) for U.S. Army Garrison-Fort Bliss is to successfully mitigate the threat of wildfires that can interrupt military training activities through an active program of fuel reduction, fire prevention, fire break maintenance, fire suppression, risk awareness and prescribed burning. This IWFMP defines responsibilities and describes wildfire prevention actions and wildfire suppression actions to be taken to meet this goal. This IWFMP includes information about current land use and conditions, fuels, weather, topography, natural and cultural resource values at risk, relevant Army policy and other agencies' programs which will aid and inform decision-makers about actions to be taken in the event that wildfires are burning on Fort Bliss. This IWFMP also includes actions to be taken for the preparation and implementation of prescribed fire projects.

This IWFMP is prepared in accordance with Army Regulation (AR) 420-01, Chapter 25, *Fire and Emergency Services* (4 October 2006), AR 200-1, *Environmental Protection and Enhancement* (13 December 2007), and the Army Memorandum on *Army Wildland Fire Policy Guidance* (September 2002). Implementation of these regulations and guidelines requires that an IWFMP be developed by Fort Bliss to address firefighter and public safety, wildland fire management, wildland fire program capabilities, and funding and environmental compliance for the burnable wildlands found on Fort Bliss.

The Fire Chief of Fort Bliss, under the Directorate of Emergency Services (DES) and as the head of the Fire and Emergency Services (FES) Division, is designated as the Fort Bliss Wildland Fire Program Manager (WFPM) by the Fort Bliss Garrison Commander and is responsible for implementing this IWFMP. The WFPM has primary responsibility to ensure that mutual aid agreements remain current, that wildfire prevention activities are occurring and that all Fort Bliss wildland firefighters are properly trained, equipped and fit for wildland fire operations in compliance with National Fire Protection Association (NFPA) standards for fitness, equipment and training. The WFPM also approves all prescribed fire projects (DoD 2002).

Fort Bliss FES has the primary responsibility for suppressing structure fires and protecting people, structures and infrastructure from all fires on lands controlled and managed by Fort Bliss. Fort Bliss FES firefighters receive specialized training for fighting wildfires, but battling wildfires is secondary to protecting lives and saving structures. As the mission of Fort Bliss has evolved and expanded in terms of Ranges, troop support facilities and numbers of soldiers training on the landscape, Fort Bliss FES has expanded to handle an increasing wildfire protection burden. Fort Bliss is in the process of expanding its wildfire protection services to Doña Ana Range and McGregor Range. Currently, when wildfires are burning, Fort Bliss FES personnel have to shut their stations down to go and battle wildfires. There are not enough firefighters to fight both wildfires and protect structures. There is a need to hire and train more firefighters that can specialize in wildland firefighting while maintaining their structural firefighting capabilities and certifications.

The Bureau of Land Management's (BLM) Las Cruces District Office has responsibility for managing the natural resources on the military withdrawn lands of McGregor Range (DOI 2007) (MLWA 1999). This includes suppressing natural or lightning caused wildfires on the withdrawn lands. However, Fort Bliss and BLM work together to suppress wildfires across Fort Bliss under the guidelines of a mutual aid agreement (BLM and Fort

Bliss 2009). Fort Bliss and BLM also work together to reduce hazardous fuels and implement prescribed burn projects on Fort Bliss. The BLM, the US Forest Service (USFS) and local Volunteer and paid Fire Departments, working under the New Mexico Joint Powers Agreement, can respond to assist Fort Bliss with fire suppression. The BLM and USFS also have the wildland fire expertise to help train Fort Bliss FES firefighters in wildland firefighting techniques, including upper-level course training to help elevate FES personnel to Incident Commander and Prescribed Fire Burn Boss levels. The successful implementation of this IWFMP depends on the support from and further development of interagency partnerships.

Other departments within Fort Bliss have key responsibilities as further detailed in this plan. The Directorate of Public Works-Environmental Division's (DPW-E) Conservation Branch is responsible for writing, updating and maintaining the Fort Bliss IWFMP. The DPW Operations and Maintenance Division (DPW O&M) and the Directorate of Plans, Training, Mobilization and Security's (DPTMS) Range Branch have responsibilities to maintain fire breaks, fire break roads and access roads and to maintain Fort Bliss Training Center (FBTC) grounds and infrastructure as necessary for their protection from wildfires. DPW-E Conservation Branch also works with the WFPM to ensure that the Fort Bliss IWFMP complies and integrates with Fort Bliss DES/FES regulations, the Range Complex Master Plan (RCMP), the Fort Bliss Integrated Natural Resources Management Plan (INRMP) and the Fort Bliss Integrated Cultural Resources Management Plan (ICRMP).

Fort Bliss will implement improvement projects to its land and infrastructure that will help keep wildfires within defined Fire Management Unit (FMU) boundaries and decrease the likelihood of severe wildfires from burning across Fort Bliss boundaries. Funding for these projects needs to be prioritized and approved in advance. Some improvements are already under way and will continue under the scope of this plan. Projects include improving roadways to firebreak standards, constructing new fire breaks in strategic locations, managing, thinning or removing fuels in targeted areas and planning and implementing prescribed burn projects that reduce fuels, improve wildlife habitat and promote ecosystem sustainability and diversity. In order for fire break roads to be effective as fire breaks, road surfaces need to be kept vegetation-free and road shoulders need to be mowed to keep vegetation short. Fort Bliss needs to purchase at least two bush hog rotary mowers or similar models, capable of mowing 15 feet in one swath behind a 60-110 hp tractor in order to maintain these roadway shoulders to fire break road standards.

To address and implement the procedures proposed in this document the following key definitions must be understood. The definitions are as follows:

Wildland Fire is any fire, controlled or uncontrolled, occurring on lands covered wholly or in part by timber, brush, grass, or other flammable vegetation. Two distinct types of wildland fires have been defined and include **wildfires** and **prescribed fires.**

Wildfire is any unplanned, unwanted wildland fire, including unauthorized human-caused fires, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

Prescribed Fire is any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire burn plan must exist, and National Environmental Policy Act (NEPA) requirements must be met, prior to approval for ignition.

Acknowledgements

The preparers of this plan would like to thank and recognize the many people who provided important technical expertise and contributions to this plan. This list is not all inclusive, not in order of importance or volume but includes: Thomas McKibbin, Dallas Bash, Charles Butler, James Narlock, Roger Hancock, Gary Ramsey, Rogelio De La Riva, Everett Duis, Shane Offutt, Rafael Corral, Stephen Sanchez, and Yvette Waychus. Thanks are also due to the Vista Technical Services team of Donna Laing, Carlos Romero, Jesse Rice, Claudia Ramirez, Jennifer Jurado, and Jeremy Lane for their skills in editing, formatting, mapmaking and other technical assistance as required throughout the formulation of this plan.

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1 Wildland Fire Management Guidance

Wildland fire management is the combination of scientific principles and land management activities necessary for the prevention of wildfires and for the protection of valuable natural resources and man-made structures from the harmful effects of wildfires. Wildland fire management supports the military mission of Fort Bliss by using mechanical treatments and prescribed fires to improve the resiliency of training lands and reducing fuel loads, thereby reducing the size and intensity of wildfires and reducing the density of undesirable brush and weed species. Effective wildland fire management on Fort Bliss includes funding for the following program areas: fire prevention, fuels management and wildfire suppression. Fire management also provides for training opportunities, upgrades and maintenance for a variety of specialized wildland fire equipment and for the administrative support necessary to field a professional, competent, safe and efficient wildland firefighting force for U.S. Army-Fort Bliss.

1.1 Fort Bliss Fire Management Goals

1. Impacts of wildfires on training and training schedules is minimized by following guidelines and prescriptions that allow for contained wildfires and prescribed fires to burn within the boundaries of Fire Management Units (FMUs) on Fort Bliss.
2. Coordinated fire management protects lives and Fort Bliss property including cultural and sensitive natural resources from wildfire's harmful effects through effective implementation of wildfire prevention, fuels management and wildfire suppression policies and programs.
3. Wildfire severity is reduced and Fort Bliss ecosystems are sustained through a program of mechanical fuels reduction, prescribed fire treatments and firebreak maintenance.
4. Training Complex users are educated to recognize the role of wildland fire in sustaining training lands and for enhancing natural resources.
5. Fort Bliss Fire and Emergency Services Division, DPTMS Range Branch, DPW Operations and Maintenance and DPW-Environment understand their respective roles and responsibilities for wildland fire management on Fort Bliss and coordinate actions to implement an excellent wildland fire management program.

1.2 Fort Bliss Fire Management Objectives

1. Firefighter and public safety is the first and highest priority on every wildland fire.
2. Fort Bliss training assets, structures, infrastructure, sensitive cultural and natural resources will be protected to the extent possible from the harmful effects of wildland fires by mowing, trimming, brush removal and/or thinning.
3. In predetermined places, wildfires will be allowed to consume as much fuel as possible as long as they are burning within the defensible perimeters of designated Fire Management Units (FMUs).
4. Prescribed fires will be used to improve the effectiveness of fire breaks by burning accumulations of wildland fuels within designated areas.
5. Prescribed fires will be used to improve wildlife habitat and improve the health and diversity of ecosystems on Fort Bliss.

6. Firefighters will use Minimum Impact Suppression Tactics (MIST) guidelines on all wildfires on Fort Bliss(See **Appendix H**).

1.3 Authority

The Assistant Chief of Staff for Installation Management (ACSIM) is responsible for oversight of the wildland and structural fire programs, updating policy, and resolving policy questions through the Facilities and Housing Directorate in coordination with the Environmental Programs Directorate. The ACSIM, through HQ Installation Management Command, Regions and the Headquarters, National Guard Bureau (HQ, NGB) will provide information to installations necessary to perform wildland fire management in accordance with guidance from Army Regulation 420-1, Facilities Engineering, Chapter 25, Fire and Emergency Services. The ACSIM and HQ, NGB will insure that wildland fire program reviews are incorporated into Fire and Emergency Services Operational Readiness Inspections and Environmental Compliance Assessment Screenings (DoD 2002).

Overall responsibility for the Fort Bliss Integrated Wildland Fire Management Plan (IWFMP) and its implementation lies with the Garrison Commander-Fort Bliss (GC). The GC has the responsibility for all base, Cantonment and Fort Bliss Training Center (FBTC) operations and for the prevention and suppression of human-caused wildfires on Fort Bliss. The Bureau of Land Management (BLM) has responsibility for the management of the natural resources on the military withdrawn lands of McGregor Range. As such, the BLM retains the suppression or management responsibility for all natural (lightning–caused) wildfires ignited on McGregor Range (MLWA 1999).

The GC delegates authority for wildfire suppression and prevention and prescribed fire implementation to the Directorate of Emergency Services (DES), Fire and Emergency Services (FES) Division (See Organization Chart-Figure 4.6). The GC also designates an installation Wildland Fire Program Manager, approves the installation IWFMP, and approves the deployment of Army civilian firefighters to any off installation incident (DoD 2002). The Fire Chief of Fort Bliss, under the Directorate of Emergency Services (DES) and as the head of the Fire and Emergency Services (FES) Division, is designated as the Fort Bliss Wildland Fire Program Manager (WFPM) by the Fort Bliss GC and is responsible for implementing this IWFMP. The WFPM has primary responsibility to ensure that mutual aid agreements remain current, that wildfire prevention activities are occurring and that all Fort Bliss wildland firefighters are properly trained, equipped and fit for wildland fire operations in compliance with NFPA fitness, equipment and training standards. The WFPM also approves all prescribed fire plans and projects (DoD 2002).

This IWFMP enables the military mission on Fort Bliss by complying with and integrating policies from the following authorities:

- DoD Instruction 6055.6, *DoD Fire and Emergency Service Program,* most recent edition.
- Army Regulations 200-1, 200-2.
- Army Memorandum *Army Wildland Fire Policy Guidance,* most recent addition.
- Fort Bliss Fire and Emergency Services Plan, 2012**.**
- 2001 Federal Fire Policy, *A Review and Update of the 1995 Federal Wildland Fire Management Policy, Jan 01, 2001*.
- NWCG Wildland Fire Qualifications Subsystem Guide, PMS 310-1/NFES 1414.
- Army Regulation (AR) 420-1, Chapter 25, Fire and Emergency Services, most recent edition.

- Integrated Natural Resources Management Plan for Fort Bliss, Texas and New Mexico. March, 2015.
- Fort Bliss Integrated Cultural Resources Management Plan 2008-2012.
- Fort Bliss Standard Operating Guidelines (SOG) for Wildland Fires. Fort Bliss Directorate of Emergency Services, Fire and Emergency Services Division, most recent edition.
- Fort Bliss Range Regulations 385-63. Fort Bliss Directorate of Plans, Training, Mobilization and Security. 2014.

1.4 Programmatic Environmental Assessment

Implementation of this IWFMP requires an assessment of the environmental effects as required by AR 200-2, *Environmental Analysis of Army Actions*, dated 29 Mar 02 (DoD 2002). This IWFMP is also an integral part of the Fort Bliss Integrated Natural Resources Management Plan (INRMP) and is included in the INRMP as an appendix. The latest revision of the INRMP is currently being analyzed through a programmatic Environmental Assessment (EA). As such, the IWFMP environmental analysis is included in the INRMP EA.

Most of the Impacts associated with this plan have already been analyzed within the Fort Bliss Texas and New Mexico Mission and Master Plan Final Programmatic Environmental Impact Statement (PEIS), December 2000 and the Fort Bliss Texas and New Mexico Mission and Master Plan Final Supplemental Programmatic Environmental Impact Statement (SEIS), dated March 2007 (PEIS, 2000 and SEIS 2007). Together these two NEPA documents meet the requirements set forth in AR-200-2 Environmental Analysis of Army Actions by assessing the impacts of increasing numbers of wildland fires on the biotic, abiotic and human environments of Fort Bliss under several different alternatives. The two EISs analyze a variety of environmental effects that are likely to occur from increased military mission impacts across the FBTC including the increased risk of wildfires from the expansion of live-fire training missions.

Actions proposed in this IWFMP will utilize the least possible ground disturbance in the suppression and management of wildland fires by following Minimum Impact Suppression Tactics (MIST) guidelines (Appendix H) and will also allow wildfires to burn under managed conditions within guidelines further detailed in this plan in Chapter 4. Prescribed fires are proposed to improve wildlife habitat and to reduce hazardous fuel loads in strategic areas across Fort Bliss.

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2 Environment of US Army Fort Bliss

2.1 Location

Fort Bliss is a multi-mission US Army installation located in Texas and New Mexico. A total of 11 percent of the installation's land area is in El Paso County in far west Texas and the remaining 89 percent is in south-central New Mexico in Doña Ana and Otero counties (U.S. Army 2007b) (Figure 2.2-1).

2.2 Military Mission

The Fort Bliss Mission is to train, sustain, transform, mobilize, and deploy members of the joint and combined team to successfully conduct global full spectrum operations to win our nation's wars, while providing for the well-being of our Soldiers, families, retirees, and civilians. It is the Commander's intent to establish Fort Bliss as an Installation of choice and a premier power projection platform for joint, interagency, and combined arms maneuver forces to help win our nation's wars (U.S. Army, 2010b).

Fort Bliss is the largest U.S. Army training installation and is the only troop training installation in the continental United States capable of supporting long-range overland missile firings. Fort Bliss composes 4.4 percent of all DoD lands and 9 percent of U.S. Army lands. Fort Bliss currently encompasses approximately 1.12 million acres and is divided into five major areas: 1) Doña Ana Range/North Training Areas, 2) McGregor Range, 3) South Training Areas (aka Division Training Area), 4) Castner Range and 5) Main Cantonment Area (Cantonment) which includes Biggs Army Airfield (AAF) (Figure 2.2-2) (U.S. Army 2007b).

The Cantonment is located in El Paso County, adjacent to the city of El Paso, Texas and represents the heaviest concentration of facilities and mission support activities on Fort Bliss and is the location of the post headquarters, as well as the primary housing for troops and accompanying equipment. The Cantonment also includes Biggs Army Air Field (AAF) which is the largest active army airfield in the world and is the center of air operations for Fort Bliss. It provides full airfield services for all U.S. military services, Department of Justice, and other government flight detachments. Castner Range is located in El Paso County adjacent to the Franklin Mountains and is a former training and weapons firing area. Previous extensive military training use resulted in the accumulation of unexploded ordnance (UXO) throughout much of Castner Range and is closed to public access (U.S. Army, 2010b).

The remainder of the installation is called the Fort Bliss Training Center (FBTC) and is composed of three large areas to support the maneuver training and gunnery requirements of installation units. FBTC contains 1,094,291 acres of land and includes the South Training Areas (aka Division Training Area) in El Paso County, Texas; the Doña Ana Range-North Training Areas in Doña Ana and Otero counties, New Mexico; and the McGregor Range in Otero County, New Mexico (US Army, 2011) which also encompasses Meyer Range, Orogrande Range Complex and Centennial Range (Figure 2.2-4). McGregor Range covers about 62 percent of the Installation and is approximately 690,000 acres, the Doña Ana Range/North Training Areas covers about 27 percent of the installation and is approximately 300,000 acres and the South Training Areas covers about 9 percent of the installation and is approximately 100,000 acres (U.S. Army, 2010b).

Within the FBTC are three base camps to provide the units using the Range Complexes a forward base from which to operate and to facilitate the support of the ranges by assigned range personnel (Figure 2.2-3). Doña Ana, McGregor/Meyer, and Orogrande Base Camps are geographically distinct which allows for a full array of targets, live-fire gunnery training and maneuver areas to be used simultaneously (Figure 2.2-4). An array of highways, tank trails and secondary roads throughout the installation allows for rapid troop dispersal and movement between ranges to facilitate maximum on-range training experience (Figure 2.2-3) (U.S. Army 2010a).

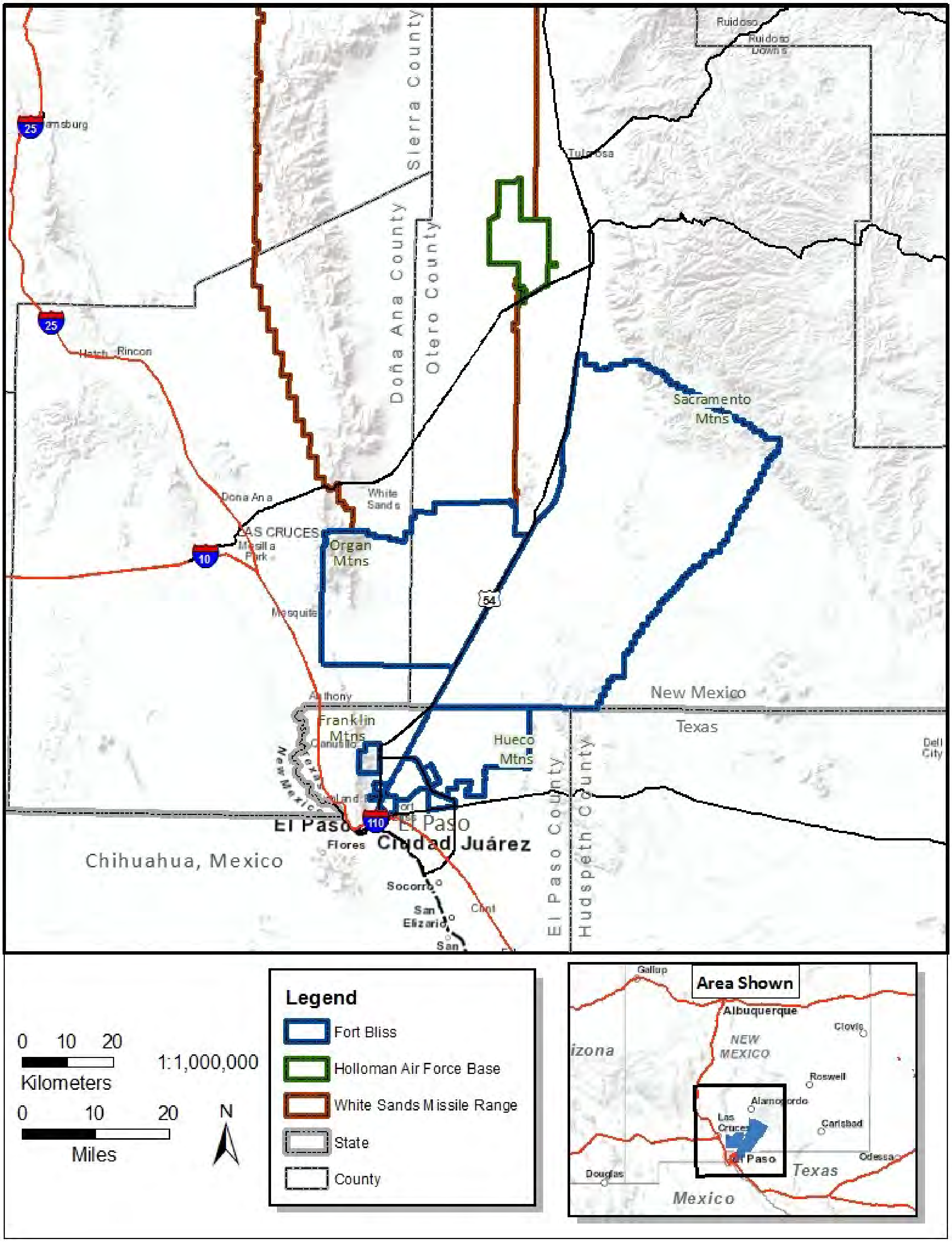
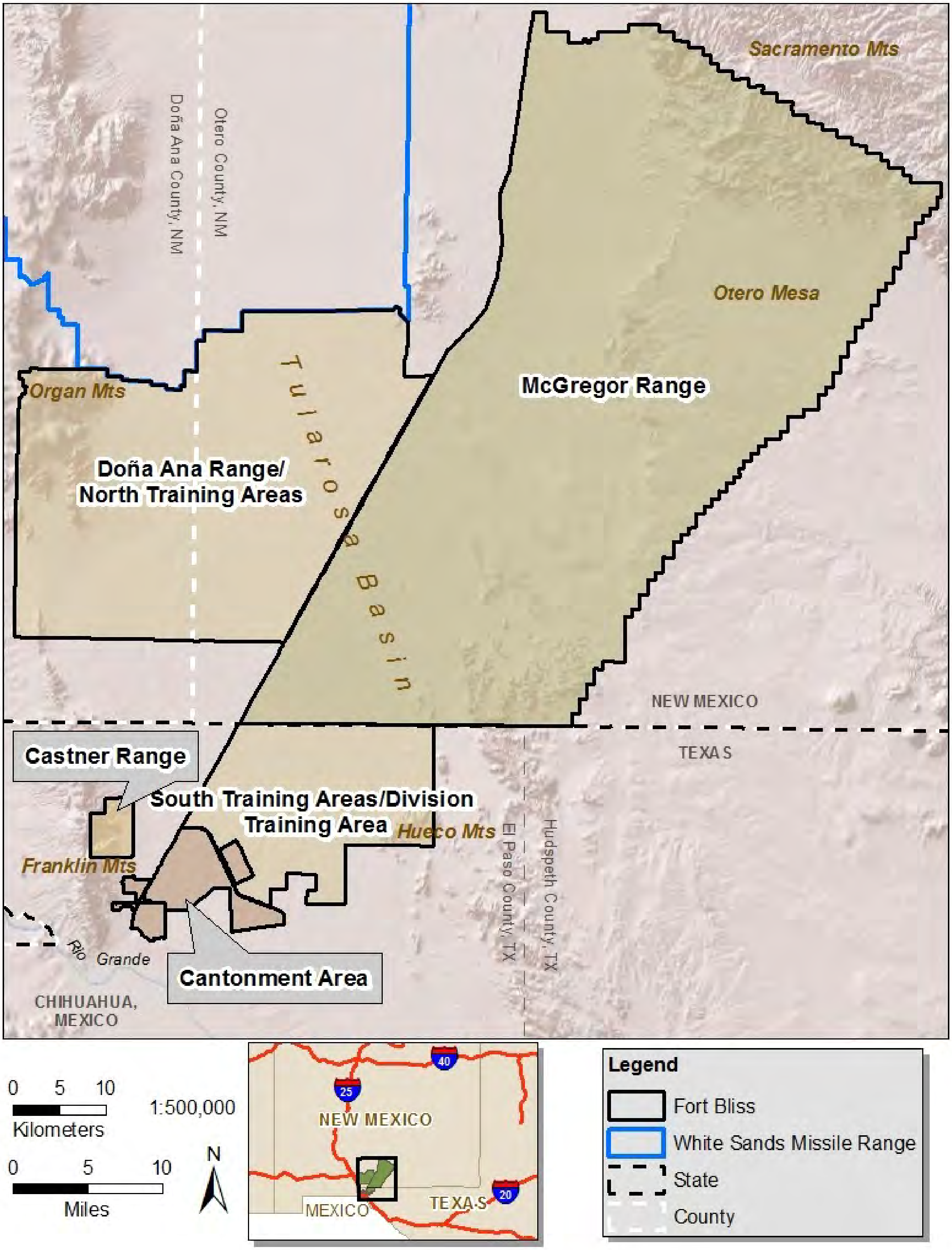


Figure 2.2-1 Fort Bliss Regional Setting



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442 **Figure 2.2-2 Fort Bliss Cantonment and Major Training Areas**

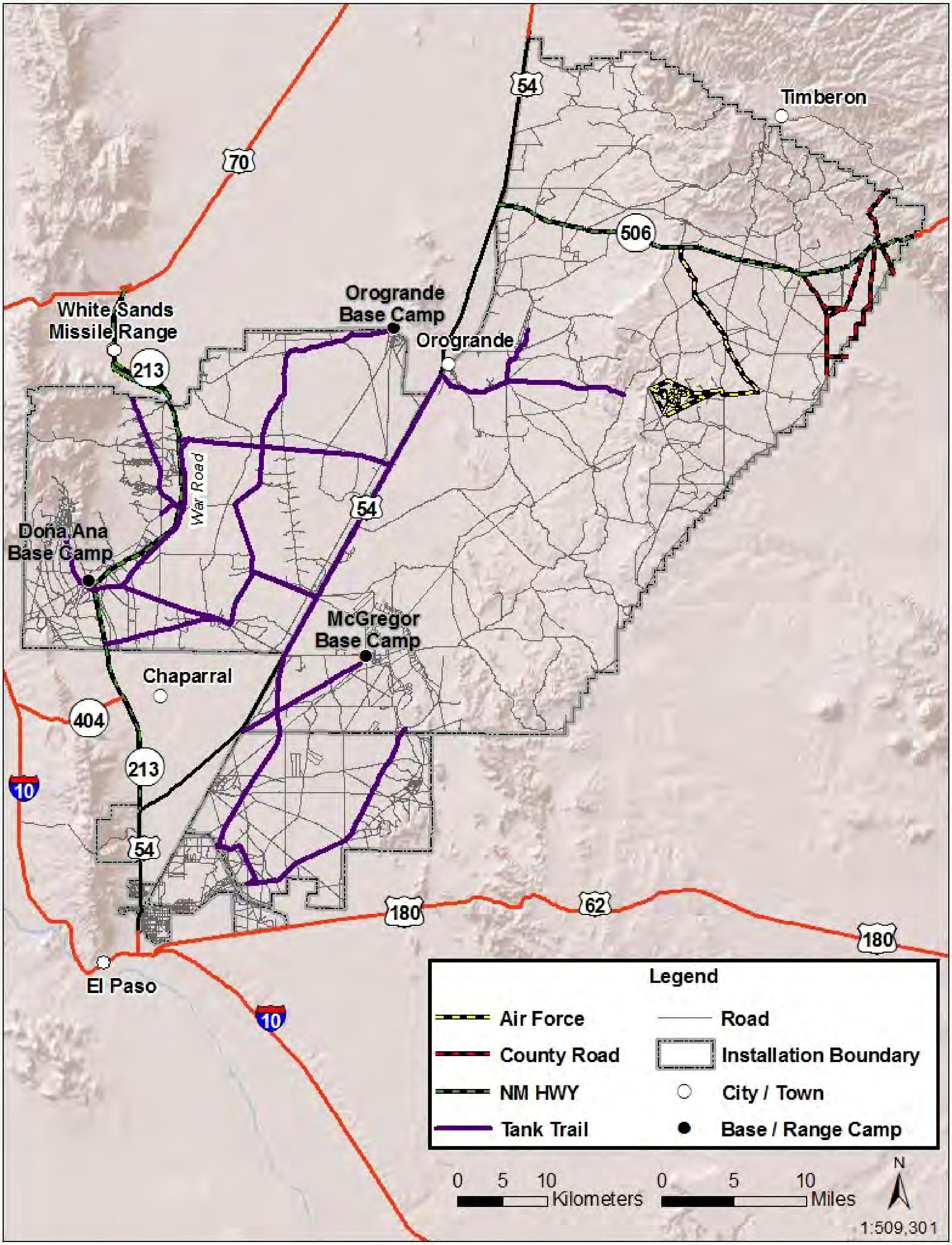

Figure 2.2-3 Fort Bliss Transportation Routes and Base Camps

The FBTC is subdivided into numbered Training Areas (TA) (Figure 2.2-4). The smaller, more manageable TA units provide flexibility in management of land uses and help ensure safety. TAs are used for the firing of guided missiles, automatic weapons, tank weapons, conventional artillery, aerial gunnery and small arms; launch and control of aerial targets; and explosive ordnance activities (U.S. Army, 2010a).

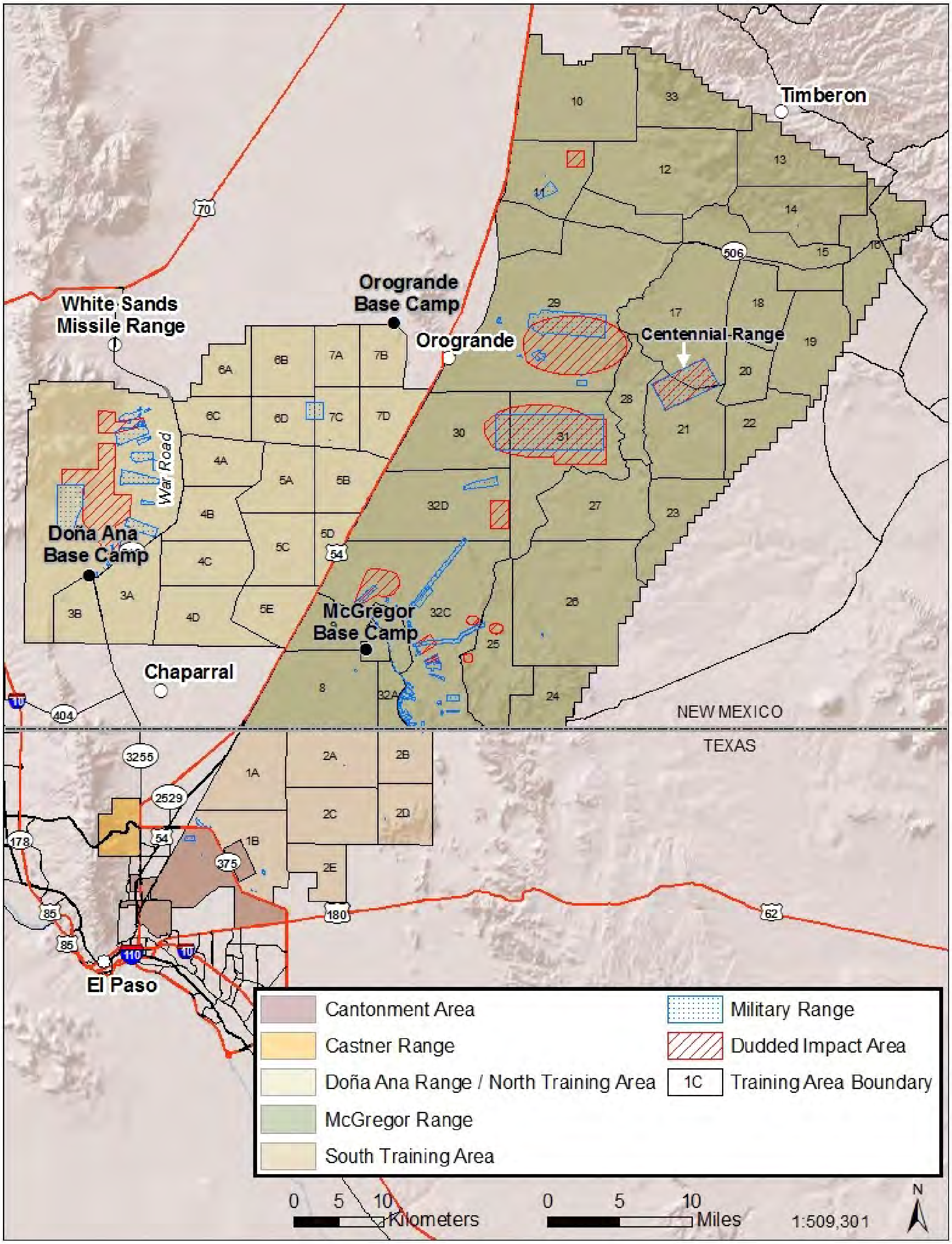

Figure 2.2-4 Fort Bliss Training Areas

2.3 Fort Bliss Cooperators in Wildland Fire Management

Fort Bliss contains lands within its perimeters that are used and shared by other agencies. These agencies are participants in wildland fire management on the installation. Internal cooperators have different missions on Fort Bliss and can also contribute to the frequency and duration of wildfires occurring on Fort Bliss. External cooperators can supply firefighting assets to assist Fort Bliss firefighters. Some of these cooperators have fire management responsibilities on the Fort Bliss lands that they use. As such, it is imperative that firefighting agencies work together to minimize harmful effects from burning Fort Bliss lands. The following agencies are considered internal cooperators.

2.3.1 Internal Cooperators

White Sands Missile Range (WSMR)-WSMR consists of approximately 2.2 million acres and is a US military installation dedicated to testing, evaluation, development and research of weapon systems and commercial products (WSMR 2006). WSMR adjoins Fort Bliss and comprises the majority of the northern boundary of the Doña Ana Range-North Training Areas (Figure 2.3-1). Units stationed at WSMR use Fort Bliss TAs, firing ranges and airspace for tactical training and military tests. Fort Bliss military units jointly use WSMR lands and airspace for training purposes. In combination, WSMR and Fort Bliss create a vast arena of more than 3 million contiguous acres of dedicated DoD land and exclusive-use airspace for training purposes and testing weapons (U.S. Army 1998).

Wildfires have crossed the WSMR/Fort Bliss boundary in the past, mostly within the rugged confines of the Organ Mountains. WSMR Fire Department has brush engines and firefighters that will respond to wildfires on Fort Bliss if they are near WSMR borders. Fort Bliss Fire and Emergency Services (FES) and the WSMR Fire Department have mutual interests in keeping wildfires small near their shared boundary.

Holloman Air Force Base (HAFB) - The Centennial Bombing Range occupies about 5,200 acres on McGregor Range and is used by the US Air Force (USAF) stationed at HAFB for air-to-ground target training. Additionally, the USAF uses a small Class-C bombing range north of New Mexico Highway 506 on McGregor Range. HAFB near Alamogordo, New Mexico does not border Fort Bliss, but utilizes Fort Bliss airspace.

HAFB monitors training activities and wildfires on Centennial Bombing Range through the use of remote cameras in strategic perimeter locations. Wildfire ignitions are common within the Centennial Bombing Range due to a ready ignition source from munitions and the abundance of light, flashy fuels. Wildfires are mostly held in check inside Centennial Range by a system of bladed roads and prescribed fire treatments around the perimeter of the Range. When wildfires burning inside Centennial Range threaten to burn across the boundaries, HAFB notifies Fort Bliss FES and BLM for wildfire suppression support.

Bureau of Land Management - McGregor Range contains 697,472 acres (Figure 2.2-4) (U.S. Army 2007b). Approximately 87 percent of McGregor Range (608,385 acres) is withdrawn public land originally administered by the BLM (Figure 2.3-1) and now co-managed by Fort Bliss and the BLM under a Memorandum of Agreement (MOA), per Congressional withdrawal of these public lands for military use (PL 106-65). BLM's Las Cruces District Office manages the natural resources and manages cattle grazing on fourteen grazing management units (GMUs) on the co-use lands of McGregor Range. Approximately 10 percent (71,083 acres) of McGregor Range is land owned-in-fee by the U.S. Army (US Army 2000). For the purposes of fire management on McGregor Range, the BLM has responsibility for managing and suppressing natural or lightning-caused wildfires (DOI, 2007b). The

Army has responsibility for suppressing military-caused wildfires on Fort Bliss lands. Both agencies respond to wildfire incidents on McGregor Range and elsewhere on the FBTC when needed or called upon and both agencies work together under a signed mutual-aid agreement for wildfire suppression (BLM and Fort Bliss, 2009) (See Appendix B for a copy of the Mutual Aid Agreement).

US Forest Service (USFS)-There are 18,004 acres of the Lincoln National Forest (LNF) that lie within the Grapevine Canyon portion of McGregor Range and are withdrawn from the public domain for military purposes. Through a cooperative agreement with the LNF, Fort Bliss uses this land on McGregor Range (TA 33) as a safety buffer and for ground troop training (U.S. Army 2000). The LNF maintains pasture fences and water for grazing leases and is responsible for managing the natural resources in the Grapevine Canyon area for multiple uses. The LNF shares a common boundary with McGregor Range for several miles in the Sacramento Mountains. LNF lands contain valuable timber, recreation, grazing and wildlife resources. As such, the LNF maintains and supports considerable firefighting resources for protecting these lands from harmful effects of wildfires including several wildland engines, two hotshot crews, a helicopter, air tanker, lead plane and air attack fixed-wing aircraft. These assets can be used for wildfire suppression near or within Fort Bliss' boundaries.

The Alamogordo Dispatch Center (ADC) is an interagency resource that controls movement and use of federal and state firefighting resources within an area called the Pecos Zone which includes all of southeastern New Mexico, far west Texas and all the lands within Fort Bliss.

2.3.2 External Cooperators

The regional area land ownership surrounding Fort Bliss includes private, State and Federal lands (Figure 2.3-1). Wildfires can burn across Fort Bliss boundaries and impact private and public lands. External agencies have resources of firefighters and equipment to assist Fort Bliss firefighters when wildfires threaten to cross boundaries and burn onto private and state lands.

In Texas, most of the land adjacent to Fort Bliss is private land, with some state-owned land in the Franklin Mountains State Park. Wildfire suppression in Texas is the responsibility of the county where the wildfire originates with support from the Texas State Forest Service. There are Rural Volunteer Fire Departments in El Paso and Hudspeth Counties that can respond to wildfires in Texas near the Fort Bliss boundary.

In New Mexico, Fort Bliss is largely surrounded by public lands that are administered by the BLM, USFS and the state of New Mexico (see Figure 2.3-1). The BLM and USFS are considered both internal and external cooperators with Fort Bliss because these agencies have lands both within and adjacent to Fort Bliss boundaries.

The state of New Mexico's Energy, Minerals and Natural Resources Department (EMNRD), Forestry Division (NMSF) retains the lead responsibility for wildland fire management on non-federal and non-municipal lands within the state of New Mexico. The Forestry Division is responsible for wildfire suppression on 43 million acres of private and state lands across the state but has limited numbers of firefighters and engines available for fighting wildfires. NMSF relies on agreements with the state's Volunteer Fire Departments (VFDs) and federal agencies for wildfire suppression assistance on state and private lands in New Mexico.

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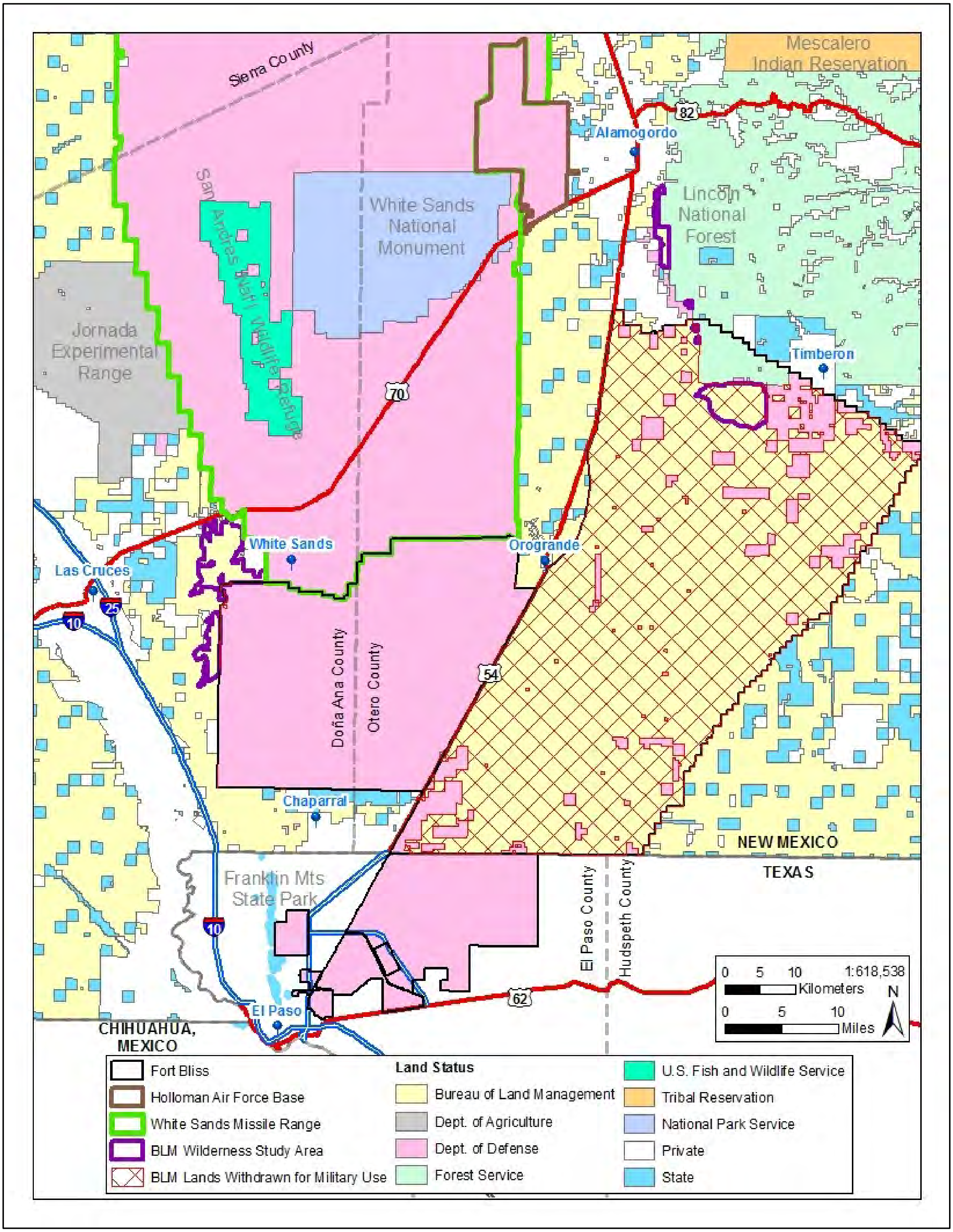


529 **Figure 2.3-1 Regional Land Status**

2.4 Cultural Resources

Fort Bliss and its surrounding area represent a landscape rich with evidence and history of human habitation. Evidence of human habitation on Fort Bliss includes prehistoric hunting and gathering camps, ranches, railroads and trails, late 20th century buildings, World War II buildings and structures and Cold War buildings and structures (US Army, 2008). Human activities continue to shape the landscape through the various missions of Fort Bliss. These activities leave records on the landscape for future generations to manage. These records collectively form the present-day cultural landscape and are worth protecting from the effects of wildfires.

Wildfires on Fort Bliss generally do not cause extensive damage to prehistoric artifacts as these items have probably been burned over by previous wildfires on numerous occasions. Wildfires can cause major damage to various types of historical properties because their primary structural material is combustible wood products. Fire suppression efforts, which can include fire-break construction, vehicle and foot traffic, and digging and trenching are usually more destructive to cultural resources than the wildfires' effects (US Army 2008). Fire management practices that involve ground disturbance or use of aerially delivered fire retardants can cause damage to rock art and archaeological sites. Firefighting resources should consult with DPW-E Conservation Branch resource advisors or archaeologists if planning line construction of any kind as these specialists have records of known cultural sites and can provide information to firefighters so that these sites can be avoided.

2.5 Physiographic Resources of Fort Bliss

Fort Bliss lies within the Basin and Range physiographic province. Extension of the earth's crust throughout this province during the past 30 million years has produced characteristic short, linear mountain ranges separated by intervening valleys (Stewart, 1978). Superimposed along the eastern side of the Basin and Range province is a peculiar physiographic feature that extends from western Texas and northern Mexico northward through central New Mexico. This feature, the Rio Grande Rift Valley, extends northward into the Southern Rocky Mountains physiographic province of southern Colorado and northern New Mexico. From Albuquerque, NM, northward, the Rio Grande Rift Valley is a relatively distinct continuous physiographic feature containing numerous basins. South of Albuquerque, the rift broadens and encompasses several valleys and small, linear mountain ranges. At about the latitude of El Paso, Texas, the Rio Grande Rift Valley turns abruptly to the southeast (U.S. Army, 2000).
Fifty-four % of Fort Bliss lies within the Tularosa Basin which is within the Rio Grande Rift Valley. The Tularosa Basin is about 100 miles long and 60 miles wide. It is one of the largest valleys in the Rio Grande Rift (U.S. Army, 2000). Surrounding the Tularosa Basin are uplands or bajadas (26% of Fort Bliss) comprised of alluvial deposits from the surrounding mountains. Topography of the bajadas consists of low hills and broad uplands cut by steep, rocky arroyos. The Tularosa Basin and the surrounding bajadas are found at elevations ranging from 3,900 to 5,500 feet (1,189 to 1,585 meters). In general, these physiographic types do not support enough vegetation, except during the wettest years, to support the growth of wildfires.

From south to north along the east side of Fort Bliss are the Hueco Mountains (2% of Fort Bliss at elevations ranging from 4,500 to 6,000 feet or 1,372 to 1,829 meters), Otero Mesa (12% of Fort Bliss with elevations ranging from 4,756 to 5,248 feet or 1,450 to 1,600 meters) and the Sacramento Mountains (5% of Fort Bliss at elevations ranging from 4,450 to 7,700 feet or 1,356 to 2,347 meters) (U.S. Army, 2000).

The Hueco Mountains form the western edge of the Diablo Plateau, which extends far into southeast New Mexico and Texas. The Otero Mesa is continuous with the Diablo Plateau. Approximately 127,300 acres of the 1.2 million acres of Otero Mesa (USAF, 1998) and 15,845 acres of the Sacramento Mountains and foothills are located on McGregor Range. The Sacramento Mountains escarpment and the Otero Mesa escarpment rise steeply from the eastern edge of the Tularosa Basin in the north and eastern parts of Fort Bliss (U.S. Army, 2010b).

Along the southwest side of Fort Bliss are the Franklin Mountains (1% of Fort Bliss and ranging in elevation from 4,300 to 5,500 feet or 1,311 to 1,676 meters). Both the Hueco and Franklin Mountains are primarily composed of limestone, as are the Sacramento Mountains on Fort Bliss.

Several miles north of the Franklin Mountains are the narrow, steep-sided Organ Mountains (2% of Fort Bliss with elevations ranging from 4,500 to 8,800 feet or 1,372 to 2,621 meters). The Organ Mountains are continuous northward with the San Andres Mountains and, together, form an unbroken 100-mile-long mountain range. The Organ Mountains are complex in terms of geology. Granite, limestone and igneous rock are all found here (U.S. Army, 2000).

The Tularosa Basin is a closed watershed basin for hydrologic functions. The surrounding mountains catch most of the available precipitation and when it is sufficient to run off the mountains, water is collected on the Tularosa Basin desert floor in shallow depressions called playa lakes. Over millennia, the Tularosa Basin has been filling with parent and mineral material washed down from the mountains. Currently this deposition is several hundred feet deep (Collins and Raney, 1991). Soils on the Basin floor are calcareous due to this deposition (U.S. Army, 2000).

2.6 Climate

Fort Bliss is located in the northern Chihuahuan Desert and has a semi-arid to arid, subtropical desert climate characterized by low rainfall, relatively low humidity, hot summers, moderate winters, wide temperature variations, and an abundance of sunshine throughout the year. Records of the weather in the area that have been kept since 1904 indicate that the area has an average annual precipitation of 8.8 inches, (US Army 2007b) with extremes from 2.22 inches to 18.29 inches. More than half of the total average annual precipitation occurs during the months of July, August, and September. During the summer months, beginning at the end of May and lasting through mid-October, convective cells are formed by the intersection of moist tropical air from the Gulf of Mexico with local air masses uplifted by intense surface heating. The resulting summer precipitation is localized and generally concentrated in short, high intensity thunderstorms in the mid-afternoon and evening that often produce substantial runoff water in arroyo drainages and standing pools of water in playas (U.S. Army, 2000).

The wildfire season on Fort Bliss and the surrounding area typically lasts from the first frost in November until the onset of the monsoons in July, reaching a peak during the spring to early summer (March-June) when winds and temperatures are at their peaks and relative humidity is lowest.

Fort Bliss has a frost-free season that averages 248 days a year. Temperatures are generally warm, ranging from highs in the mid-50 degrees Fahrenheit (°F) during the winter months to highs well above 90°F during the summer. The annual average temperature is 63.3°F, with a record low of -8°F and a record high of 114°F.

Daytime humidity is generally low, ranging from 10 to 14 percent. Because of the mountainous terrain and the Rio Grande Valley, there are significant diurnal and regional fluctuations in humidity. Typical of desert climates, rapid cooling from nighttime re-radiation causes increases in relative humidity. Average daily relative humidity increases to about 40 percent at midnight and to 51 percent by 6:00 a.m. (U.S. Army 2007b).

Wind speeds in the El Paso area are moderate, with an annual average of 9.0 miles per hour (mph). The highest average wind speeds (11.3 mph) occur during the months of March and April, decreasing slightly in May to an average of 10.5 mph. The combination of relatively strong sustained winds and low precipitation in the spring contribute considerably to the occurrence of wildfires and to sand/dust storms in the area. Fire weather forecasters issue red flag watches and warnings during periods of critical dryness and high speed wind events to inform the public of the high potential for large, wind-driven wildfires and to caution users within the wildlands to be extra cautious with fire. Red flag warnings can occur anytime during fire season but are most frequent in the months of April-June. During the summer months, average wind speeds drop to their lowest levels of the year (less than 8.0 mph) (U.S. Army 2007b).

Fire planners who wish to use prescribed fire treatments to reduce fuel loads or to improve wildlife habitat must factor climate and weather variability into their prescriptions for a burn. Prescribed fires are relatively easy to ignite and control in the fall and winter because fuels are dry and relative humidity is high and winds are usually light. However, vegetation may not respond favorably to the burn if there is a lack of moisture for several months following the burn. Burning closer to the onset of the monsoon season favors desired plant communities' ability to recover from wildfire effects. However, this is the season when winds are strongest, relative humidity is lowest and temperatures are highest making control problems more likely for prescribed burners.

2.7 Vegetative Communities of Fort Bliss

Plant communities on Fort Bliss range from Chihuahuan Desert plant communities in the Tularosa Basin to Rocky Mountain conifer forests in the Organ Mountains (U.S. Army 2000). Fort Bliss's large size (approximately 1.1 million acres) and varied topography (desert basins to montane peaks) allow for a high degree of biodiversity. There are estimated to be 300 nonvascular and 1,200 vascular plant species that occur on Fort Bliss, with over 800 in the Organ Mountains alone (U.S. Army 2001, 2007). A desert shrub-grassland vegetation community characterizes the majority of Fort Bliss landscapes. Less than 1% of the Fort Bliss area can be classified as forest, while 98 percent of Fort Bliss is considered to be shrublands and grasslands (U.S. Army 2007). Shrublands makes up 67 percent of the land cover, 31 percent is grasslands, 0.94 percent is montane woodland and riparian and 0.3 percent is facilities (U.S. Army, 2007b). Section 3.1.2 contains detailed descriptions of Fort Bliss' flammable fuel types.

The Tularosa Basin of Fort Bliss contains mostly desert shrublands. About 31 percent of Fort Bliss is covered with mesquite (*Prosopis glandulosa*) dominated plant communities which are mostly coppice dunes. Creosote *(Larrea tridentata)* dominant communities cover 15.5 percent of Fort Bliss. Over the last century, these shrub-dominated plant communities have replaced grassland communities, including black grama (*Bouteloua eriopoda*) grasslands, over large areas of the Chihuahuan Desert (Buffington and Herbel 1965; Whitford 1997; Pidgeon, et. al. 2001). A problem that occurs within these shrub-dominated areas is wind erosion, which occurs mostly between January and June (Goran, et. al. 1983). Wind erosion has been associated with degrading grasslands and the loss of their ability to retain topsoil while increasing desert shrublands and coppice dunes.

Woodland plant communities are found at the higher elevations in the Organ Mountains and in the Sacramento Mountains foothills (6,000-9,000’). Piñon pine (*Pinus edulis)* and juniper *(Juniperus spp.)* woodlands and montane shrublands dominated by mountain mahogany *(Cercocarpus montanus)* occur in these mountain ranges. Montane riparian vegetation communities, montane coniferous forests, and montane shrubland communities dominated by Gambel’s oak *(Quercus gambelii)* occur in the highest elevations (> 7,000’) of the Organ Mountains on Fort Bliss (U.S. Army 2000).

2.8 Animal Resources of Fort Bliss

A total of 335 species of birds, 58 species of mammals, 45 species of reptiles and 8 species of amphibians have been documented on Fort Bliss (U.S. Army, 2007a) (U.S. Army 2007b).

Invertebrates are abundant and diverse, yet relatively unknown. There are a number of invertebrates that are of special interest for various reasons (such as endemic species or species prized by collectors), including, but not limited to, a number of grasshoppers, beetles, flies and butterflies (Lightfoot and Forbes 1997). Four endemic snail species are known to exist in the Organ Mountains and on Bishop’s Cap (Metcalf, 1984).

During the monsoon season in the Chihuahuan Desert on Fort Bliss, an assortment of ephemeral invertebrates (primarily larvae and small shrimp-like crustaceans) hatch in the playas and reproduce before the water dries up. In turn, this invertebrate fauna provides important food for adult and larval toads, salamanders and birds (MacKay et al., 1990) (Hobert, et al., 2008b).

Most of the 335 bird species found on Fort Bliss are protected under the Migratory Bird Treaty Act. Eighty species occur throughout the year and are considered residents of Fort Bliss, 129 species are seen only temporarily during migration, 42 species are spring and summer residents, and the remaining species occur principally during the winter (U.S. Army, 2000).

2.9 Threatened, Endangered and Sensitive Plant and Animal Species of Fort Bliss

There is only one plant species, Sneed pincushion cactus (*Coryphantha sneedii var. sneedii)* that is federally listed as endangered under the Endangered Species Act (ESA) and is found on Fort Bliss. Three species of birds found on Fort Bliss are candidates for federal listing as threatened or endangered under the ESA. The northern aplomado falcon *(Falco femoralis septentrionalis)* is a candidate for listing but has been designated by the US Fish and Wildlife Service (USFWS) as a Nonessential Experimental Population within the states of New Mexico and Arizona (U.S. Army, 2010b). The northern aplomado falcon occurs occasionally as a transient visitor on Otero Mesa of Fort Bliss. The other two species listed as ESA candidate species are the Sprague’s pipit *(Anthus spragueii)* and the yellow-billed cuckoo *(Coccyzus americanus).*The Sprague’s pipit is a migrant that is found in the grasslands of Otero Mesa on Fort Bliss in the winter. The yellow-billed cuckoo has been sighted on Fort Bliss on five occasions. It mainly inhabits riparian areas and is not known to nest on Fort Bliss (U.S. Army 2014).

There are numerous other plant and animal species found on Fort Bliss that are considered to be sensitive by the states of New Mexico and Texas. These species could become endangered if significant portions of their habitats or habitat requirements are lost. **Appendix G** provides detailed information on the effects that wildfires and prescribed burns can potentially have on the threatened, endangered and sensitive plant and animal species found on Fort Bliss. This information is particularly valuable to individuals that are writing, proposing or designing prescribed fire plans or projects because it indicates specific areas and periods of the year to avoid in order to minimize fire impacts to threatened, endangered, sensitive or rare species found on Fort Bliss.

3 Wildland Fire Factors and Wildfire History

Wildland fires are shaped by the interactions of natural or human-induced combustion, terrain, climate and fuel. Fuel for wildland fires can be natural vegetation or combustible man-made structures. This section of the IWFMP explains how the interactions of wildland fire factors of fuel, topography and climate affect fire frequency and fire behavior and, correspondingly, how wildfires affect the human environment. An understanding of these interactions coupled with a knowledge of historical and current ecosystem components and wildfire history can help managers make decisions as to where, when and how wildfires are suppressed or managed on lands administered by Fort Bliss. This knowledge also aids in implementation of land management activities including prescribed fires and mechanical fuels treatments that help the landscapes of Fort Bliss to become resilient to wildfires' harmful effects and ultimately help the Army to sustain its training lands for use far into the future.

3.1 Fort Bliss Fire Regimes

Fort Bliss wildland fire managers use information from wildfire history records, including the frequency and severity of wildfires in a given area along with historic vegetative community composition as a baseline for comparison with current vegetation and fuel loads. The analysis of historic and current conditions provides the basis for making informed land management decisions and implementing beneficial ecosystem projects.

Wildland fires across the Fort Bliss landscape differ widely in terms of frequency, size and spread pattern, fire intensity, and burn severity. Over time, we can measure fire return intervals (FRI), and see similarities in fire patterns among ecosystems and regions. These patterns are what constitute ***fire regimes***. A fire regime characterizes the historical features of wildland fires that have been typical for a particular ecosystem (Kennard, 2008). Hardy et al. (2000) mapped fire regimes of the Western United States using fire severity and fire frequency and combined them into five fire regime classes (Table 3.1-1). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. The five standard fire regimes were developed primarily for forests, shrublands and prairie grasslands where natural vegetative succession is easily measured and wildfires burn in ways that are predictable in terms of severity and frequency.

On Fort Bliss, wildfire frequency, wildfire severity and fuel loads are highly variable and do not fit neatly into the standard fire regime groups. Most wildfires on Fort Bliss are spread by grass fuels inter-mixed with desert shrubs in varying amounts which tends to inhibit wildfire growth. This is true on the grassland areas of Otero Mesa where there are many areas of shrubs intermixed with grasses. Fire history records show that some areas of Otero Mesa have burned 4-5 times in the last thirty years while other areas of Otero Mesa have not burned at all. Shrub-woodland communities, such as those found in the Organ and Sacramento Mountains also exhibit highly variable fire frequencies and widely varying fire intensities and thus exhibit widely variable fire regimes. Most of the Organ Mountains have burned one-three times in the past 34 years while most of the Sacramento Mountains and foothills with similar vegetation have not burned at all within that time frame.

On Fort Bliss, there are four basic ecosystem types: desert, grassland, shrub woodland and forest. Characteristics of fire regimes within each of these ecosystems are presented.

Desert-About two/thirds of Fort Bliss is desert which does not commonly support large wildfire spread (>500 acres) due to the lack of continuous fuels. These areas are characterized by mesquite coppice dunes, bedrock, bare ground and creosote-covered piedmonts and basins. The contemporary period (after 1900) had a mean Fire Return Interval (FRI) in these areas of 50 years (Poulos et al., 2013). Fire frequency before this period is unknown and was likely highly variable. Periods of extended drought has contributed to lengthening of FRI. The mean FRI for the Chihuahuan Desert now stands at 20-80 years (LANDFIRE 1.1.0 2010).

Grassland-About one/third of Fort Bliss is covered by grasslands. This is where the majority of wildfires occur on Fort Bliss. Grasslands recover quickly after being burned and are capable of burning again within three-five years. Frequent wildfire plays a significant role in nutrient recycling and favors grassland propagation by reducing or eliminating less fire-tolerant shrub species (McPherson, 1995). Research suggests that the mean FRI for Chihuahuan desert grasslands throughout the seventeenth to early nineteenth centuries was five to 10 years (Swetnam 1996). Fort Bliss fire history shows that the grasslands of Fort Bliss currently have an FRI of 4-35 years.

Shrub/Woodland-About three percent of Fort Bliss is piñon-juniper, mountain mahogany and oak shrub/woodlands. This ecosystem type is found in the Organ Mountains and Sacramento Mountain foothills. The extent of historic piñon-juniper savannas has decreased while piñon-juniper woodlands have increased. This is due to the disruption of frequent, low severity fire regimes at these sites which has resulted in widespread tree regeneration (Poulos, et al., 2013). Much of this fuel type on Fort Bliss has burned in varying severities 1-3 times in the past 35 years, mostly due to an increased use of fire-producing ammunitions across the FBTC.

Forest-Less than one percent of Fort Bliss is forest (Table 3.1-2). On Fort Bliss this includes mixed stands of Ponderosa pine (*Pinus ponderosa*), Gambel oak (*Quercus gambelii*) and Douglas fir (*Pseudotsuga menziesii*) found in the higher elevations of the Organ Mountains (>8,000') and in a small area of the Sacramento Mountains adjacent to the village of Timberon. Most of the forested areas in the Organ Mountains have burned with variable fire severities 1-2 times in the past 35 years. An analysis of tree ring fire scars on Ponderosa pine in Fillmore Canyon of the Organ Mountains showed that prior to 1805 the FRI was an average of every two years, but wildfires were quite small and patchy. After 1805 and up to 1874 the FRI rose to 3.5 years but wildfires burned hotter and were more widespread (Morino et al., 1996). After 1874 there were no fire scars to record until 1994 when the Organ Fire burned much of this fuel type.

Table 3.1-1 Five Historic Natural Fire Regime Groups

Fire Regime Group	Frequency (Fire Return Interval)	Severity
I	0–35 years	low severity
II	0–35 years	stand replacement severity
III	35–100+ years	mixed severity
IV	35–100+ years	stand replacement severity

V	>200 years	stand replacement severity

3.2 Fort Bliss Wildfire History

Prior to 1850, most fire ecologists agree that frequent wildfires within the Chihuahuan Desert and associated sky island mountain ranges limited the accumulation of vegetative biomass and favored grassland vegetation over woody shrubs. The indigenous Apache people purposely burned woodland areas of the Organ Mountains and other mountain ranges to maintain open areas for ease of hunting (Morino 1996). Woodlands were characterized by savannas of scattered mature piñon, ponderosa and juniper trees surrounded by dense grasses. The historic FRI was measured from tree-ring studies and found to be an astonishing 2.4 years (Morino, et al. 1996). The tree-ring study was conducted by coring mature, live ponderosa pines in the Fillmore Canyon area. These trees were scattered over a few square miles. The sampled trees revealed that very few of the trees actually burned in the same year but the number of fire scarred annual rings was quite high. The study revealed that frequently wildfires burned in a portion of the study area, but over relatively small areas with low fire intensities. Under these conditions the majority of fuels consisted of dried grasses so that heat generated by burning was not enough to adversely affect soils or the roots of grasses. These fires only killed the seedlings of woody plants and allowed for the quick recovery of grasses. Fires did not contribute to soil erosion and served to maintain the dominant vegetation of grasses and widely spaced trees (Muldavin 1996). This high frequency, low burn severity fire regime was maintained until European settlers arrived and the native Apaches were displaced in the mid-nineteenth century (Morino, 1996).

Although European influence in the area began prior to 1600, it wasn't until the advent of the railroad in the mid nineteenth century that large-scale changes began to occur on Southwestern landscapes. With the ability to drive livestock to nearby railheads, grazing pressure on rangelands increased dramatically in the late nineteenth century (Drewa and Havstad, 2001). Wildfires that occurred were suppressed to save grass for grazers. The combination of grazing and fire suppression ultimately led to a decrease in grass biomass and a corresponding increase in woody vegetation within formerly grass dominated sites. Long intervals between wildfires and grazing animals' preference for mesquite beans allowed for the establishment and spread of mesquite to previously unknown levels across vast areas of the Chihuahuan Desert (Drewa and Havstad, 2001). Shrubs completely replaced grasses in drier lowland areas while higher elevations were occupied by dense mixtures of trees, shrubs and grasses. Today, when wildfires occur at these sites, they tend to be stand-replacing fires which burn the litter, surface and crowns of mature trees and shrubs. When wildfires burn at high intensities, roots and soil organic material are consumed and this leads to wide-spread soil erosion. These fires destroy several age classes of trees and shrubs and require decades to recover.

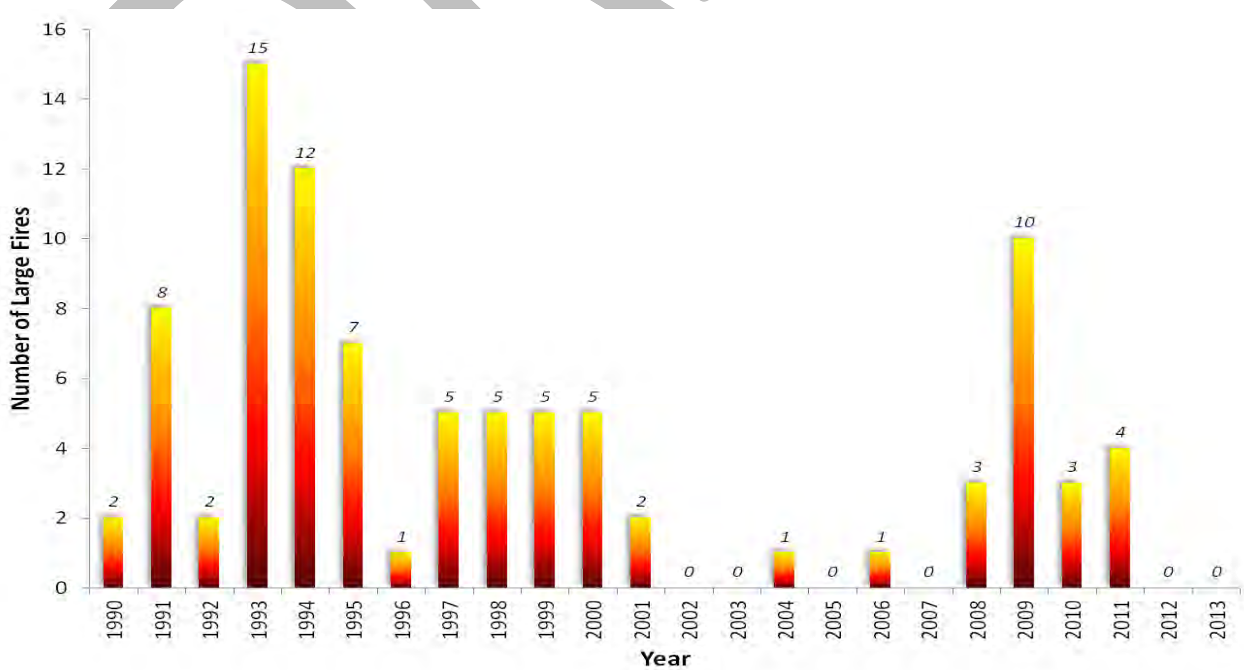
Fire history studies conducted in several fuel types in southeast Arizona, which are similar to fuel types found on Fort Bliss, found that widespread fires were significantly associated with the occurrence of two consecutive years of wetter-than-average conditions (Baisan and Swetnam 1990). They interpreted these findings as indicating the importance of precipitation for producing fine fuels, *e.g.,* grass, which facilitate the occurrence of widespread fires. In the Southwest, summer precipitation, in particular, may play an important role in fuel accumulation. Many of the grass species found in the Southwest respond strongly to summer precipitation, *i.e.* July to September, when up to 90% of growth occurs (McClaran 1995). A study of tree ring growth and wildfire history in the Organ Mountains showed a strong correlation between years of above average tree growth followed by scarring from widespread wildfires (Morino, et al, 1996).

Wildfire history has only been thoroughly documented and recorded on Fort Bliss for about 35 years. Table 3.2-1 depicts large wildfires since 1990 and Table 3.2-2 depicts the acres burned each year by wildfires since 1990. Figures 3.2-1 and 3.2-2 portray the areas of Fort Bliss that experienced wildfires since 1990. The Fort Bliss fire frequency map (Figure 3.2-2) shows where wildfires have been concentrated. It illustrates the fact that Otero Mesa has the highest frequency of wildfires, specifically on Centennial Range where live-fire activities occur year-round. Most of the areas within the grassland fuel types have burned 1-4 times in the last 24 years. Over fifty wildfires have been recorded since 1990 upon Otero Mesa and at least 8 wildfires have burned to the east across Fort Bliss boundaries and onto private and public lands. Large wildfires occurred on Otero Mesa in 1993-1994, 1997, 1999, 2000 and 2008-2011. All of these wildfires occurred in dry seasons that followed strong monsoon seasons. The drought years of 1996, 2001-2007 and 2012-2014 experienced very few wildfires in total and no large wildfires because the fuel loads had become low due to the effects of prolonged drought. In 2011, after the Abrams Fire, Fort Bliss began implementing restrictions on fire-producing ammunitions based on fire danger levels. These restrictions are partially responsible for the low numbers of wildfires since that time.

Fort Bliss Fire and Emergency Services has records for the number of wildfires that they responded to from 2010-2014. The figures are by fiscal year and numbers of wildfire responses: 2010-29 responses, 2011-43 responses, 2012-16 responses, 2013-9 responses and 2014-14 responses.

From 1990 to 2013, 423 wildfires were recorded on Fort Bliss and 302,770 acres were burned. Large wildfire events (>500 acres) occur on Fort Bliss most years (Table 3.2-1). Most large wildfires are military mission-caused or lightning-caused and have occurred in every month from November through July, prior to the onset of the monsoon season in mid-summer. Fire season is traditionally considered to be from February to mid-July but wildfire events can occur any time of the year on Fort Bliss.

Table 3.2-1 Wildfires Greater than 500 Acres on Fort Bliss since 1990



On Fort Bliss, most wildfires are contained by firefighters within 24 hours of discovery. Though these wildfires may consume a few thousand acres of grass and shrubs in one burning period during the day, they generally respond favorably to night-time firefighting efforts, due to slight increases in relative humidity and large decreases in air temperature and winds. Night-time conditions allow firefighters with engine support to eventually engage in direct suppression tactics along the less intense flaming edges.

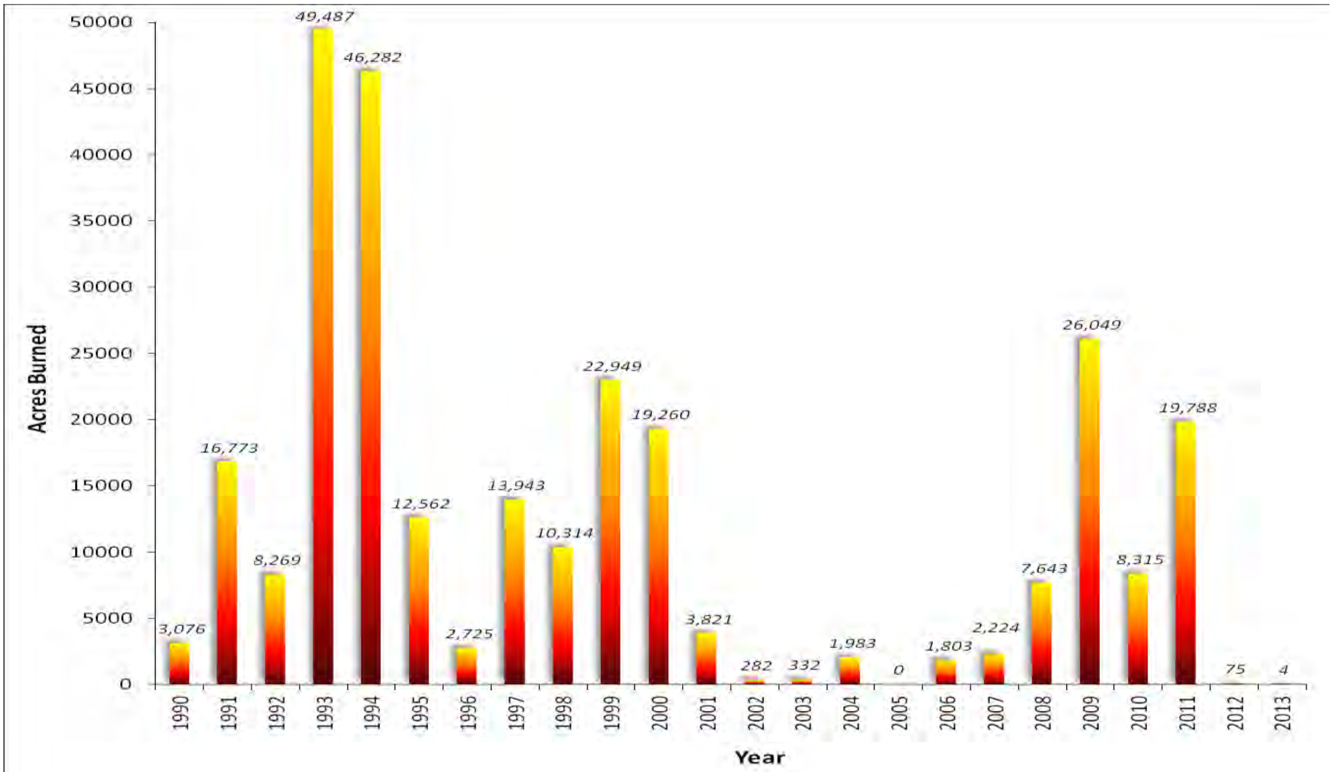
In 1994, a wildfire called the Organ Fire was started by lightning strikes on Organ Peak and eventually burned several thousand acres of montane shrub/woodland and forest fuel types in the Organ Mountains. The wildfire was contained at 13,806 acres (Muldavin, 1996). In 2010, two large wildfires (Fort Bliss II, 3,718 acres and the Long Canyon Fire, 2,208 acres) were started on Fort Bliss from military live-fire exercises and burned much of the south side of Soledad Canyon, Rattlesnake Ridge, Boulder Canyon, Oak Canyon and Long Canyon. These wildfires burned in foothills and piedmont grasslands and in shrub/woodland fuel types. In 2011, the Abrams Fire was started west of Range 66A by live-fire exercises. The wildfire burned Soledad and Rucker Canyons and went over the top of North Peak and Organ Peak eventually burning across Fort Bliss boundaries onto WSMR and BLM lands to the north. The Abrams Fire was eventually contained at 11,026 acres.

The wildfires started by military, live-fire exercises in the Organ Mountains that grew into large wildfires (>500 acres) ignited under predicted high winds and during high to extreme fire danger. Since the Abrams Fire in 2011, Fort Bliss has adopted fire restriction policies that take into account predicted high to extreme fire danger ratings and current weather indices and has imposed restrictions on live-fire ammunitions training during high fire danger periods. This policy combined with the fuel breaks and proposed prescribed fires in this plan will reduce the potential for wildfires burning throughout the Organ Mountains and crossing Fort Bliss boundaries.

Large wildfires occur in sand sage (*Artemisia filifolia*) grasslands on the eastern edge of the Tularosa Basin, primarily in Training Areas 10, 11 and 29-32. Wildfires here can burn readily and become large, but are generally extinguished under cover of darkness and seldom burn beyond a 24 hour period.

Wind-driven wildfires have burned up the bottoms of Hay Meadow Canyon, Martin Canyon and Owl Tank Canyon and onto Otero Mesa. These three canyons are prime targets for fuel and fire management actions of installing fuel breaks and implementing prescribed burns.

Table 3.2-2 Acres Burned by Wildfires 1990-2013



3.3 Wildfire History Data Collection Methods

Wildfire history records at Fort Bliss are stored in a corporate Geographic Information System (GIS) database. This database is maintained and updated by DPW-E and is shared with other interested parties on Fort Bliss including the Las Cruces District-BLM. Data provided to DPW-E is collected by firefighters who walk or drive the perimeter of the burned area while carrying a hand-held Global Positioning System (GPS) unit and recording points at regular intervals. DPW-E may also collect GIS data from firefighting aircraft, satellite burn scar imagery or may digitize images drawn by hand. Sources of wildfire data are usually Fort Bliss firefighters, Fort Bliss Range Operations staff and BLM Fire staff.

Many wildfires on Fort Bliss burn unobserved and unreported. DPW-E relies on geospatial analysis of satellite imagery to collect fire history data that is unreported. LandSat Enhanced Thematic Mapper Plus (ETM+) imagery is periodically downloaded from the U.S. Geological Survey's Global Visualization Viewer. The downloaded imagery is a collection of light bands that are used for analysis in two different ways. The first process combines various bands to produce a false color image, where burned vegetation is displayed as a bright red color and can be studied visually. This process is the quickest, but can also be unreliable if the fire occurs in light fuels or rugged terrain, is followed by high winds, or is less than 75 acres. The second process is done by calculating differenced normalized burn ratios (dNBR), which are similar to vegetation or greenness indices. A normalized burn ratio (NBR) is calculated on imagery that was taken from two different time periods but within a month of each other. These two NBR's are subtracted from each other to produce the dNBR. Any areas that that have had a change in vegetation cover (such as a wildfire) become clearly visible (Cocke et al 2005). As with the false color imagery, the dNBR may not detect small fires or those wildfires that are in areas with low fuel loads.

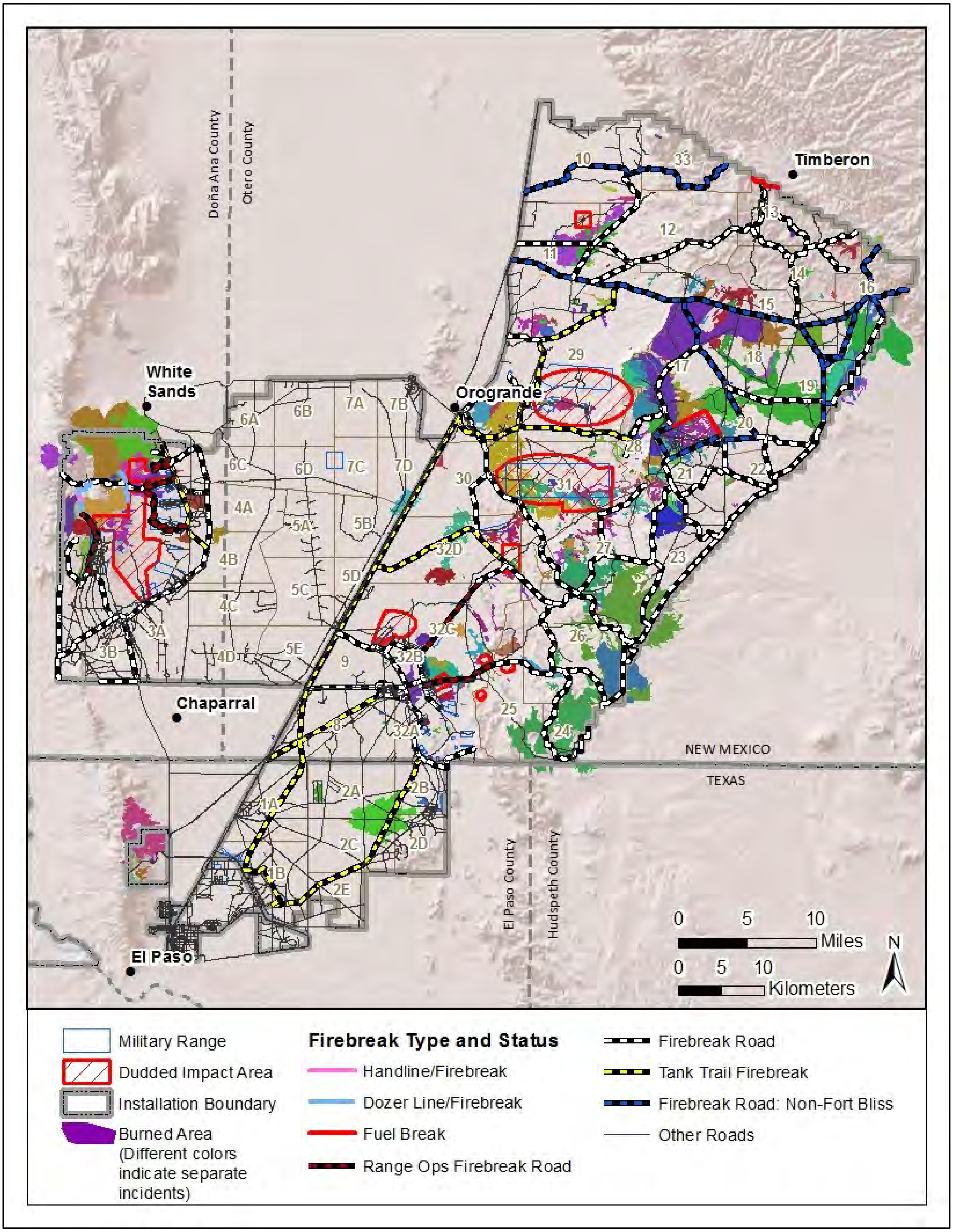


Figure 3.3-1 Fort Bliss Wildfire History

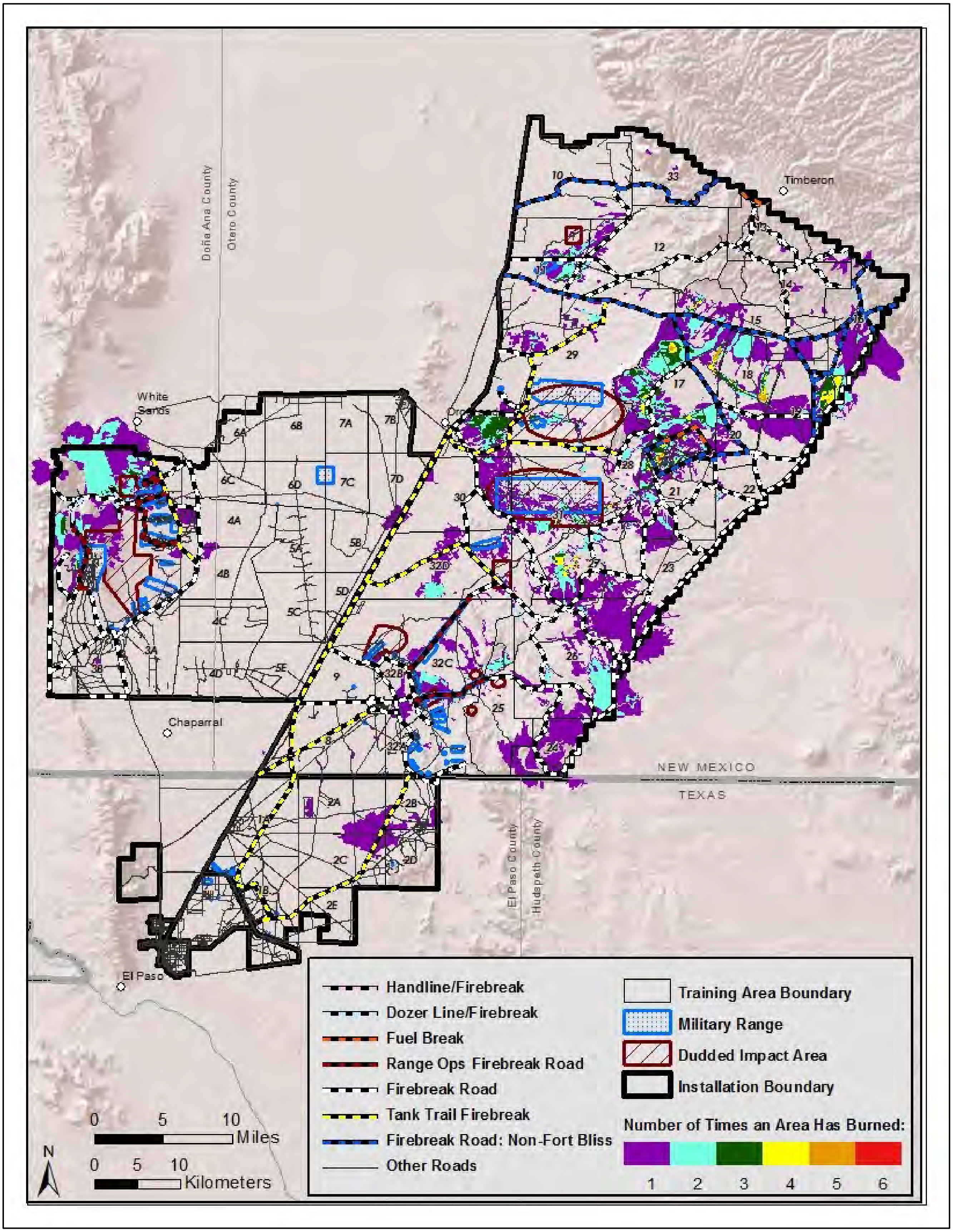


Figure 3.3-2 Fort Bliss Wildfire Frequency

3.4 Fort Bliss Fuel Types

In the NWCG Glossary of Wildland Fire, ***fuel*** is defined as any combustible material, especially petroleum-based products and wildland fuels. Fuel is one leg of the fire triangle at which fuel, heat and oxygen combine to create fire. Remove any one of the three legs of the fire triangle and fires cannot burn. ***Fire behavior*** is primarily influenced by fuels, topography and weather. Wildland fire managers cannot control the weather or topography in any meaningful way but fuels can be manipulated in several different ways and, therefore, fuels are the primary management target for fire suppression, fuels management and fire prevention efforts.

Fort Bliss fuel type descriptions portray various fuel associations as areas where wildfires can and cannot generally spread and thus point to focal areas for wildland fire management activities (Figure 3.3-1). Fort Bliss fuel types are a mixture of many species of vegetation that tend to burn in a characteristic manner (Table 3.3-1). Many areas within each fuel type have inclusions of other fuel types within them. For example, mesquite coppice dunes and creosote bajadas surround pockets of grass which are highly flammable. However, there is little potential for wildfire spread outside the areas of grass due to the low above ground biomass of mesquite and creosote fuel types. Variable annual precipitation causes variations in fuel loads within all fuel types and, in higher than average annual precipitation years these variations in fuel loads can change a fuel type that is not flammable to one that is flammable and therefore subject to wildfire spread.

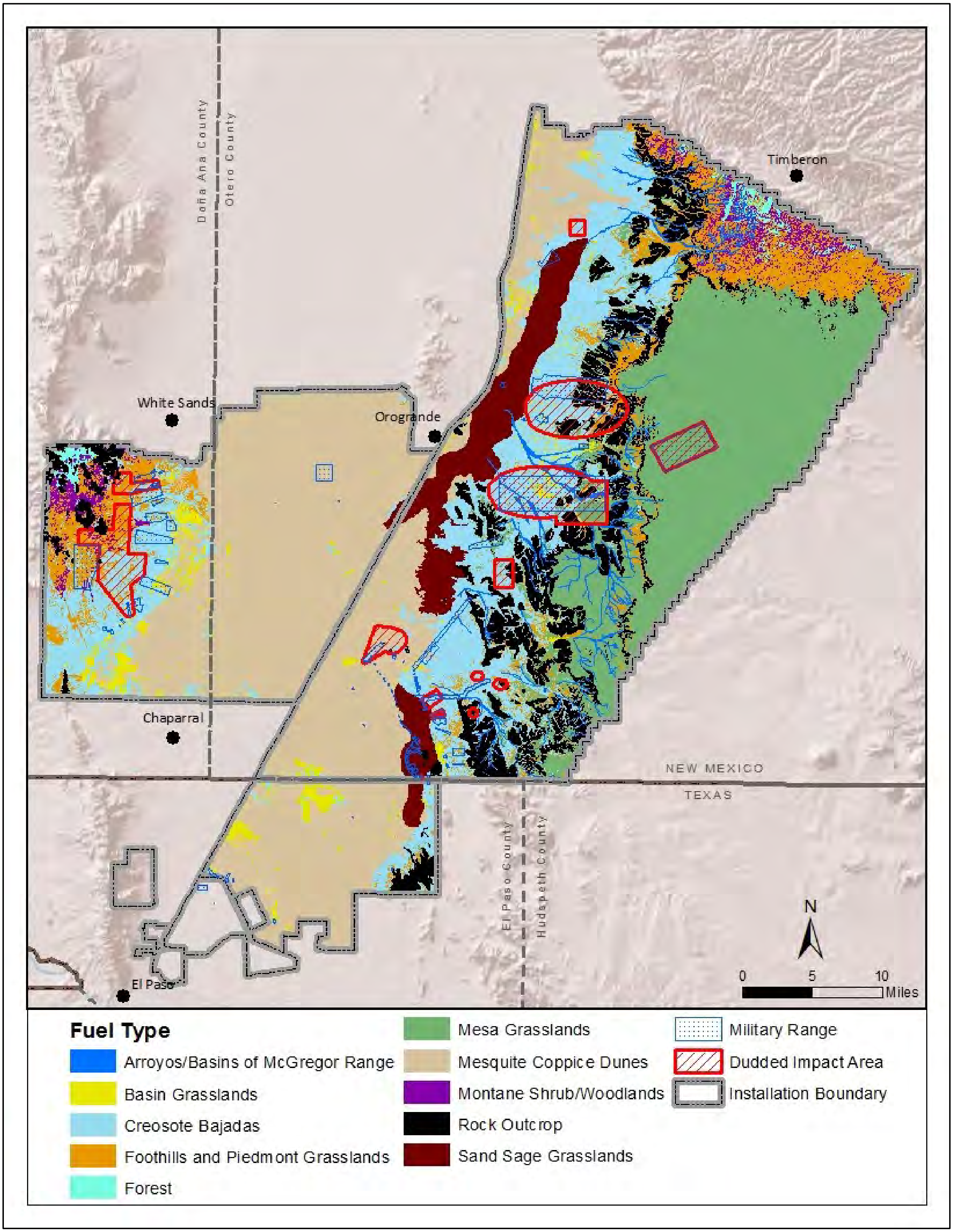
Cured perennial and annual grass fuels are the primary carrier of wildfires on Fort Bliss. This is borne out by wildfire history on Fort Bliss. The grasslands of Otero Mesa have, by far, the highest concentrations of large wildfires (>500 acres) on the installation. The Organ Mountains have the second highest concentration of wildfires but are the most complex in terms of fire management due to the great topographic relief and the high variety of fuel types. The Organ Mountains also generate the most public interest when they burn due to their high profile and proximity to human populations. Wildfire history in the Organ Mountains points to locations where fire management activities such as prescribed fires, mechanical fuel reduction and firebreak placement are necessary and justified.

Shrub and woodland fuel types will not generally sustain wildfire spread on Fort Bliss without a grass component underneath. Grasses grow well in the higher elevations of Fort Bliss (>5,000' elevation) and also in lower areas where water is concentrated from runoff from the surrounding hills, such as basins, arroyos and playas.

Table 3.3-1 lists the 10 fuel types found on Fort Bliss and their relative size. The 10 fuel types are shown as colors in Figure 3.3-1. A description of each of the 10 fuel types including the dominant plant species and burn characteristics follows the fuels map.

Table 3.4-1 Fort Bliss Fuel Types

Fuel Type	Acres	% of Fort Bliss
Mesquite coppice dunes	367,630	33.92%
Mesa grasslands	207,695	19.16%
Creosote bajadas	186,151	17.17%
Foothills and piedmont grasslands	92,995	8.58%
Bedrock	90,165	8.32%
Sand sage grasslands	54,658	5.04%
Basin grasslands	26,242	2.42%
Montane shrub/woodlands	24,930	2.30%
Arroyos/Basins of McGregor Range	24,243	2.24%
Forest	9,183	0.85%
Total Acres	**1,083,893**	

941


942 **Figure 3.4-1 Fort Bliss Fuel Types**

Mesquite coppice dunes-This fuel type is widespread across the Tularosa Basin on Fort Bliss. This fuel type is a barrier to wildfire spread. The spaces between the dunes have lost their topsoil due to scouring by high winds. Topsoil is deposited on the lee sides of the mesquite dunes and helps to perpetuate them. The interstitial spaces are almost completely devoid of vegetation with the exception of a few hardy species such as snakeweed (*Gutierrezia* spp.), four-wing salt bush (*Atriplex canescens*), yucca (*Yucca* spp.) and drop-seed grasses (*Sporobolus* spp.).

Mesa grasslands-This fuel type includes the grasslands of Otero Mesa and the rolling hills south of Otero Mesa (sometimes referred to as the sub-mesa) down to and including the flanks of the Hueco Mountains on Fort Bliss. Grass fuels of several species are fairly continuous and support large wildfire growth. There have been more large wildfires in this fuel type than any of the others on Fort Bliss. Generally there has to be a wind component to push wildfire through this fuel type. Mesa grasslands are associated with soap tree yucca (*Yucca elata*) creosote, snakeweed, cholla (*Cylindropuntia* spp.) and prickly pear cacti *(Opuntia spp.)*.

Creosote bajadas-This fuel type is found on Fort Bliss on the uplands above the Tularosa Basin floor surrounding the Organ Mountains and also paralleling the base of the Otero Mesa escarpment. Fire regime is variable, but in general, this fuel type is a barrier to wildfire spread. Fire seasons that follow above average precipitation may have enough cured weeds, forbs and grasses to support large wildfire growth in places. Creosote bajadas are found in many soil types and are intermixed with mesa grasslands in areas of the Otero Mesa and on the sub-mesa in the vicinity of Castner Draw and Owl Tank Canyon.

Foothills and piedmont grasslands-This flammable fuel type is found in the Organ Mountains on Doña Ana Range and in the Sacramento foothills of McGregor Range. Grasses, shrubs and forbs of many species are found in the foothills, basins and canyons of the Organ Mountains and Sacramento foothills. This grassland fuel type is intermixed with shrubs. The most common shrubs include sotol (*Dasylirion wheeleri*), mesquite, acacia, algerita (*Mahonia trifoliolata*), mountain mahogany and creosote. The most common grasses include a variety of gramas (*Bouteloua* spp.), muhlys (*Muhlenbergia* spp.), dropseeds and three awns (*Aristida spp.)*. The Sacramento foothills have similar vegetation but the fuel loads are less than the Organ Mountains. This is due to the prevalence of limestone rock outcrops throughout the Sacramento foothills. Historically, wildfires do not spread in the Sacramento foothills like they do in the Organ Mountains.

Bedrock-This fuel type is associated with exposed bedrock areas on McGregor Range that are below the Otero Mesa and includes the escarpment of Otero Mesa, the rocky crags and exposed rock of the Organ Mountains and rock outcrop areas within the Sacramento Mountain foothills. Fuels are discontinuous and will not support large wildfire spread. Fuels found on bedrock areas include acacia *(Acacia spp.),* agave *(Agave spp.)*, cacti, ocotillo (*Fouquieria splendens*)*,* tarbush (*Flourensia cernua*), yucca, mariola (*Parthenium incanum*) and scattered perennial bunchgrasses.

Sand sage grasslands-Deep sand and sandy soil types define this fuel type. In these areas, sand has been lifted and moved across the open areas of the Tularosa Basin by prevailing southwesterly winds. Over thousands of years this sand has deposited and built up against the Otero Mesa escarpment and at the bases of nearby hills. In years following normal to higher than average precipitation, plants adapted to life in sandy soils grow in abundance here. This fuel type is dominated by perennial and annual grasses and forbs that are associated with shrubs of sand sage, four-wing saltbush, sumac (*Rhus* spp.), acacia, creosote and snakeweed *(Gutierrezia* *microcephala)*. This fuel type intergrades with mesquite coppice dunes and creosote bajadas so large wildfires within the sand sage grasslands die out at the interface of these fuel types.

Basin grasslands-Basin grasslands are found primarily on the Tularosa Basin floor in shallow basins and include pockets of perennial drop-seeds, tobosa *(Pleuraphis mutica*), black grama and sacaton (*Sporobolus* spp.) grasses amid a variety of annual forbs and annual grasses. Basin grasslands are a fuel type where wildfires can spread. Wildfires that ignite in these areas are confined to this fuel type because surrounding fuel types (mesquite coppice dunes and creosote bajadas) are not conducive to wildfire spread.

Montane shrub/woodlands-This fuel type is found in the Organ and Sacramento Mountains and encompasses a variety of fuels that will support large wildfire growth. Montane woodlands includes piñon and juniper tree species that are associated with shrubs including various oak species (*Quercus spp.),* mountain mahogany, algerita, sacahuista/bear grass (*Nolina texana*), sotol, cat-claw acacia *(Acacia greggii),* cacti and agave. The understory includes a wide variety of grass species and forbs and is the primary carrier for wildfire spread. There are large differences in biomass, fuel continuity and plant diversity based on aspect and soil types. Wildfire history records from the Organ Mountains confirm that all aspects can be fire-prone within this fuel type. Inclusions within this fuel type include large areas of bedrock that inhibit wildfire spread. Canyon bottoms contain dense fuel loads with a wide variety of riparian vegetation.

The Sacramento foothills and mountains differ from the Organ Mountains because soils and aspect plays more of a role in inhibiting fire behavior. Slopes are wider than and not as steep as the Organ Mountains. South-facing slopes in the Sacramento foothills inhibit wildfire spread due to discontinuous fuels and limestone rock outcrops. North-facing slopes are more fire-prone with piñon, juniper, oak, mountain mahogany and grass fuels intermixed. Woodland fuels range from dense in closed-canopy cover without much grass understory on some north-facing slopes and within canyon bottoms to sparse to open savanna on upper slopes and ridges with highly variable densities of grass fuels.

Arroyos/Basins of McGregor Range-This fuel type is delineated by narrow strips of dense shrubs and grasses that follow and parallel stream courses. West-running arroyos begin at the crest of the Otero Mesa escarpment and widen into canyons and then into basins as they cross the bajadas and terminate on the Tularosa Basin floor. Arroyo/Basin areas north of Hay Meadow Canyon begin at the bottom of sheer cliffs along the face of the Otero Mesa escarpment and are barriers to wildfire spread onto Otero Mesa. Arroyo/Basin areas within Hay Meadow Canyon, Martin Canyon, Owl Tank Canyon and Castner Draw support various perennial grasses and shrubs and act as conduits to carry wildfires past the escarpment and onto Otero Mesa but only during those fire seasons when fuel loads are high. Perennial grasses within this fuel type are tobosa, drop-seeds, alkali and giant sacaton (*Sporobolus airoides* and *S. wrightii*, respectively) and black grama and are associated with shrubs of apache plume (*Fallugia paradoxa*), mesquite, creosote, four-wing saltbush, little-leaf sumac (*Rhus microphylla*)*,* acacia, and desert willow *(Chilopsis linearis*).

Forest-This small but important fuel type is found on Fort Bliss in the upper reaches of the Organ and Sacramento Mountains. Ponderosa pine is the dominant fuel and is associated with Douglas fir and various oak species on north-facing slopes. This fuel type is resilient to low intensity burning, but is subject to stand replacement in the altered fire regimes found throughout the mountains of the southwest. About 50% of the forested areas within the Organs burned in 1994 (Organs Fire) with moderate to high fire severity. These forest stands are now in early seral states dominated by shrubs and grasses (Muldavin 1996). More forest stands burned again in 2011 during the Abrams Fire. Fire effects following the Abrams Fire were less severe than in 1994, with the exception of one stand of mature ponderosa pine on a north-facing slope in Fillmore Canyon that suffered stand replacement (Bumgarner, pers. observation, 2011).

3.5 Fort Bliss Climate and Weather Effects

Fort Bliss is located in the northern Chihuahuan Desert eco-region, an area where naturally occurring wildfires are an integral part of the environment. Vegetation is adapted to fire and usually recovers quickly following wildfires and normal rainfall patterns. As discussed previously, Chihuahuan desert grasslands and sky islands burned under a low-intensity surface fire regime where the fire frequency is correlated to climate. There is a strong association between annual precipitation and the level of plant productivity but rainfall is highly variable from year to year, therefore so is wildfire frequency and intensity (Swetnam 1996). Fort Bliss' climate is characterized by moist summers and dry fall, winter and spring seasons. This pattern can lead to large amounts of standing dead grassland vegetation from late fall through the winter and spring until early summer. On Fort Bliss, perennial grass species are adapted to heat and low moisture regimes and stay nearly dormant until monsoon moisture arrives. After that, perennial grasses grow quickly and produce about 75% of their total annual foliage in about 60 days (Dick-Peddie 1993) and about 90% of their total growth in about 90 days (McClaren 1995). These grasses generally retain a high amount of live fuel moisture until the arrival of the first frost, typically in early to mid- November.

High amounts of fine fuels from cured grasses are necessary to transport wildfires in these desert ecosystems. Consequently, the frequency, duration and size of wildfires are determined largely by precipitation during the preceding summer months. In other words, high precipitation in the summer is usually followed by greater numbers of wildfires than normal during the following spring and early summer. Low precipitation in the monsoon season means fewer wildfires than normal during the following spring and summer months.

Weather patterns have a large influence on how wildfires behave on Fort Bliss. The nature of fine dead fuel moisture in grasses is that cured grasses respond very quickly to even minor changes in relative humidity and air temperatures. What this means for fire suppression efforts is that a wildfire may burn readily during daylight hours and be difficult to contain but with nightfall and a corresponding increase in humidity and falling temperatures that same wildfire will rapidly diminish in intensity and allow for direct suppression efforts to be effective.

The effect of wind on wildfire behavior makes it the most volatile weather variable for firefighters to deal with. Winds that are variable in speed and direction, in combination with wildfires burning in light, grassy fuels are especially dangerous for firefighters. **More wildland firefighter deaths are attributed to engaging wildfires in light, flashy fuels than in any other fuel type.** Minor increases in wind speed make vast differences in overall fire size, particularly in grass fuels like those found on Fort Bliss. Winds associated with thunderstorms and frontal passages can increase rapidly and change directions frequently. These sudden changes can make a relatively benign grass fire with fire front flame lengths of 1' to 2' at the head grow into a fast-moving wildfire spreading in multiple directions with flame lengths from 8' to greater than 20'.

Long-term drought and climate change are issues for the entire Southwest and can lead to an eventual overall decrease in plant abundance and biomass. Fort Bliss precipitation records show that since 1990 more years have been below average than above average in rainfall. From 1970 -1990 there were more years of above average rainfall than there were below average. These trends follow a pattern of cyclical drought that is prevalent in the current state of the climate for this region. Many scientists and climatologists today agree that the overall climate for this area is changing due to an increase in global temperatures caused by increasing amounts of greenhouse gases in the atmosphere (Bachelet et al, 2001). An ever-increasing body of scientists predict that the southwestern US will experience increasing drought and higher ambient air temperatures for the next several decades. For wildfire management, the implications are that wildfires will increase in severity and size in areas where wildfires can be sustained due to sufficient biomass and fuel continuity (Nemani, et al, 2003). The areas of Fort Bliss that fall into this category are the grasslands of Otero Mesa, the Sacramento Mountains, the Hueco Mountains and the Organ Mountains. Increased atmospheric carbon dioxide could lead to an increase in plant biomass in many regions of North America. However, scientific consensus predicts temperature increases and long-term drought for the American Southwest which could lead to increased desertification for this area throughout this century (Nemani, et al, 2003).

3.6 Fort Bliss Terrain Influences on Wildland Fires

Higher elevations of Fort Bliss see a higher occurrence of large wildfires than the lower deserts and basins. This is due to higher precipitation, lower temperatures and lower evaporation rates than the desert floor. Vegetation has an advantage in these areas and produces much more biomass than in lower elevation areas. The Organ Mountains, Hueco Mountains, Sacramento Mountains and foothills and Otero Mesa are at elevations above 5,000 ‘ where the vast majority of large wildfires on Fort Bliss occur.

Topographical effects on fire growth are not as pronounced as weather effects but can still make a significant difference in how fast wildfires spread. The physical effects of radiation and convection mean that heat is transferred ahead and upwards of a flaming fire front. This effect of preheating and drying upon upslope fuels means that wildfires on slopes burn uphill 2-3 times faster than they do on flat ground. Canyon bottoms, narrow chutes and saddles, all found in the rugged country of Fort Bliss’ mountains and foothills have a funneling effect upon winds causing them to swirl and accelerate in these areas and are places where wildfire spread can increase and create intense wildfire behavior.

Aspect is an important factor in wildfire spread and intensity within the Chihuahuan Desert eco-region. South and southwest facing slopes have considerably less vegetation than north and east facing slopes. Generally speaking, southern exposures act to slow wildfire spread and northern exposures help promote wildfire spread. In deep or steep canyons this effect is less pronounced and all aspects will support wildfire growth.

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4 Wildland Fire Management

Wildland fire management is the application of scientific principles and land management activities necessary for the prevention of harmful wildfires, for the sustainment of ecosystem components and for the suppression of wildfires. Wildland fire management includes the use of mechanical fuel reduction treatments and prescribed fire treatments for meeting land management objectives.

The objectives for effective wildland fire management on lands managed and protected by Fort Bliss are:

1. Firefighter and public safety is the first and highest priority on every wildland fire.
2. Fort Bliss training assets, structures, infrastructure, sensitive cultural and natural resources will be protected to the extent possible from the harmful effects of wildland fires by mowing, trimming, brush removal and/or thinning.
3. In predetermined places, wildfires will be allowed to consume as much fuel as possible as long as they are burning within the defensible perimeters of designated Fire Management Units (FMUs).
4. Prescribed fires will be used to improve the effectiveness of fire breaks by burning accumulations of wildland fuels within designated areas.
5. Prescribed fires will be used to improve wildlife habitat and improve the health and diversity of ecosystems on Fort Bliss.
6. Firefighters will use Minimum Impact Suppression Tactics (MIST) guidelines on all wildfires on FBTC (See **Appendix H**).

4.1 Assumptions and Constraints

The following defines the current situation and the constraints encountered with managing wildland fires on Fort Bliss.

4.1.1 Mission Assumptions and Constraints

1. Live-fire ammunitions and pyrotechnics training provide for a constant source of potential wildfire ignitions and can lead to large wildfire growth.
2. In an average year, about 40% of Fort Bliss contains sufficient vegetation to allow for the growth of wildfires. These grassland, shrub/woodland, forest, and arroyo/basin fuel types will burn frequently and rapidly when atmospheric and fuel conditions are right, but usually in a patchy uneven manner. The remaining 60% will not ordinarily burn (mesquite coppice dunes, creosote bajadas and bedrock fuel types) under any conditions and are places where live-fire exercises should be conducted year-round with few constraints.
3. A priority for Fort Bliss is to contain wildfires within Fort Bliss boundaries because it saves time and money for the installation. Wildfires that burn across installation boundaries cost Fort Bliss in terms of lost training time, reduced visibility from smoke impacts and high fire suppression costs because Fort Bliss has to pay for the outside resources needed to contain escaped Fort Bliss wildfires.

4. Only when wildfires are threatening humans, man-made improvements, structures or target mechanisms should training be halted and wildfire suppression begin. In most cases on the FBTC, wildfires will burn out on their own. If target pits are kept clean and the vegetation near structures is kept short, there is almost no risk of wildfire damage to these improvements.
5. Red Flag Warnings issued by the Santa Teresa office of the National Weather Service (NWS) for the Fort Bliss fire weather zones means that the use of any fire–producing devices will have a very high probability of starting a wildfire that will be difficult to contain. Use of fire-producing ammunitions including tracers, pyrotechnics, flares and high explosives is prohibited on Fort Bliss during the time frame specified by the Red Flag Warning (See Section 4.1.5 and Table 4.1-1).

4.1.2 Firefighting Constraints

1. No fire suppression is allowed within duded impact areas (DIA) or within 725 meters of DIA 1 and 2 (Figure 4.1-4) due to potential exposure to unexploded ordnance (UXO). DIAs are marked on maps, but are not marked on the ground. UXO may be found outside DIAs on Fort Bliss. UXO safety protocol requires that any encounters with UXO in the field be communicated to Range Operations so that Fort Bliss Explosive Ordnance Disposal (EOD) personnel can be contacted to respond and remove the potential hazard. UXO should never be disturbed, but should be photographed from a safe distance with the location recorded on a map or with a hand-held GPS using military grid coordinates (MGRS) to give to EOD. Firefighters battling wildfires in the wildlands of Fort Bliss are at higher risk for injury than others because wildfire heat could trigger UXO to explode. Remember the 3Rs for UXO safety: Recognize, Retreat, Report. See **Appendix F** for more information on UXO hazards and protocols.
2. The magnitude of Fort Bliss, the lack of good roads in the wildlands and the difficulty of the terrain increases travel times from fire stations to wildfire incidents which may allow for large growth of wildfires in grass and shrub/woodland fuels. Firefighters must consider use of mutual aid and aerial firefighting resources in these situations.

4.1.3 Cultural Resources Constraints

Significant cultural resources are found throughout the FBTC. Archaeologists at Fort Bliss estimate there are more than 19,000 cultural sites on the FBTC (U.S. Army, 2008). These sites have two classifications, prehistoric and historic. Many of them are protected within Off Limits Area (OLAs). No firefighting is allowed in OLAs. These areas are marked by siber stakes (distinctly colored, reflective fiberglass cylinders atop t-posts) and are off-limits to all personnel (Figure 4.1-1).

Prehistoric sites-Located throughout the FBTC are sites that were used over many centuries by Native American tribes for shelter, religious or traditional subsistence gathering activities. The majority of these sites on the FBTC are located within areas that are not at risk from wildfire damage due to the lack of continuous fuels. However, there are many cultural prehistoric materials, occurring on the surface or just below the surface, that can be damaged or destroyed by wildfire or wildfire associated activity. Wildfire intensity and burn severity can affect the amount and type of damage to cultural resources, particularly in areas where flammable vegetation has built up and has not burned in a long time. The use of heavy equipment to suppress wildfires or construct fire lines generally creates more damaging effects to prehistoric cultural sites than the actual wildfire itself (U.S. Army, 2008). See **Appendix H** for use of Minimum Impact Suppression Tactics (MIST) Guidelines.

Historic sites-Historic ranch houses, stables, barns, corrals, fences, etc. are records of human activity from a recent bygone era. These features are made of wood and can easily be destroyed by wildfire. These assets are well-known and documented by Fort Bliss cultural resources staff. Nearly all these features are protected within OLAs that are delineated by siber stakes.

Actions to protect specific cultural resources found within Fort Bliss Fire Management Units (FMUs) are described in **Appendix A, Fire Management Units and Maps**. Specific actions, common to all FMUs and necessary to mitigate wildland fire damage to cultural resources found on Fort Bliss include:

- Heavy equipment should only be used on Fort Bliss when valuable human resources are threatened. DPW-E will provide a cultural/natural resource advisor to guide heavy equipment to insure valuable resources are not harmed.
- Prior to any rehabilitation activities using heavy equipment after wildfire suppression efforts, DPW-E cultural staff will be consulted for archaeological clearances.
- An archeological survey of a proposed prescribed burn area is required before the prescribed fire plan is finalized and signed.
- All firelines constructed during fire suppression activities will be recorded by firefighters using handheld GPS and military grid coordinates. This information will be given to DPW-E cultural staff for the purposes of analyzing the data to insure no cultural sites were disturbed or, if sites were disturbed, then insuring proper mitigations are completed in accordance with state and federal laws.

4.1.4 Natural Resources Constraints

In compliance with environmental laws and regulations, training restrictions have been placed on several areas of FBTC. Restricted area designations include: OLAs and Limited Use Areas (LUAs). OLAs and LUAs are determined according to the degree of protection necessary to protect the resource (Figure 4.1-1). Access (military or recreational) is prohibited within OLAs. OLAs include endangered species habitat, prehistoric and historic cultural sites and are marked in the field by signs and siber stakes. LUAs on Fort Bliss exist due to biological resource constraints and are not marked in the field. LUAs limit intensive troop training and help protect sensitive species habitat, migratory bird corridors, highly erodible soils and wildlife watering areas. LUAs include grasslands, playas, earthen water collecting tanks, water troughs and other wildlife watering locations; arroyo-riparian habitats; the four units of the 3,839-acre Black Grama Grassland Areas of Critical Environmental Concern (ACEC); the 11,304-acre Culp Canyon Wilderness Study Area (WSA); and sensitive plant population locations. LUAs are open to military training activities, but are off-limits to static vehicle positions, concentrations of vehicles, bivouac, fueling or digging trenches or foxholes (U.S. Army, 2010b). For firefighting purposes these same restrictions apply. LUAS are areas where the use of bulldozers is prohibited. The use of hand tools and brush engines driving off-road in LUAs is permissible when fighting wildfires.

Appendix G contains further information on sensitive plant and animal species, the effects that wildfires have upon them and the management actions necessary to conserve them.

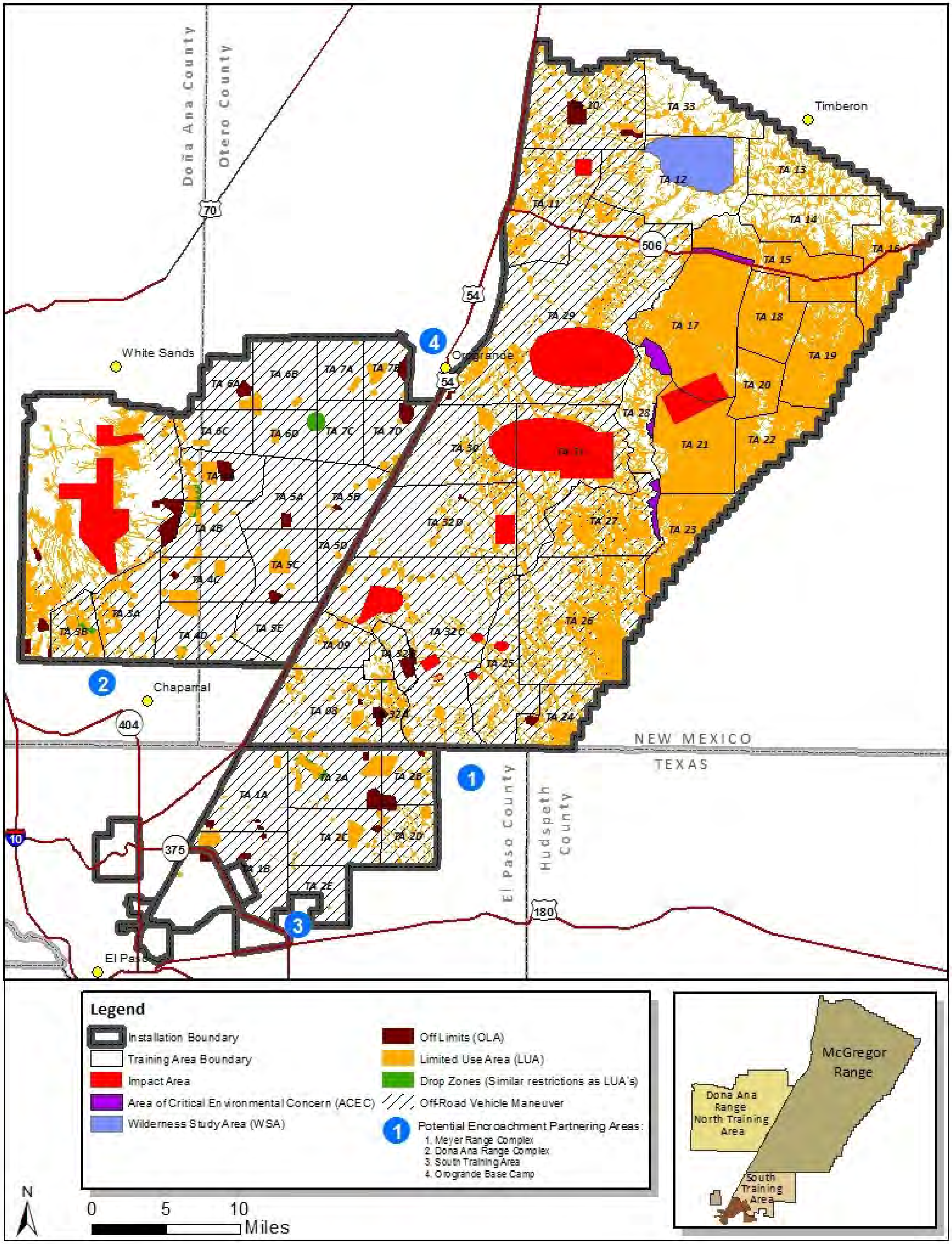


Figure 4.1-1 Natural and Cultural Constraints on Fort Bliss

4.1.5 Fire Weather Constraints

A **wildfire hazard rating system** is used by Fort Bliss to help military trainers plan when and where to initiate training based on the potential for large wildfires (Table 4.1.4). When NWS forecasts a higher than normal potential for large wildfire growth, Fort Bliss systematically begins to restrict when and where units training on the FBTC can use live-fire ammunitions (Sec. 4.1.5.1).

Fort Bliss Soldiers, Fire and Emergency Services, Range Operations and Range Safety personnel use the National Fire Danger Rating System (NFDRS) and the NWS weather forecasts to determine the fire danger ratings for the upcoming week and for each day. This information is disseminated daily to firefighters, range managers, and Soldiers, among others. The NFDRS daily Fire Danger Rating takes into account current and antecedent weather, fuel types, and both live and dead fuel moistures (Deeming et al 1977, Bradshaw et al 1984). NFDRS uses a method of normalizing risk rating classes across different fuel models through data capture from local station locations called Remote Area Weather Stations (RAWS) (See the red dots in Fig. 4.1-2). Values between stations are estimated with an inverse distance-squared technique on a 10-km grid. NFDRS uses an adjective rating to communicate the wildfire risk of Low, Moderate, High, Very High and Extreme. The daily forecast fire danger from NFDRS is based on 1300 hours (mid-day) weather expected and is always the worst case scenario for the day (Fig. 4.1-3). See http://www.wfas.net/images/firedanger/subsets/fdc_f_sw.png.

Fire weather forecasts and weather criteria for fire weather watches and red flag warnings for the Fort Bliss area are issued by the Santa Teresa, NM office of the National Weather Service (NWS) and are based on data from local RAWS. Fire weather forecasts include expected afternoon high temperature, afternoon minimum relative humidity and a range of wind speeds. The Santa Teresa office employs specially trained fire meteorologists who produce the daily fire weather forecasts for the six fire weather zones (FWZs) in southern New Mexico and far west Texas (Fig.4.1-2). The six FWZs serviced by the Santa Teresa office are divided by topographic and climatologic differences. Fort Bliss lies primarily in FWZ 112 with a small portion in FWZ 113 and in FWZ 055. During the fire season (March-July) fire weather forecasts, specific to each FWZ, are issued twice daily, once @ 0700 and once @ 1330. These are the most accurate weather forecasts available to Fort Bliss wildfire managers. See the Santa Teresa/NWS website at http://www.srh.noaa.gov/epz and click on fire weather in the left-hand column. This site has long-range forecasts which are useful for planning purposes for the upcoming weeks. For instance, a unit Commander might opt to reserve a Range or TA in a Low hazard area rather than in a High hazard area due to a long-range forecast of dry, windy weather that covers the desired timeframe for training. This would preclude the need for obtaining a waiver during High, Very High or Extreme fire danger rated days (See Section 4.1.5.1 for details).

A **Red Flag Warning** is a forecast warning issued by the Santa Teresa office of the NWS to inform the public and area fire and land management agencies that conditions are ideal for any wildfire ignitions to cause rapid wildfire propagation. Red Flag Warnings are given when high winds, low relative humidity and low fuel moistures are predicted in the area within the next 12-24 hours.

A separate but less imminent forecast is a **Fire Weather Watch**, which is issued to alert fire and land management agencies to the possibility that Red Flag conditions may exist beyond the first forecast period (12 hours). The watch is issued generally 12 to 48 hours in advance of the expected conditions, but can be issued up to 72 hours in advance if the NWS is reasonably confident. The term “Fire Weather Watch” is headlined in the routine fire weather forecast. That watch then remains in effect until it expires, is canceled, or upgraded to a Red Flag Warning.

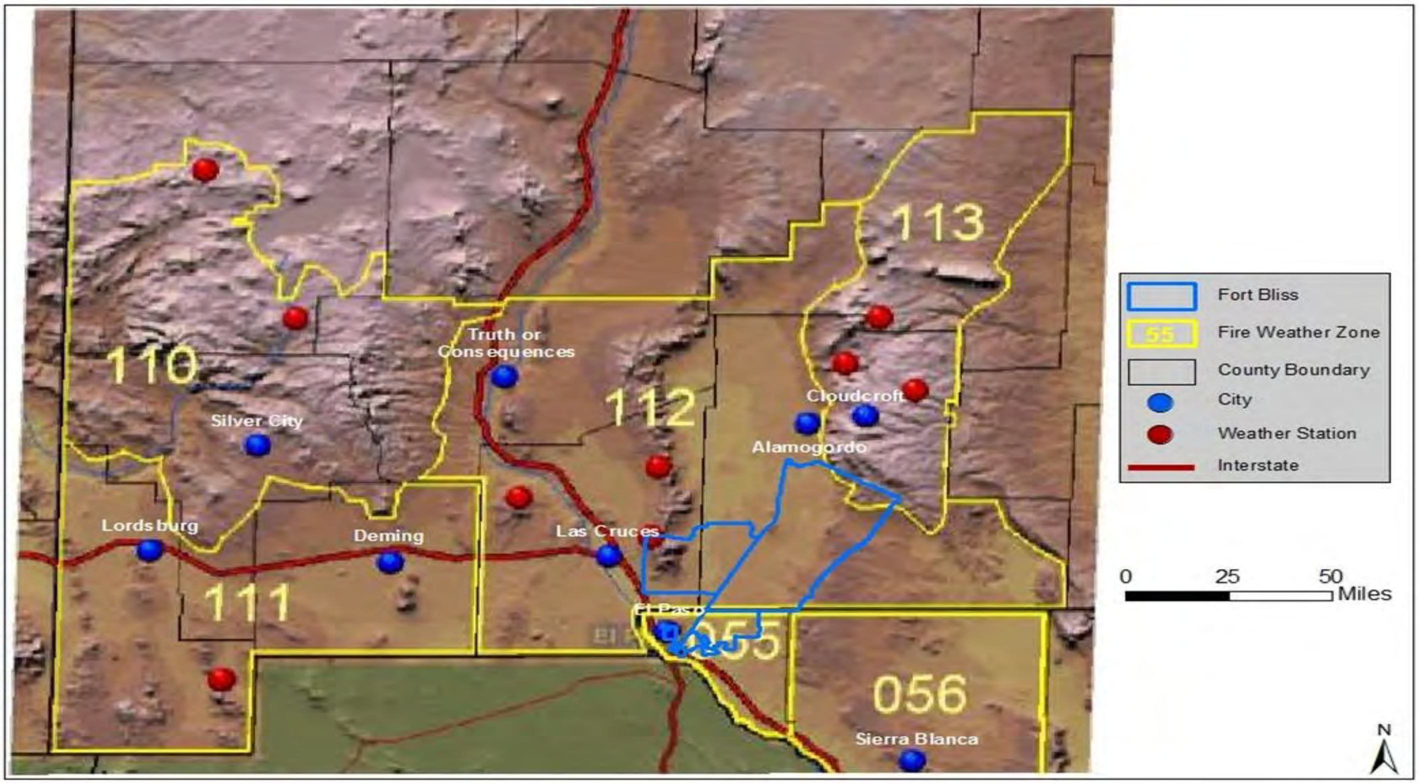


Figure 4.1-2 Fire Weather Zones Serviced by the Santa Teresa Office/NWS

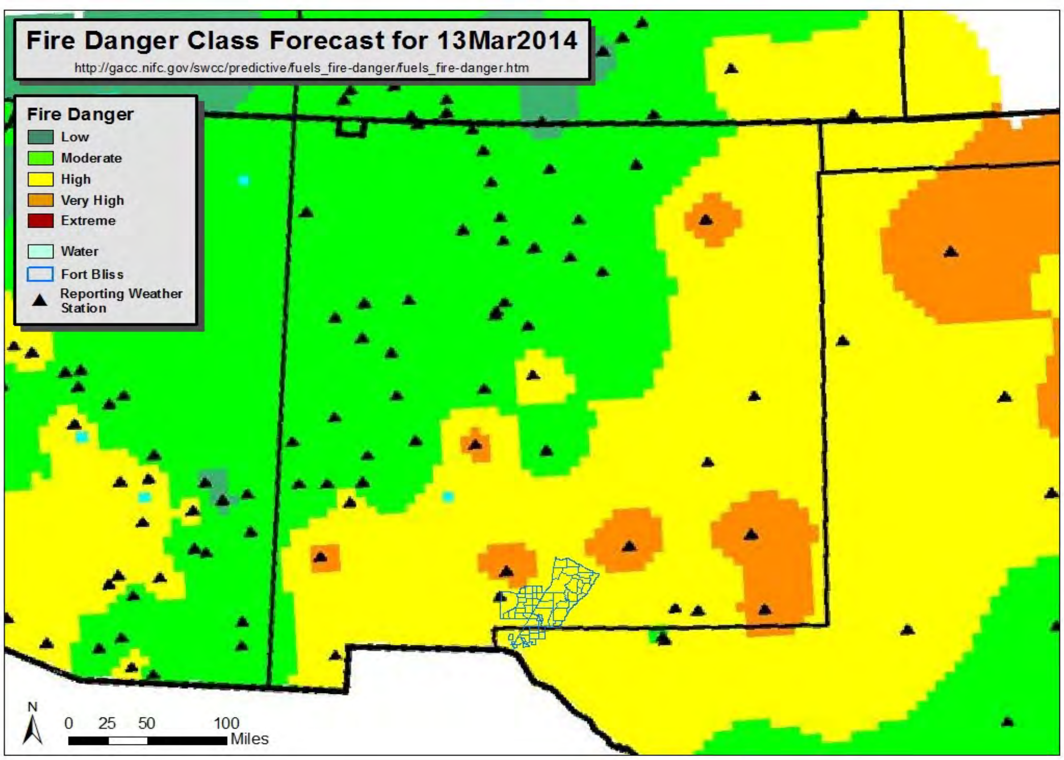


Figure 4.1-3 NFDRS Fire Danger Rating for the Southwest

4.1.5.1 Wildfire Hazard Ratings for FBTC

Fort Bliss is divided into areas of High and Low wildfire hazard ratings based primarily on fuel loads (Fig 4.1-4) (Table 4.1-1). The hazard ratings follow Training Area boundaries to facilitate understanding of locations for all users of the FBTC.

HIGH hazard areas are those areas of Fort Bliss that contain sufficient fuel loads and fuel continuity to promote large wildfire growth and therefore receive the maximum focus and efforts to suppress wildfires by firefighters (See brown areas in Fig. 4.1-4). In general, the fuels adjacent to and within the Organ Mountains, the grasslands of Otero Mesa and the sub-mesa, portions of the Hueco Mountains and the Sacramento Mountains and foothills have the quantities, continuity and arrangement of live and dead fuels to sustain large wildfires. HIGH hazard areas for wildfires allow for units to train with all types of live-fire and all types of fire-producing ammunitions on Low and Moderate fire danger days but require waivers to be granted for use of live-fire on High, Very High and Extreme fire danger days (Table 4.1-1). Waivers for the use of live fire-producing ammunitions require a review of the training units' request for waiver that includes the unit's mitigations for preventing wildfires. Waivers are granted through the G-3 by the Brigade Commander for High and Very High fire danger days or by the CG-Fort Bliss for Extreme fire danger days with concurrence from Range Safety. From February 1 to July 31 waivers are required for High hazard areas (DA 2013). Waivers are not granted during Red Flag conditions. Red Flag Warnings issued for the Fort Bliss Fire Weather Zones (FWZ) mean that all fire-producing ammunitions, flares and pyrotechnics are prohibited from use anywhere within that FWZ until the Red Flag Warning is lifted by the National Weather Service (DA 2013).

LOW hazard areas include most of the Tularosa Basin and the surrounding uplands and are areas where wildfire suppression is minimized because fuel loading and fuel continuity is insufficient to support large wildfires (See gray areas in Fig. 4.1-4). Within the Tularosa Basin and surrounding uplands are inclusions of hills, playa lakebeds and arroyos that have sufficient fuels to support the spread of wildfires. However, these inclusions are not continuous, are surrounded by mesquite coppice dunes and/or creosote bajadas and do not support the spread of large wildfires (wildfires >500 acres). These areas, rated as LOW potential for wildfire hazards allow for live-fire training when the fire danger is rated as Low, Moderate, High, Very High or Extreme (Table 4.1-1). However, the use of fire-producing illumination devices, pyrotechnics and flares is prohibited when the fire danger is rated Extreme (DA 2013).

Table 4.1-1 conveys the daily wildfire danger rating for High and Low hazard areas and includes all TAs, Ranges and other facilities combined with the corresponding ammunitions restrictions.

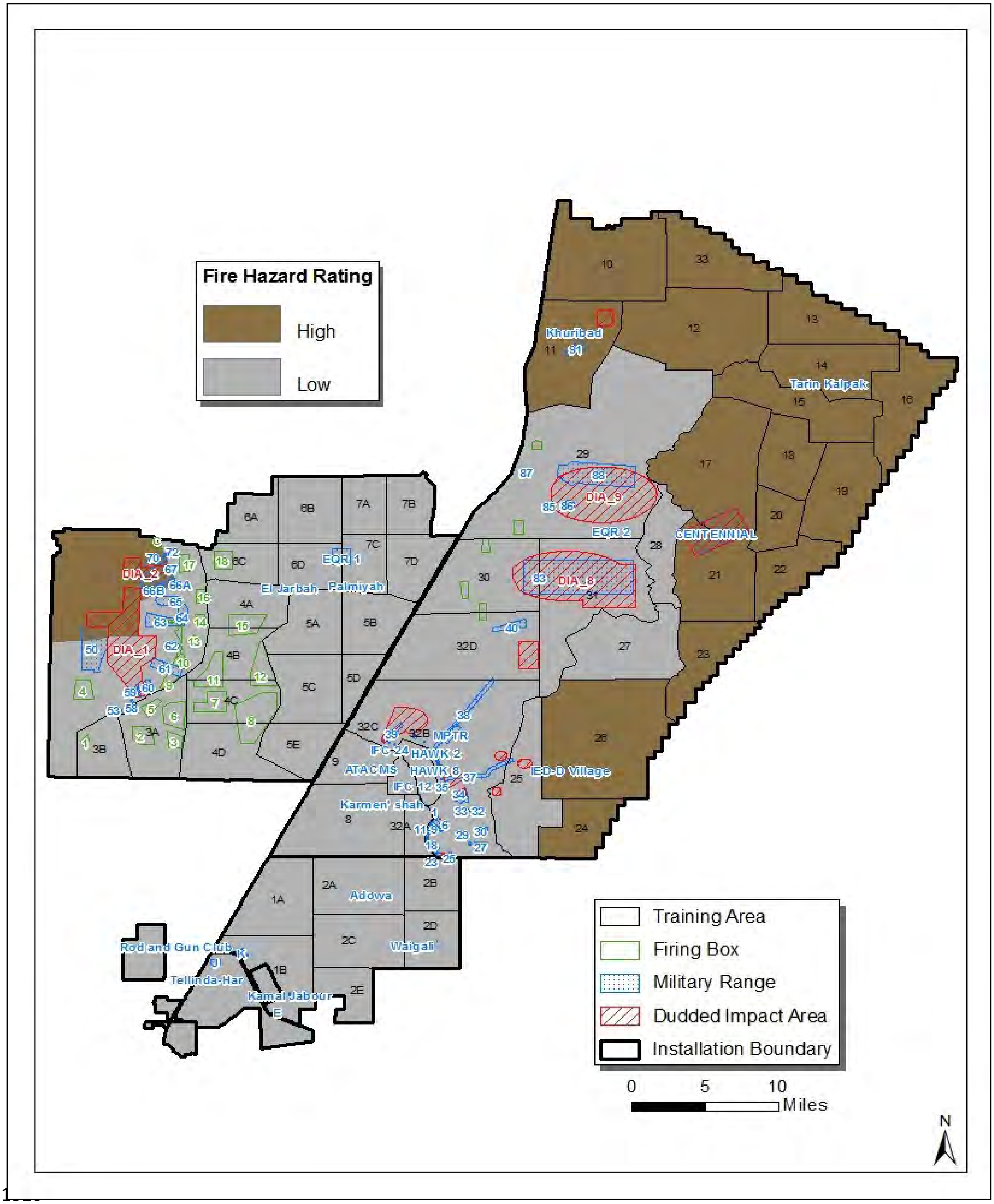


Figure 4.1-4 High and Low Fire Hazard Rating Areas for Fort Bliss

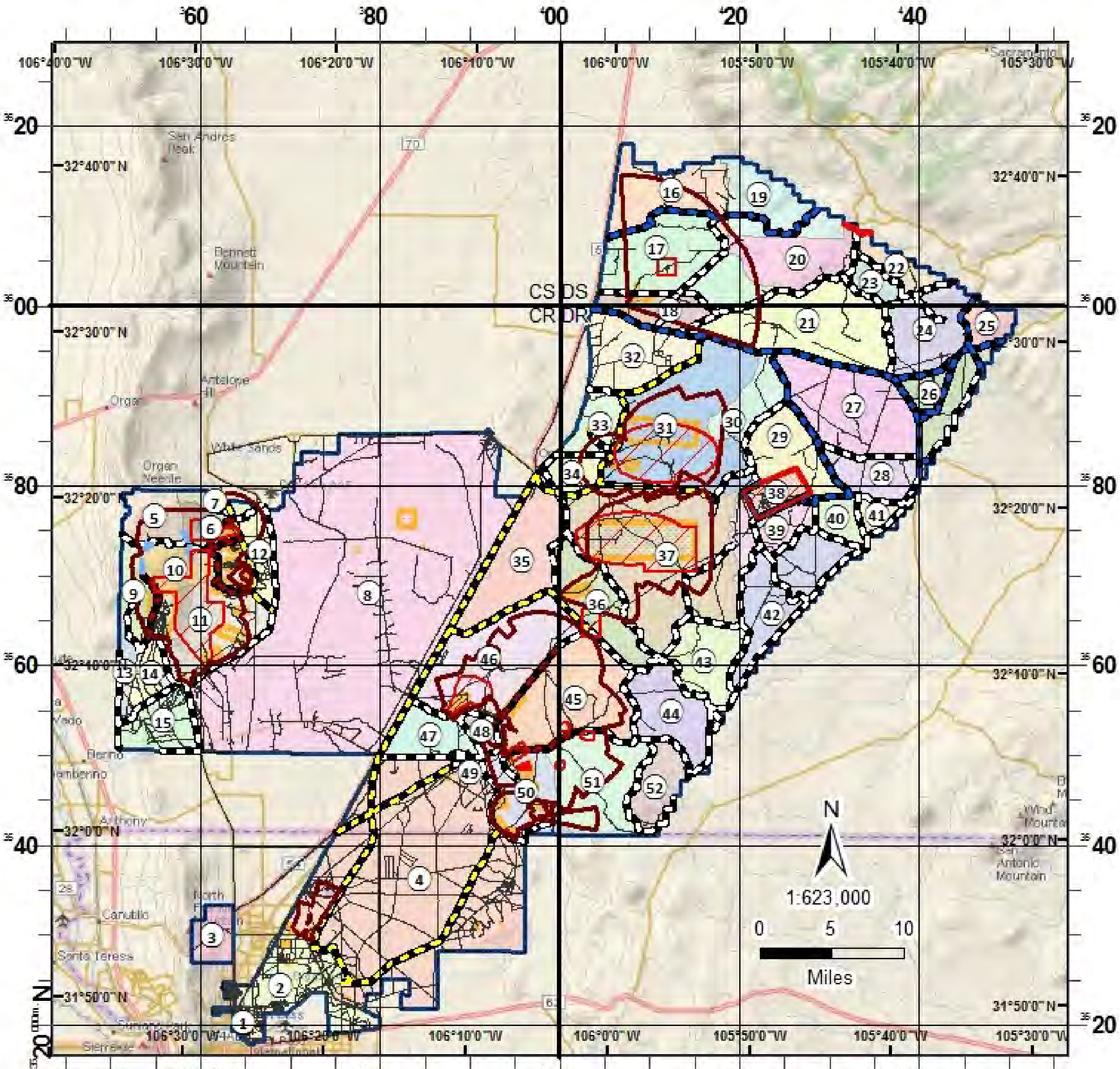
Table 4.1-1 Fort Bliss Fire Conditions and Corresponding Ammunitions Restrictions

FBTC FIRECON AND AMMUNITIONS RESTRICTIONS CHART

Fort Bliss Fire Hazard Rating is based on the following conditions: (1) Firing Ranges and Villages are maintained throughout the year to be free of any accumulations of combustible fuels (particularly tumbleweeds) around target mechanism and structures. (2) Limited Use Areas (LUAS) on FBTC are protected areas where pyrotechnics are not authorized at any time. (3) Pyrotechnics in areas that are LOW hazard is within maintained portion of the training site.

Fort Bliss Fire Hazards (FBFH)	
Low	High

National Fire Danger Rating System (NFDRS)	FIRING RANGES AND IMPACT AREAS	TRAINING AREAS AND VILLAGES	OTHER TRAINING FACILITIES	RESTRICTIONS
Low / Moderate	All Live Fire Activities and All Training Sites			No restrictions
High / Very High	Ranges 1-8, 9-30, 32-40, 50 (South of Grid Line 67), 53-56, 58-64, 67-69, 71-72, 83-88, DIA_1 (South of Grid Line 67), DIA_8B, DIA_9B	TA 1A, 1B, 2A-2D, 3A, 3B, 4A-4D, 5A-5E, 6A-6D, 7A-7D, 8, 9, 25, 27-31, 32A-32D, Adowa, Darrinur, El Jarbah, Kamal Jabour, Khuribad, Karmen'shah, Malakhand, Palmiyah, Tellinda-Har, Waigali	EQR 1, EQR 2, Hawk 1-8, IFC 1-26, All TAC Sites, Gas Chambers, Land Navigation Courses, FOB Maple Leaf, FOB Ubique	No restrictions
	Ranges 50 (North of Grid Line 67), 65, 66A-B, 70, 91, DIA_2, DIA_1 (North of Grid Line 67), Centennial	TA 10-24, 26, 33, Tarin Kalpak		Waiver w/ mitigating measures from BN CO to BDE CO. BDE CO Approved Waiver Forwarded to G-3
Extreme	Ranges 1-8, 9-30, 32-40, 50 (South of Grid Line 67), 53-56, 58-64, 67-69, 71-72, 83-88, DIA_1 (South of Grid Line 67), DIA_8B, DIA_9B	TA 1A, 1B, 2A-2D, 3A, 3B, 4A-4D, 5A-5E, 6A-6D, 7A-7D, 8, 9, 25, 27-31, 32A-32D, Adowa, Darrinur, El Jarbah, Kamal Jabour, Khuribad, Karmen'shah, Malakhand, Palmiyah, Tellinda-Har, Waigali	EQR 1, EQR 2, Hawk 1-8, IFC 1-26, All TAC Sites, Gas Chambers, Land Navigation Courses, FOB Maple Leaf, FOB Ubique	Airborne Pyrotechnics, Illumination projectiles and flares are Not Authorized
	Ranges 50 (North of Grid Line 67), 65, 66A-B, 70, 91, DIA_2, DIA_1 (North of Grid Line 67), Centennial	TA 10-24, 26, 33, Tarin Kalpak		Waiver w/mitigating measures from BDE CO to CG through G-3 Airborne Pyrotechnics, Illumination projectiles and flares are Not Authorized
Red Flag	All Live Fire Activities and All Training Sites: ONLY BLANK AMMUNITION AUTHORIZED			No Waiver ONLY BLANK AMMUNITION AUTHORIZED



FMU #	FMU Name	Acres
1	Cantonment	4,581
2	Biggs	19,237
3	Castner Range	6,773
4	South Training Area	122,965
5	North Organs	9,194
6	Ranges 66B-70	6,023
7	WSMR Boundary	3,327
8	North Training Area	199,655
9	West Organs	8,476
10	South Organs	9,383
11	Ranges 50-66A	30,285
12	16 Bay	7,300
13	Lords Ranch	4,370
14	South 50	5,945
15	Stewart Lake	11,811
16	NW McGregor	20,615
17	Khuribad	32,513

FMU #	FMU Name	Acres
18	Range 91	10,148
19	Lincoln NF	18,259
20	Culp Canyon	17,160
21	Wildcat Canyon	34,691
22	Timberon	7,218
23	El Paso Canyon	4,769
24	McAfee Canyon	18,668
25	Chatfield Canyon	5,733
26	Prather	15,553
27	Mesa Horse Camp	31,367
28	Toy Tank	11,227
29	Double Tree	15,714
30	Broke Tank	10,050
31	DMPRC	47,955
32	Wright	19,615
33	Wilde-Benton	8,845
34	Aerial Target Launch	6,751

FMU #	FMU Name	Acres
35	Desert	24,881
36	IPBC	17,762
37	DAGIR/Mack	62,250
38	Centennial Range	5,346
39	Martin Canyon	11,333
40	End of Line Tank	5,997
41	Antelope	4,349
42	Shiloh	25,920
43	Owl Tank	15,006
44	Castner Draw	18,528
45	Borrego	32,528
46	Alvarado North	35,886
47	Alvarado South	11,148
48	IFC North	3,030
49	McGregor Range Camp	945
50	Meyer Range	17,046
51	Hueco Mountains	24,916
52	East Hueco Mountains	11,100

Figure 4.1-5 Fort Bliss Fire Management Units

4.2 Fort Bliss Wildland Fire Suppression and Management Strategy

The Fort Bliss wildland fire management strategy was developed through collaboration and consensus with facets of Installation Command, Range Safety, Range Operations, Fire and Emergency Services and DPW-E.

Fort Bliss is divided into 52 Fire Management Units (FMUs) to facilitate firefighter response across the FBTC (Fig. 4.1-5). **Appendix A** contains specific instructions for managing wildfires and protecting resources within each FMU and also includes a detailed map of each FMU. Each FMU is distinct and was designed, to the extent possible, to be surrounded by defensible firebreaks or end at Fort Bliss boundaries. Currently there are 25 FMUs that are designated as Immediately Suppress FMUs and 27 FMUs designated as monitor and suppress from boundaries. In general, the FMU boundaries and the wildfire suppression strategy reflect the LOW and HIGH wildfire hazard areas described above.

The wildfire suppression strategy to be employed by Fort Bliss firefighters is two-pronged:

1. If the wildfire is located within one of 25 Immediately Suppress FMUs (Fig.4.2-1) or is threatening any humans or man-made structures anywhere on the FBTC, then the wildfire is immediately suppressed using all available resources at the disposal of the designated Incident Commander.
2. If the wildfire is within one of 27 FMUs that have the option to monitor and suppress from roads or firebreaks (Fig. 4.2-1) and is not actively threatening any man-made structures or facilities then the wildfire is monitored. All wildfires are monitored by Fort Bliss FES firefighters until they either extinguish themselves or they burn to a FMU boundary or other defensible position such as a fire break, road, rocky outcrop or other area devoid of fuel. At that point the wildfire will be suppressed by firefighters from the defensible perimeter.

All wildfires starting on Red Flag warning days are immediately suppressed anywhere on the FBTC. Red flag warnings mean that wind, temperature and humidity are aligned at critical thresholds for extreme wildfire behavior and large wildfire growth.

The majority of military-caused wildfires on the FBTC occur on live-fire Ranges where Soldiers are regularly training with weapons and weapon systems. These Ranges have a network of roads for accessing targets and firing positions. Wildfires that start within live-fire Ranges are often suppressed by the firefighting detail on site even though the wildfire is contained within the road system. Training has to be halted in order for the firefighting detail to go downrange and engage the wildfire. FB Reg. 385-63, Sec. 2-31 states that “Range Operations Center will immediately place range into a hold fire, if the fire is endangering life or equipment/facilities.” If the wildfire is not endangering life or equipment, then it would be advantageous for training units to continue training and allow these wildfires to consume as much fuel within the road system as feasible, so that the next wildfire that starts will not have any place to burn. As always, target pits and other man-made improvements on live-fire ranges must be regularly maintained and kept vegetation-free in order to minimize the risk of wildfire damage. Fort Bliss FES needs to be called out when wildfires start, and once on scene they will make a determination to engage in wildfire suppression or monitor wildfire spread.

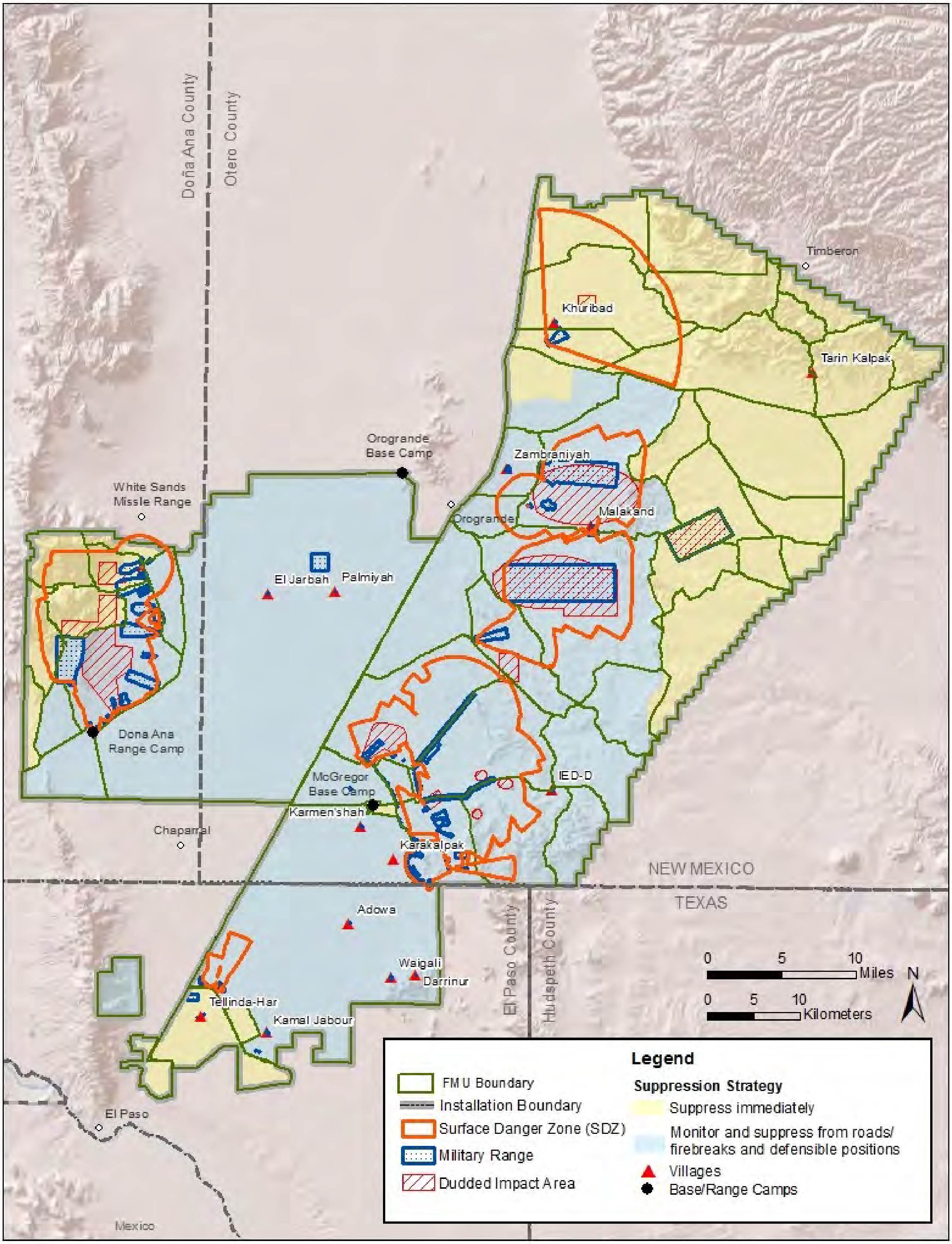


Figure 4.2-1 Wildfire Suppression Strategy

4.3 Fort Bliss Fire Management Units

Fort Bliss is divided into 52 Fire Management Units (FMUs) (Fig. 4.4-1) created based on the defensibility of their boundaries, common fuel types and common fire management priorities. **Appendix A** contains detailed descriptions, strategies, constraints and maps of each FMU**. Appendix A** is designed to be a usable tool for firefighters and is meant to be reproduced and kept as a guide within fire vehicles for easy reference. Each of the 52 FMUs listed in Appendix A has a physical description, location, size in acres, improvements/structures to be protected along with a suppression strategy section that includes specific risks, hazards, tactics and special considerations for firefighters. Each FMU description and text is followed by a full-page map showing boundaries, roads, firebreaks, Training Areas, Ranges, Surface Danger Zones, structures, power lines, topography and fire history.

The following wildland fire management guidelines and strategies are general to Fort Bliss:

4.3.1 General Firefighting Strategies for FMUs on Fort Bliss

1. Wildfires will not be directly suppressed in many areas of the FBTC (blue areas in Fig.4.2-1). FMUs are designed to contain wildfires within firebreak boundaries. Fort Bliss firefighters will monitor wildfires from defensible perimeters. Most wildfires on Fort Bliss will burn out and extinguish themselves as they run out of fuel. If a wildfire approaches an FMU boundary and the wildfire is burning intensely, then firefighters may initiate a backfire from a defensible position. If the wildfire intensity is low enough to allow firefighters to stand at the flaming front and make their attack, then firefighters will engage in directly fighting the wildfire from defensible boundaries using water and hand tools.
2. Whenever wildfires are ignited anywhere on the FBTC, Fort Bliss FES must be contacted so that a wildfire suppression response can begin immediately.
3. The primary tactic for suppressing wildfires within immediate suppression FMUs (yellow areas in Fig. 4.2-1) is to engage in suppression efforts as close to the fire edge as possible, extinguishing flames using handtools and water. This is called **direct attack** (See Section 4.5.3 for additional information). This tactic works best on wildfires with flame lengths less than 4 feet. This tactic usually involves driving wildland engines and/or UTVs off-road, engaging the wildfire from an anchor point and working along the flanks of the wildfire towards the head. If areas are too rough to drive, then firefighters on foot will use the same tactics using bladder bags and/or hand tools.
4. Wildfires that occur within areas designated as monitor and suppress from firebreaks (blue areas in Fig. 4.2-1) or in immediate suppression areas that exhibit intense fire behavior (flame lengths are >4 feet) firefighters will utilize **indirect attack** tactics from pre-planned roads/firebreaks and/or natural barriers (See Section 4.5.3 for additional information). Indirect attack on intense, fast-moving wildfires is accomplished by burning out fuels ahead of the wildfire along firebreaks. Burnouts are conducted by qualified and experienced wildland fire personnel. If burnouts or backfires are not feasible due to time constraints or lack of qualified personnel, then firefighters will allow the wildfire to come to the fuel or fire break rather than attempting to construct new firelines with hand tools or heavy equipment (bulldozers). See **Appendix H Minimum Impacts Suppression Tactics (MIST) Guidelines** for tactical considerations for minimizing impacts to natural resources and using natural features for firelines and safety zones.

5. Firefighting efforts should be commensurate with the values at risk. If lives are in danger or military structures or infrastructure is at risk then an all-out effort will be made to contain and control the wildfire while considering the safety of firefighters first. This includes the use of Soldiers as firefighters.
6. Prescribed fires will be used to reduce hazardous fuels and to create black lines in strategic areas where fuels are concentrated. Prescribed fires are used to help contain wildfires within FMU boundaries and to accomplish ecosystem and wildlife management goals.

4.3.2 Fire Management Goals Common to all FMUs on Fort Bliss

1. Wildfires on Fort Bliss do not spread beyond installation boundaries because firefighters contain them within FMU boundaries.
2. Live-fire training continues on FBTC Ranges and TAs even when wildfires are burning, because wildfire threat to structures has been abated by keeping target pits and infrastructure brush and weed free.
3. FMU boundaries are effective barriers to wildfire spread because they are maintained by a system of continual road and firebreak maintenance that includes road surface scraping, road shoulder mowing, water bar and drain dip maintenance, and blacklining.
4. Range infrastructure (targets, structures, facilities) is protected from damaging wildfire effects by a systematic program of fire prevention inspections followed by actions of fuel reduction or fuel removal.
5. Prescribed fire treatments are used in places where there are high concentrations of fuels to strengthen FMU boundaries and consume available fuels and are only conducted within the prescription's limits.

4.3.3 Best Management Practices Common to all FMUs on Fort Bliss

1. **Pre-fire season fuels management and fire containment:**
    a. Maintain defensible space around range infrastructure. Mow living vegetation to 3-6 inches in height within 30 feet of infrastructure. Any live vegetation within 30 feet of structures that is not mowed or cut to near ground level should be watered regularly to maintain greenness. Clear dead accumulations of vegetation for 30' from structures.
    b. Maintain designated firebreak roads by removing vegetation down to mineral soil on road surfaces, by mowing roadway shoulders where practical and by maintaining erosion control features. Fort Bliss needs two Bush Hog Model 3810 15' or similar rotary mowers to accomplish mowing of firebreak road shoulders. These mowers are PTO-driven and are pulled behind a 60-110 hp tractor.
    c. Pre-position Fort Bliss FES firefighting equipment to High Hazard live-fire ranges (Table 4.1-1) during training exercises that are occurring on Very High to Extreme fire danger days.
    d. Use prescribed fires to strengthen fire break effectiveness for stopping a wildfire by blacklining (burning combustible fuels in long parallel strips) alongside roads and firebreaks where it is feasible and practical to do so.
    e. Fort Bliss firefighters will familiarize themselves with the FBTC by driving roads. Firefighters should have knowledge of locations of firebreaks and firebreak roads, Training Area and Range boundaries, water fill sites, and FMU locations and boundaries. Firefighters also need to recognize the different types of flammable wildland fuels found on Fort Bliss (See Section 3.3 Fort Bliss Fuel Types).

2. **Suppression:**
    a. Due to safety and resource considerations, the main fire suppression strategy to be implemented by Fort Bliss firefighters in the 27 Low hazard FMUs (Identified with light blue shading in Fig. 4.2-1) is to monitor wildfires within FMU boundaries from firebreak roads and suppress wildfires if they advance to firebreak roads. These firebreaks can be burned out in advance of a flaming fire front if it is deemed advantageous to do so by the Incident Commander provided there are trained personnel available and in place. In most cases, firefighters will allow wildfires to consume combustible fuels within the confines of the FMU boundaries and burn out on their own. Most Fort Bliss FMUs are bounded by roads or constructed firebreaks (See Appendix A).
    b. In the 25 High hazard FMUs wildfires will be immediately suppressed at the earliest opportunity. Direct attack is the preferred tactic for fighting wildfires, but in areas where the fire intensity is too high (>4 foot flame lengths) then indirect attack tactics will be used.
    c. Interagency Hotshot Crews are often the best and safest resources for fighting wildfires in the rugged portions of Fort Bliss. For safety purposes, a Fort Bliss employee that is familiar with military operations, impact area boundaries, UXO, terrain and fuels should accompany hotshot crews as a resource advisor.
    d. The decision to utilize helicopters on Fort Bliss wildfires should be based on an assessment of values at risk (See Section 4.5.4). Most wildfires burning on Fort Bliss will not require helicopter support. Helicopters equipped with buckets shall be used whenever wildfires threaten to cross Fort Bliss boundaries and when structures or FBTC infrastructure are threatened by wildfires.

4.4 Fort Bliss Wildfire Prevention Program

The Fort Bliss wildfire prevention program is focused on reducing or eliminating the unintentional ignitions of wildfires and on reducing the risks and hazards that can contribute to a severe wildfire. Prevention efforts require an analysis of risks, hazards, and values, and require education, awareness and preparation. Wildfire prevention requires actions to be taken to reduce the potential impacts of identified risks and hazards. **Risks** are ignition sources that can start wildfires, including live-fire training, use of pyro and flares, maintenance activities like welding, vehicles traveling across wildlands and troops bivouacking in wildlands. **Hazards** are fuels that burn, including the natural vegetation growing across the FBTC and the flammable structures located on Fort Bliss.

Fort Bliss FES has an Assistant Chief for Fire Prevention that is responsible for fire prevention and inspections on firing ranges and Training areas across the FBTC. This effort is to be coordinated with Range Operations, DPW O&M and Range Safety because these are the programs that request, program and use the funds needed to accomplish most of the identified fire prevention tasks. Figure 4.4-1 depicts firebreak road maintenance responsibilities for DPW O&M and Range Operations, among others. Many of these roads are regular access roads for military activities and have recently been designated as firebreak roads. Additional maintenance needs for firebreak roads include mowing road shoulders in areas where fuels loads are high. This is an additional expense but is an important part of the Fort Bliss wildfire prevention program. Areas of fuel accumulations where mowing needs to be done shall be identified and made known after each growing season.

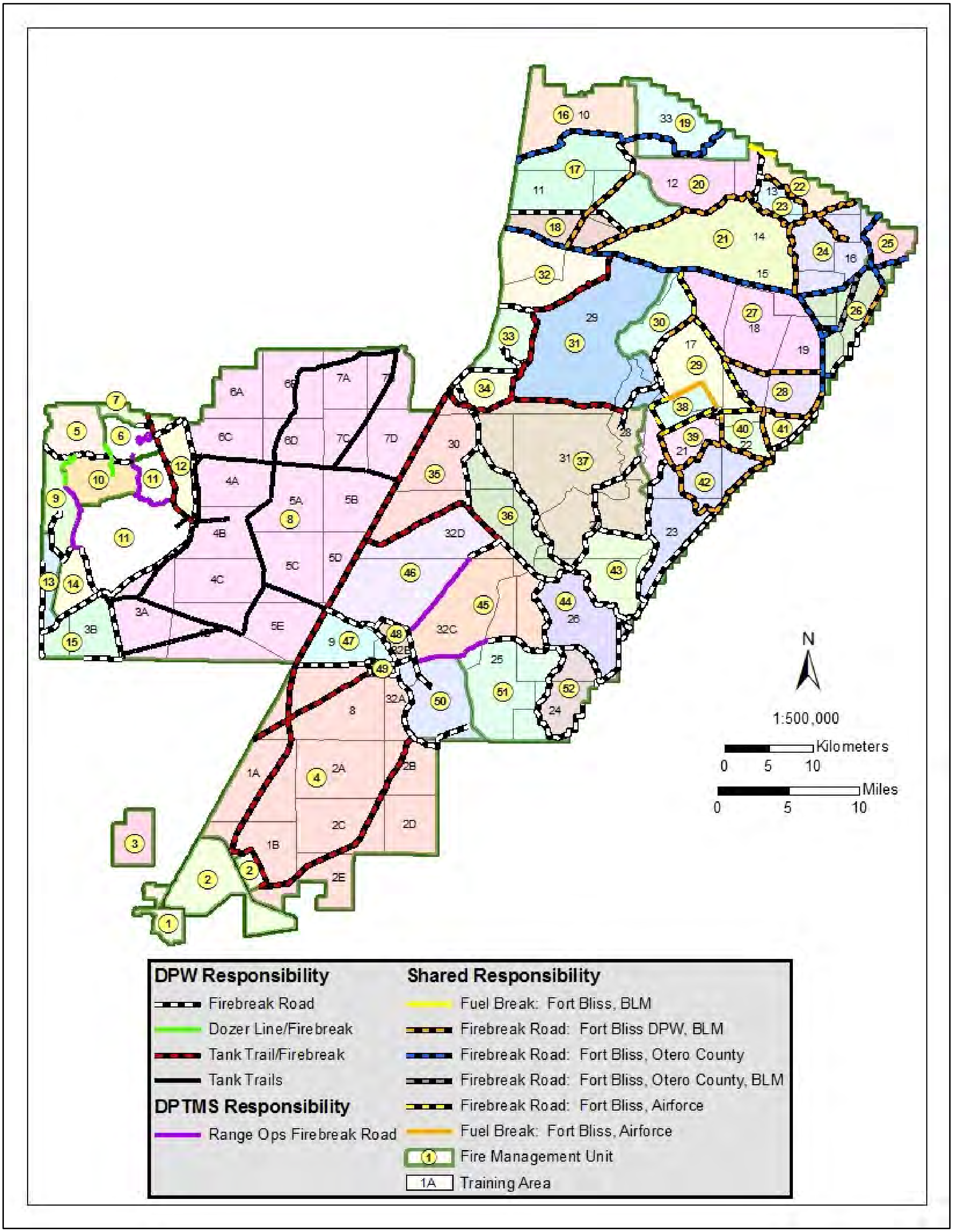
Another primary task for wildfire prevention is to identify all the areas, facilities and infrastructure that are vulnerable to wildfire damage and, secondly, translate that vulnerability into actions needed to reduce the hazards. Inspectors pay particular attention to mechanical, moving targets as tumbleweeds collect in target pits and can cause wildfire damage to these mechanisms. Table 4.4-1 summarizes the wildfire prevention actions to be completed on FBTC before fire season begins in March.

Wildfire risks and hazards are inherent to Fort Bliss and will never disappear. To lessen risk and prevent wildfires a Fire Danger Rating System has been developed for Fort Bliss. This system promotes wildfire awareness within Training Areas and Ranges and modifies training activities when wildfire risks are high (Table 4.1-1) (Section 4.1.5.1) (F.B. Reg. 385-63). Since live-fire training is a priority mission for Fort Bliss, reducing hazardous fuels is a preferred management action for preventing wildfires. Actions to reduce hazardous fuels include prescribed burning to reinforce fire breaks, creating defensible space around improvements by mowing vegetation or watering to keep green, mowing road shoulders, maintaining roads and firebreak surfaces to be vegetation-free and removing combustible fuels accumulations (tumbleweeds) from target pits, mechanisms and structures.

Fire break roads are used as FMU boundaries in most areas of Fort Bliss and are places where firefighters will stop the advance of wildfires. However, not all FMU boundaries are fire breaks. FMU boundaries in the Organ Mountains follow canyon bottoms and rocky ridgelines and while these features may slow down wildfire spread they are not barriers to wildfire spread. FMU boundaries that follow the Otero Mesa escarpment are good barriers to wildfire spread. The FMU boundary of the Lincoln NF is a fence line that is non-existent in places and is not a barrier to wildfire spread. The perimeter of Fort Bliss has many areas, particularly within the Organ, Hueco and Sacramento Mountains, that are not protected by firebreak roads and wildfires can easily burn across boundaries in these areas.

Table 4.4-1 Fort Bliss Wildfire Prevention Actions to be Taken Before Fire Season

Responsible Party	Hazard Reduction Tasks to be completed	Time frame	FMUs Identified with the Task
Fort Bliss Fire and Emergency Services Asst. Chief Fire Prevention and DPW-E Cultural Staff	Inspection of Historic Cultural sites for accumulations of brush and weeds	Nov- Jan	1, 5, 8, 10, 20, 21, 22, 23, 24, 28, 31, 32, 33, 35, 37, 44, 51, 52
Fort Bliss Fire and Emergency Services Asst. Chief Fire Prevention	Inspection of facilities for accumulation of brush, weeds and grass	Nov- Jan	1, 2, 4, 6, 8, 9, 10, 12, 14, 15, 31, 33, 34, 36, 37, 45, 47, 48, 49, 50
Fort Bliss Fire and Emergency Services	Prescribed burning along fire breaks within areas identified in prescribed burn plans	Nov-Feb or as necessary to reduce fuel loads (may be once every few years)	5, 6, 9, 10, 20, 22, 31, 34, 37, 38, 45
DPW Operations and Maintenance Division and FES Asst Chief Fire Prevention	Fire break road maintenance and mowing of roadway shoulders pre-identified by FES Fire Prevention	annually	4, 5, 6, 7, 9, 10, 12, 13, 15, 17, 18, 20, 21, 22, 23, 24, 26, 27, 28, 29, 31, 33, 34, 36, 37, 39, 40, 41, 42, 3, 44, 46, 47, 48, 49, 50, 51, 52
DPW Operations and Maintenance Division	Clearing of weeds and brush around facilities and historic cultural sites by mowing, clearing or crushing	Dec-Feb	All areas as identified by Asst Chief Fire Prevention
Range Operations	Range fire break road maintenance	annually	6, 7, 10, 11, 37, 45
Range Operations	Clearing of weeds and brush around Range facilities by mowing, clearing or crushing	Dec-Feb	All areas as identified by Asst Chief Fire Prevention



1507
1508 **Figure 4.4-1 Fire Prevention and Maintenance Responsibilities for Firebreak Roads**

4.5 Fort Bliss Wildfire Suppression Program

An up-to-date, practical reference for use by all wildland fire suppression programs is the newly published National Wildfire Coordinating Group publication: PMS 210, Wildland Fire Incident Management Field Guide. http://www.nifc.gov/nicc/logistics/references/Wildland%20Fire%20Incident%20Management%20Field%20Guide.pdf (NWCG 2013). The field guide has chapters on basic firefighting safety, wildland fire operations, incident positions and responsibilities and includes guidelines for managing incidents of increasing complexity. The field guide has charts and tables for fireline production rates, engine operations, heavy equipment usage and a host of other information that is pertinent to firefighters, incident commanders and wildland fire program managers.

4.5.1 Wildfire Detection

Early wildfire detection is part of an effective initial response to wildfires on FBTC. Any agency, unit leader, Soldier or individual noticing a wildfire is responsible for reporting it as soon as it is detected. Contact Range Operations at (915)744-9546/9547/9548/9554, or Fort Bliss DES/FES Fire Dispatch at 915 744-2115 or (non-emergency) 915 744-1283 or dial 911 by landline phone or communicate via two-way radio to Range Operations to report wildfires.

Military units training on FBTC will utilize the following protocol (F.B. Reg. 385-63). Upon detection of a wildfire located on a live-fire Range or within a TA, the Officer in Charge (OIC) will immediately notify Range Operations, give the grid coordinates (MGRS), estimate the size of the wildfire, direction of movement of the wildfire and estimate existing danger to personnel, equipment and structures. Range Operations will immediately notify Fort Bliss FES of any wildfire reports on Fort Bliss. The OIC will not send troops to engage the wildfire until cleared to do so by Range Operations or by on-scene FES personnel. For further firefighting response by Soldiers see **Appendix D Wildfire Response Procedures for Soldiers Training on FBTC** (F.B. Reg. 385-63). The Fort Bliss IWFMP intent is to allow military training activities to continue after an initial evaluation of threats to improvements or personnel. If no immediate threats exist and the wildfire is burning in an FMU that allows for it to burn, then training should continue. Fort Bliss FES personnel will request Range Operations to suspend training if, and when, they decide they need to move into position to suppress the wildfire.

4.5.2 Dispatch Procedures

Fort Bliss FES will dispatch appropriate available wildland fire resources to a wildfire burning on Fort Bliss based on the following criteria and then immediately contact the Assistant Fire Chief for Operations for further guidance:

1. Imminent threats to lives or structures.
2. Red Flag Alert or Extreme Fire Danger Rating.
3. Imminent threat to Fort Bliss boundaries.
4. Wildfire is burning in an FMU that requires an immediate suppression response and the Fire Danger Hazard Rating is High, Very High or Extreme (See Appendix A).

Fort Bliss FES will dispatch appropriate wildland firefighting resources, ordinarily two Type 6 wildland fire engines and two UTVs to a wildfire burning on Fort Bliss based on the following criteria:

1. There are no immediate threats to life or structures.

2. Wildfire is burning within an FMU that is designated control from a road or a fire break and the Fire Danger Rating is Low to Very High.
3. Wildfire smoke is visible but the location of the wildfire has not been determined.
4. Wildfire is burning within an FMU that is designated for immediate suppression response and the Fire Danger Hazard Rating is Low to Moderate (See Appendix A).

If it is determined by Range Operations, in communication with the wildfire Incident Commander (IC), that resuming training will not affect firefighting efforts, then Range Operations will notify units that training may resume. Units will not resume training until Range Operations has notified the OIC and confirmed that training may resume.

4.5.3 Initial Attack Procedures

Initial attack has two phases. The first phase is the call out and rollout of responding personnel and equipment. The second phase includes arrival on scene, determination of a course of action after reconnaissance and engaging in the initial attack. Fort Bliss FES personnel, while enroute to the incident will observe and note the following in order to anticipate fire behavior, firefighter safety, tactics and resource protection:

- Fuels and topography
- Weather conditions
- Smoke column characteristics
- Access routes
- Fire barriers (natural and constructed)
- Potential water sources
- Capabilities of responding resources
- Unusual human activity or suspicious behavior

The safety and security of responding personnel is the first priority as units approach the incident. Response personnel will have an appropriate awareness of the **10 Fire Orders, LCES and the 18 Watch-out Situations (Appendix C).** Responding personnel will incorporate their knowledge of the fire area and observe how current wildfire conditions compare to past experiences with wildfire fuels and weather conditions.

Initial attack forces should designate an Incident Commander (IC) before arrival at the incident. The initial attack IC should be among the first to arrive at the incident. Upon arrival at the incident, the designated IC should size-up the wildfire before engaging firefighters and report to Fort Bliss Fire Dispatch:

- size of the wildfire
- fuel type burning
- fuel types ahead of the wildfire
- terrain or slope features
- observed hazards
- current weather conditions including wind speed and direction, relative humidity, temperature and cloud cover
- an estimate of anticipated equipment, supplies and resources needed to bring the wildfire under control

Initial attack procedures involve either direct or indirect attack tactics depending on FMU designation, flame lengths, rate of wildfire spread, and/or difficulty of terrain and heavy fuels. When using **direct attack** tactics, firefighters engage the wildfire directly along the flaming perimeter (flame lengths are generally < 4’). The direct attack method of engaging wildfire is the simplest and safest method to bring a wildfire under control. This is the safest suppression method because firefighters can have “one foot in the black.” The ‘black’ or previously burned areas are the best places for safety zones on a wildfire and are easily reachable when fighting fire on the fire’s edge. The primary strategy for direct attack is to establish an anchor point and then proceed with firefighters along each flank, directly extinguishing flames with hand tools, swatters or water from engines and progressing towards the head of the wildfire, eventually pinching the head and meeting the firefighters from the other flank. See **Appendix H Minimum Impacts Suppression Tactics (MIST) Guidelines** for tactical considerations for minimizing impacts to natural resources and using natural features for firelines and safety zones.

Indirect attack methods should be used when fire behavior is such that direct attack is not feasible (flame lengths > 4’) or when wildfire is within an FMU designated as monitor and suppress from FMU boundaries. The firefighting strategy for indirect attack is to fall back to a defensible position, establish an anchor point and burn out fuels ahead of the advancing wildfire as necessary. Tactics include burning out along roads or firebreaks eventually encircling the wildfire or halting the advance of the wildfire. Indirect attack tactics should be led by wildland firefighters experienced and qualified in burning techniques. There also should be adequate engine and firefighter resources on scene to hold the line and extinguish hotspots behind the ignition team.

It is imperative that lookouts are posted and safety zones and escape routes are scouted and marked and made known to everyone to make sure they are viable options for firefighters. Engaging in indirect attack tactics means that there will be unburned fuels between the fire break and the advancing fire front. Visibility of the wildfire and changes in fire behavior may be obscured or limited. Winds can change at any time, causing fire to blow across firelines and compromising firefighters’ access to escape routes and safety zones

Indirect attack tactics may also include pre-positioning resources such as engines and firefighters along a defensible perimeter such as a fire break road and engaging the advancing wildfire with water, foam and handtools as it approaches the fire break. This tactic works well when fire behavior is not extreme or along the flanks of a wildfire. Be careful engaging wildfire directly at the head. Again, post lookouts, establish escape routes and safety zones and make them known to everyone engaged in fighting the wildfire.

Once perimeter containment of the wildfire has been achieved, fuels within the interior of the wildfire will be allowed to burn out. Mop-up will only be conducted on the perimeter to bring the wildfire under control. Keep enough resources to patrol and monitor the wildfire until it completely burns out.

Firefighters will use a handheld GPS to record a final fire perimeter before leaving the incident. The coordinates will be downloaded and e-mailed to DPW-E Conservation Branch or the GPS unit may be brought to DPW-E Conservation Branch, Natural Resources Office on Fort Bliss for downloading and recording wildfire information. FES GPS units need to have mapmaking and area calculating capabilities. DPW-E Conservation Branch will provide GPS training for firefighters and will maintain a GIS database for all wildland fires on Fort Bliss.

4.5.4 Fort Bliss Aerial Firefighting Assets

1 AD CAB helicopters will not automatically respond to Fort Bliss wildfires. Aerial assets are ordered by the IC onsite or by the Fort Bliss WFPM. The request for helicopters to aid in wildfire suppression operations on Fort Bliss should be based on a risk analysis of the threat to human resources and/or structures, the potential for a wildfire to escape Fort Bliss boundaries and the potential exposure of ground-based firefighters to multiple risk factors including steep slopes, ingress/egress, escape routes, safety zone accessibility and wildfire entrapment. Helicopter bucket support will be especially beneficial for suppressing wildfires located in remote, inaccessible terrain such as that found in the Organ and Sacramento Mountains.

Helicopters from the 1st Armored Division Combat Aviation Brigade (CAB), equipped with "bambi" buckets can currently deliver thousands of gallons of water for the purposes of extinguishing wildfires located on Fort Bliss. An estimated 790,000 gallon storage tank with an open top to allow for helicopter bucket fill has been built on Doña Ana Range. It is located just east of the junction of NM 213 (War Road) and the southern terminus of Firing Line Road (See Table 4.5-2 for location in MGRS). 1 AD CAB helicopters have begun training with the "bambi" buckets at the Doña Ana dipsite. Currently the CAB has two 2,000 gallon collapsible "bambi" buckets for the CH-47s (Chinooks) and four 660 gallon 'bambi' buckets for the UH-60s (Blackhawks).

A "bambi" bucket connected directly to the helicopter belly cargo hook works well for dipping out of standing, open water. It is best for extinguishing flames from wildfires when the helicopter is able to do a passing or trailing drop at 10-15 knots forward air speed. The bucket should be a minimum of 30' above the fire to keep rotor wash from fanning the flames. Helicopters should not come to a hover over a wildfire before delivering a load of water due to the increased rotor wash which accomplishes fanning of the flames and increases wildfire spread rates.

Interagency helicopter pilot experience qualifications for flying contract helicopters on federal wildland fires are listed in Table 4.5-1 (Forest Service Handbook 5709.16 2009) for reference.

Table 4.5-1 Interagency Flight Hour Requirements for Contracted Helicopter Pilots

	PIC	Make and Model	Model in the last 12 months	Weight class of helicopter* "small" "medium" "heavy"	Turbine engine time	mountainous terrain**	mountainous terrain in make and model
Helicopter flight hour requirements for contract pilots to meet federal wildland firefighting certification	**1,500 hrs**	**50 hrs.**	**10 hrs.**	**100 hrs.**	**100 hrs.**	**200 hrs.**	**10 hrs.**

*"Small" helicopter is defined as having a gross weight of 7,000 pounds or less, a "Medium" helicopter has a gross weight from 7,000-12,500 pounds and a "Heavy" helicopter has a gross weight of greater than 12,500 pounds.

**Mountainous terrain experience is defined as: Experience in maneuvering a helicopter at more than 7,000 feet mean sea level (MSL) altitude including numerous takeoffs and landings in situations indicative to mountainous terrain. This terrain consists of abrupt, rapidly rising terrain resulting in a high land mass projecting above its surroundings, wherein complex structures in which folding, faulting, and igneous activity have taken place. These mountainous areas produce vertical mountain winds and turbulence associated with mountain waves, producing abrupt changes in wind direction often resulting in upflowing or downflowing air currents (FSH 5709.16 2009).

An excellent resource for aviation users and anyone involved in helicopter operations within the wildland fire environment is the Interagency Helicopter Operations Guide (IHOG). The IHOG and the IHOG Supplemental Forms Package are available for viewing and downloading at: http://www.nifc.gov/aviation/av_ref_ihog.html.

An SOP for helicopter use on wildfires on Fort Bliss should be developed and contain the following:

1. 1st AD CAB helicopters should be considered an initial attack asset for Fort Bliss use only. Fort Bliss use of an Interagency Incident Management Team for extended attack wildfires means that aerial resources from outside agencies will be brought in to fight the wildfire. 1 AD CAB helicopters will return to normal duties when these other aerial assets are brought in.
2. Outline of the process for how military helicopters are to be dispatched for wildfire assignments on the FBTC including:
    - A. An order for helicopter support on a wildfire should come from the onsite Incident Commander (IC) to the Fort Bliss FES Dispatch.
        - a. The order should include which type of helicopter is needed (Chinook or Blackhawk),
        - b. who the helicopter should report to,
        - c. where the helicopter should go first (MGRS coordinates for the location needs to be provided with the request).
    - B. The request for helicopter support is routed from the wildfire to Fort Bliss FES Dispatch who sends request to 1AD CAB:
        - a. FES Dispatch should provide the information in A. above to the CAB, as well as:
        - b. the radio frequency that the ground forces on the incident are using,
        - c. any fire information that would be pertinent (fuels burning, wildfire size, weather information).
    - C. 1 AD CAB helicopter should provide to FES Dispatch:
        - a. the call sign of the helicopter being dispatched,
        - b. estimated time enroute to incident,
        - c. souls on board and equipment on board (with or without bucket hooked to external cargo hook),
        - d. radio frequencies, if pre-assigned, for air-to-ground and air-to-air communications.
    - D. 1 AD CAB helicopter, once on scene should recon the fire area prior to filling the water bucket for the first time:
        - a. to look for hazards
        - b. to locate the fire and firefighters,
        - c. determine the best approach and departure paths,
        - d. establish communications with the ground forces who may be working the incident.

E. Fill bucket at the Doña Ana helicopter dipsite.

3. The locations and numbers of helicopter accessories, such as buckets, cargo nets, leadlines, swivels and long lines.

4. The location and description of all potential water sources.

5. Pre-established air-to-ground and air-to-air radio frequencies.

6. Safety protocols for external loads and water delivery.

7. Safety protocols for working with ground resources.

8. Training protocol that includes practice with buckets and long lead lines. Forest Service Handbook 5709.16 requirement for contract pilots is a minimum of 10 hours for longline vertical reference (VTR) experience. IHOG guidelines state that if a longline is utilized for water bucket operations then the longline shall be a minimum of 50 feet in length to reduce the risk of bucket or long line entanglement with the tail rotor or tail boom. Pilots utilizing long lines with water buckets must be approved for VTR operations (IHOG 2009). Pilots that are not approved for VTR operations must attach the bucket directly to the belly hook during water bucket operations (IHOG 2009).

4.5.5 Extended Attack Procedures

Extended attack wildfires are those wildfires that have escaped initial attack and are still burning after 24 hours. Fort Bliss will manage these incidents using their civilian and military work force, including mutual aid resources, so long as they have the required expertise and personnel in place to accomplish safe and efficient wildfire suppression and management. This includes use of 1 AD CAB helicopters.

The National Wildfire Coordinating Group recognizes 5 levels of wildland fire incident command (See below for descriptions of each level of incident command). The smallest wildfires or initial attack fires require a Type 5 Incident Commander (ICT5). Most Fort Bliss FES firefighters with wildland fire experience will qualify as ICT5. Type 4 ICs (ICT4) require more training but Fort Bliss has qualified firefighters who can fill this position. If the Fort Bliss ICT4 decides that the current incident complexity calls for the next higher level of incident management and that IC is not qualified, and there is not one within Fort Bliss FES ranks, then an outside agency IC will need to be ordered. The order for a Type 3 IC (ICT3) or higher is placed through the Alamogordo Dispatch Center (ADC). If mutual aid resources are already involved in the suppression efforts, it is possible that there may be a ICT3 within their ranks. If so, a name request is then placed with the order to ADC to facilitate the transition to the higher level IC.

Use of outside ICs for Fort Bliss wildfires require a delegation of authority be given to the IC for the management of the incident. A delegation of authority is a written document from the Garrison Commander-Fort Bliss to the incoming IC granting the IC the authority to expend funds and order all necessary resources to bring the wildfire under control. See **example of a delegation of authority in Appendix E.**

The types of IC levels and the corresponding incident complexity are provided below:

1. Type 5 Incident

a) Resources required are local and typically vary from two to six firefighters.

b) The incident is generally contained with initial attack resources and often within a few hours after resources arrive on scene.

2. Type 4 Incident

a) Resources are local and vary from a single module to several resources.

b) The incident is usually limited to one operational period in the control phase.

c) No written Incident Action Plan (IAP) is required. An operational briefing will be completed for all incoming resources not involved in the initial attack.

3. Type 3 Incident

a) Resources are usually local and some overhead positions may be activated, usually at the division/group supervisor and/or unit leader level. These resources may be called upon to fill key positions such as Operations, Logistics, Safety and Plans Section Chiefs. These positions in wildland fire organizations are called command and general (C and G) staff positions. Incoming ICT3s may have a predetermined Type 3 Organization with qualified C and G staff positions filled.

b) Type 3 organizations manage initial attack fires with a significant number of ground and air resources. Type 3 organizations manage extended attack wildfires until containment/control is achieved.

c) Initial briefing and closeout are more formal and more critical.

d) Resources vary from several resources to several task forces/strike teams.

e) The incident may be divided into divisions.

f) The incident may involve multiple operational periods prior to control, which may require a written IAP.

g) A documented operational briefing will be completed for all incoming resources, and before each different operational period.

4. Type 2 Incident

a) Resources are usually from the regional area. Type 2 teams are filled by qualified personnel who are pre-selected for that team. All C and G staff positions are filled as well as positions at the Branch, Division, Task Force and Strike Team Leader levels.

b) Type 2 organizations manage extended attack wildfires that have exceeded the complexity of a Type 3 team. Type 2 fires usually have significant outside resources involved in air and ground operations. There is typically significant public and political interest and there are usually multiple land ownerships and government agency jurisdictions involved.

c) Only the most complex wildfires on Fort Bliss will need the larger Type 2 Incident Management Teams (IMT). Within the past 25 years only three large wildfires within the Organ Mountains have needed the expertise required of a Type 2 IMT. The decision to call in a Type 2 IMT should be a joint decision between the ICT3 at the time, the WFPM and the GC.

5. Type 1 Incident

a) Resources are national in scope and are used on the most complex and largest fires in the nation. Fort Bliss does not have the fuel loads or the continuity of fuels that would be necessary to warrant the use of a Type 1 Incident Management Team.

4.5.6 Water Sources

Water sources for firefighting purposes are rare commodities across the FBTC. This is a logistical problem for firefighters needing to refill wildland fire engines and return to the fireline in a timely manner. The cantonment, Doña Ana, McGregor and Orogrande Base Camps have hydrant systems that are available for engine refill. Many of the Ranges on the FBTC have water but it may not be available or adequate for engine refill purposes. Overhead stand pipes and storage tanks are located in a few places (See Table 4.5-2 and Figures 4.5-1 and 4.5-

2). Fort Bliss FES has a water tender that is capable of delivering 1000 gallons to a wildfire but is restricted to maintained roads. Intermittent water may be available for drafting at many of the dirt tanks located throughout the FBTC. The pipeline system that carries water from the Sacramento Mountains for the purpose of watering livestock and wildlife on McGregor Range is also available for firefighting purposes. There are numerous storage tanks and drinking troughs associated with the pipeline system and are potential draft sources. Las Cruces District Office-BLM should be contacted and made aware of the use of this water so that they can assure that the livestock they are responsible for are not negatively impacted by the firefighting efforts.

Table 4.5-2 Potential Water Sources for Firefighting on Fort Bliss

Potential Water Sources for Firefighting on Fort Bliss						
Name		UTM		MGRS (13S)	Training Area	Capacity (GPM or Gallons)
		Easting *	Northing *			
open storage tanks						
1	Open Storage #1	407,293	3,597,830	DR07299783	11	
2	West Mesa Rim Tanks	419,980	3,579,314	DR19987931	21	
3	West Mesa Rim Tanks	419,993	3,579,366	DR19987936	21	
4	Open Storage #2	428,464	3,575,695	DR28467569	22	
5	Mare Pasture Rim Tank	428,466	3,578,125	DR28467812	20	
6	Culp Rim Tank	428,654	3,602,905	DS28650290	12	
7	Open Storage #3	428,672	3,584,857	DR28678485	17	
8	Wingfield Line Storage Tank	429,806	3,591,888	DR29809188	17	
9	East Poe Tank	431,114	3,596,256	DR31119625	15	
10	Open Storage #4	439,119	3,601,828	DS39110182	13	
11	Open Storage #5	439,119	3,601,831	DS39110183	13	
12	Lower Sombrero Tank	439,377	3,603,433	DS39370343	13	
13	Open Storage #6	441,938	3,587,996	DR41938799	16	
stand pipes						
14	Dona Ana Base Camp	358,270	3,558,124	CR58275812		
15	DA South Well	368,162	3,566,126	CR68166612	4B	
16	Hueco Base Camp	371,290	3,553,716	CR71295371	4D	
17	North of State Line	375,074	3,541,401	CR75074140	8	
18	Before McGregor Range Camp Road	379,535	3,549,395	CR79534939	8	
19	McGregor Base Camp	390,349	3,549,915	CR90344991	32B	
20	Orogrande Base Camp	391,987	3,585,720	CR91988572	7B	
21	Meyer Range	392,116	3,543,845	CR92114384	32A	
22	Orogrande Range Complex	405,898	3,584,359	DR05898435	29	
hydrants						
23	Dona Ana Base Camp**	357,893	3,558,030	CR57895803		
24	McGregor Base Camp**	389,077	3,549,688	CR89074968	32B	
25	Orogrande Base Camp**	392,039	3,585,904	CR92038590	7B	

helicopter tank						
26	Dona Ana Dip Tank	368,224	3,566,236	CR68226623	4B	
	* Coordinates are WGS 84 UTM Zone 13N					
	** Location for central hydrant at each Range Camp site.					

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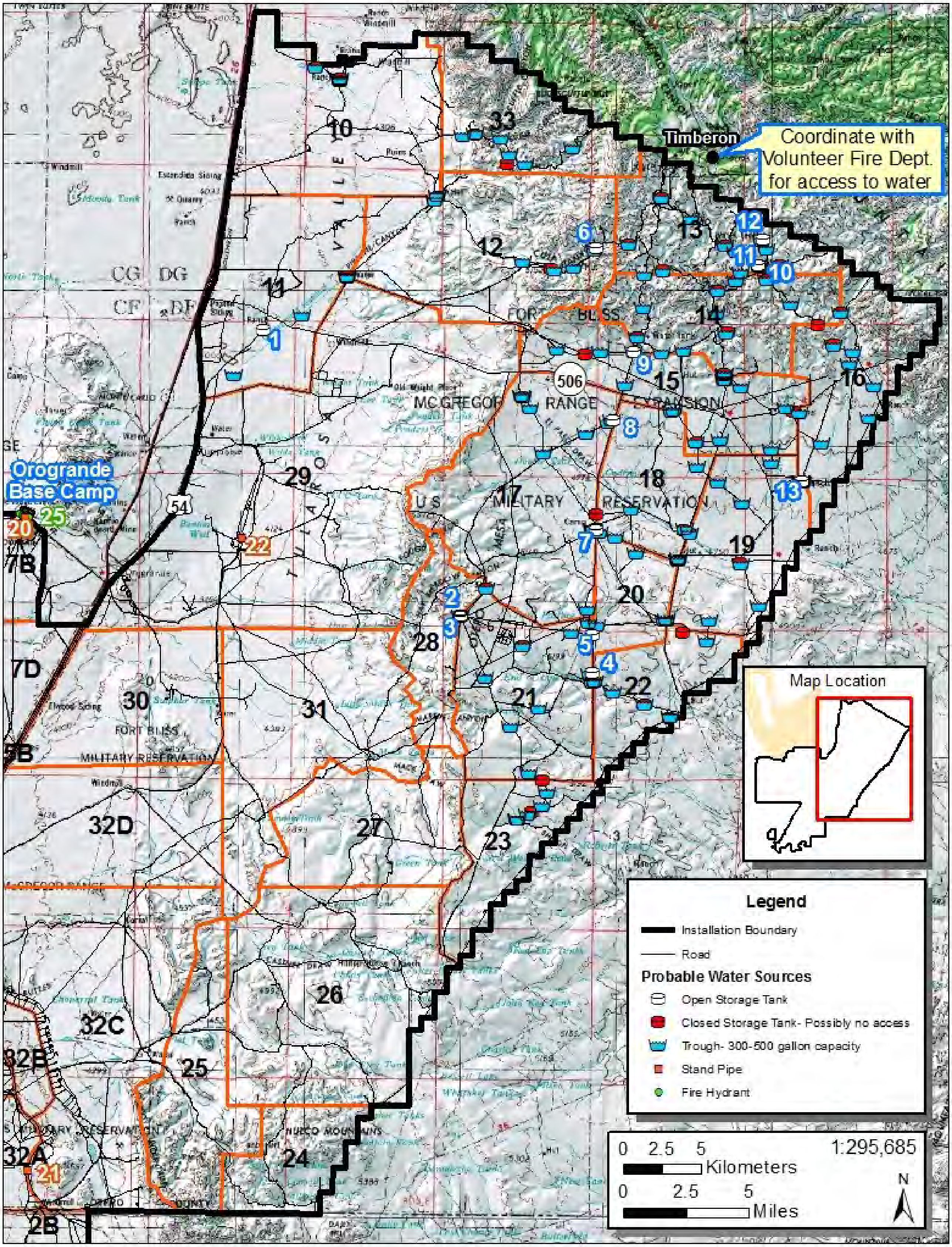
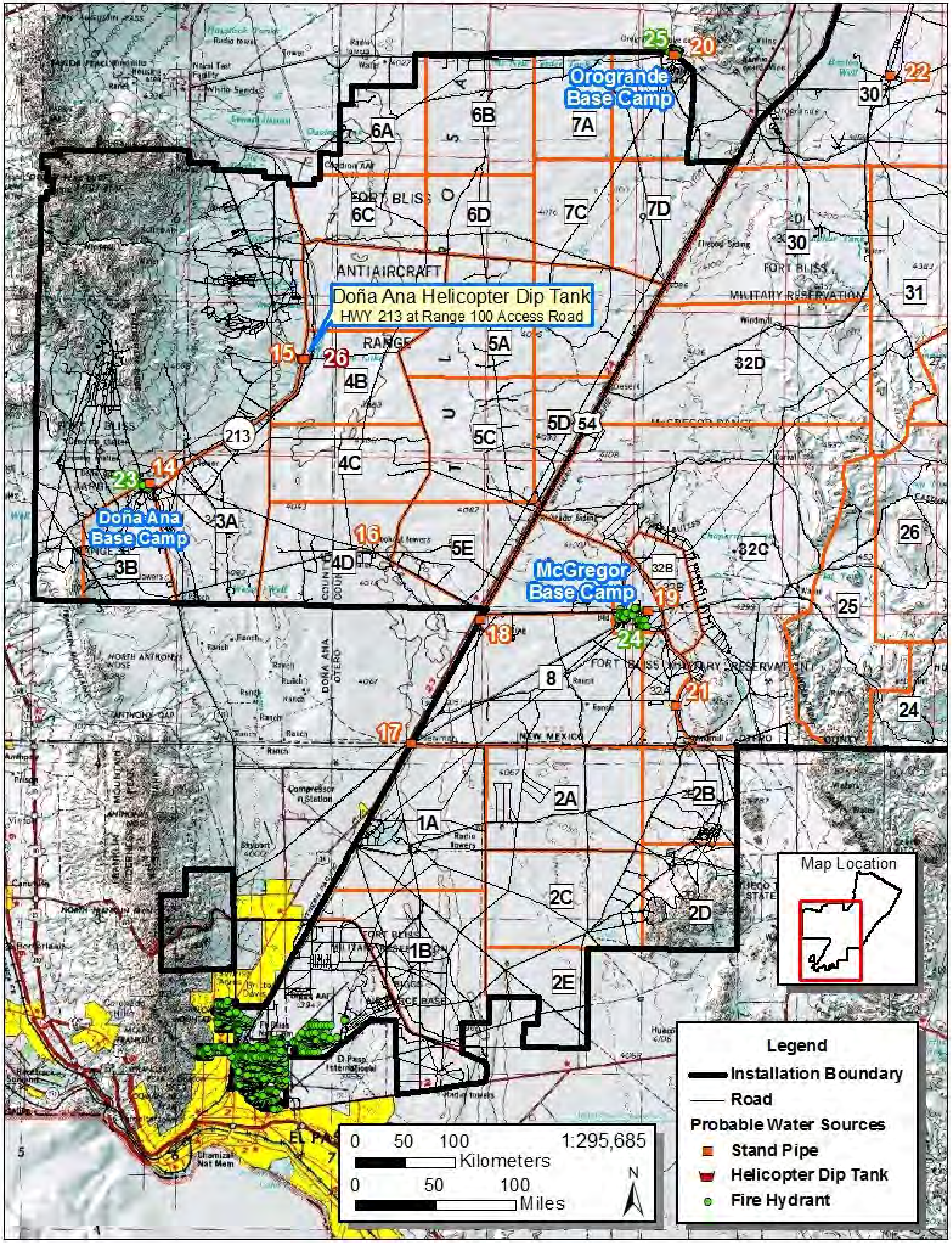


1787 **Figure 4.5-1 Water Sources for Engine Refill-Most of McGregor Range**



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1789 **Figure 4.5-2 Water Sources for Remaining Portions of Fort Bliss**

4.5.7 Rehabilitation Needs and Procedures

Very few areas within the FBTC will require rehabilitation after a wildfire. Seeding of burned areas with native grass seed is common practice in many areas but is generally unnecessary on Fort Bliss. Vegetation found across Fort Bliss has evolved with wildfire and generally recovers quickly after being burned.

Ground disturbances such as hand lines or bulldozer lines caused by firefighting efforts should be restored, as much as possible, back to their original condition. Firelines that were created should be covered back up with previously cut brush, rocks and sticks. Waterbars should be placed on disturbed slopes. Place waterbars at a 30 degree angle to the scraped fire line so that water is carried off of the disturbed area and into undisturbed vegetation. Place waterbars so that there is one for every 6' rise in elevation. Use of bulldozers should be discouraged except around structures, as the disturbance caused by the heavy equipment usually is more pronounced and lasts longer than the disturbance caused by a wildfire. See **Appendix H** for rehabilitation guidelines.

Soil erosion can be a problem after a severe wildfire if it burns through steep country. Water diversions made by placing sticks or logs parallel to the contours of the slope are useful in trapping sediment and limiting soil erosion. Aerial or hand seeding of native grasses can help severely burned areas to recover more quickly but costs can be prohibitive. Be careful using seed. Minimize the chances of introducing non-native or invasive weeds or grasses and only order seeds from sources that certify their seeds to be at least 98% weed-free. Canyon and arroyo bottoms can benefit from structures designed to slow down water flow. Place boulders, logs and cut brush into gullies to help slow down the movement of water and trap sediment.

4.5.8 Communications

Handheld and mobile two-way radios are the most common form of communications on wildland fires. Fort Bliss will purchase programmable FM radios for Fort Bliss FES firefighters that are compatible with local Fire Departments and Volunteer Fire Departments (VFDs), BLM, NM State Forestry and US Forest Service in order to communicate with these and other agencies. Currently, Fort Bliss radios are not programmable to outside agency frequencies, nor are outside agencies able to program DoD frequencies. This is a safety issue for Fort Bliss FES firefighters, particularly when coordinating and working alongside other agencies ground and air resources. Cell phones should not be relied on in the wildland environment of Fort Bliss as coverage is unavailable in many areas.

The following are communication SOPs for wildland firefighters:

1. All Fort Bliss personnel assigned to wildfire suppression duties will carry a radio or they will remain in vocal contact with someone that has a radio.
2. All fire-assigned personnel will be familiar with the controls of the radio and must be able to communicate common wildfire principles, tactics and operational procedures in clear text.
3. Radio communications on each wildfire incident will have an assigned frequency that will be made known to all fire-responding personnel.
4. Radios should be checked for battery charge and proper frequency set before engaging in wildfire operations.
5. Over-the-air transmissions should be kept short and messages should be transmitted in a clear, methodical tone.
6. Important safety and tactical messages should receive affirmation and acknowledgement.

7. Fort Bliss FES Dispatch should insure that constant communication links are maintained throughout the duration of each incident.

8. Range Operations should monitor fire-assigned frequency and be able to transmit information to fire resources. The IC or designee should monitor Range Operations frequency and be able to transmit information to Range Operations so that training can be resumed as soon as possible.

4.5.9 Equipment

Fort Bliss FES maintains a fleet of engines, trucks and UTVs that are designed for fighting wildfires on Fort Bliss.

Table 4.5-3 Fort Bliss Fire and Emergency Services Wildland Firefighting Equipment

Equipment Call Sign	Type 3	Type 4	Type 5	Type 6	Type 7
Engine 25	500 GPM 500 Water 30 Foam A	NA	NA	NA	NA
Engine 14	NA	NA	NA	150 GPM 300 Water	NA
Engine 22	NA	NA	NA	150 GPM 300 Water	NA
Engine 23	NA	NA	NA	150 GPM 300 Water	NA
Polaris 1	NA	NA	NA	NA	120 GPM 150 Water 10 Foam A
Polaris 2	NA	NA	NA	NA	120 GPM 150 Water 10 Foam A
Polaris 3	NA	NA	NA	NA	120 GPM 150 Water 10 Foam A
Polaris 4	NA	NA	NA	NA	UTV only
Tender 47	500 GPM 1000 Water 2000 Potable Tank	NA	NA	NA	NA

Support Vehicles	4x4	Crew Cab
Unit 902	YES	YES
Unit 905 (Battalion 2)	YES	NO
Unit 906	YES	YES
Unit 907	YES	NO
Chief 3	YES	YES

Table 4.5-4 contains a list of mandatory personal equipment, clothing and gear to be worn or carried by all firefighters when engaged in wildland fire operations on Fort Bliss.

Table 4.5-4 Mandatory Personal Protective Equipment for Wildland Fires

Equipment	Required when...
Hard hat.	On the fireline.
All leather, 8" high boots with slip and melt-resistant soles and heels. No steel toes.	On the fireline.
Flame resistant clothing (Nomex pants and shirt). Sleeves should be rolled down.	On the fireline, in helicopters.
Leather gloves.	On the fireline.
Eye (safety glasses), face (nomex shroud), and neck protection (shroud or bandanna).	When necessary.
Fire Shelter.	On the fireline
Hearing protection. ANSI approved ear plugs or ear muffs	When working with high noise-level firefighting equipment, such as helicopters, air tankers, chain saws, portable pumps, etc.
Chaps (required for chain saw operators and swampers).	When operating or swamping for chain saws.
Dust/smoke mask.	When necessary.

4.5.10 Records and Reports

Guidance from AR 420-1 and DoDI 6055.06 requires that a fire report be completed by Fort Bliss FES personnel and forwarded to the National Fire Incident Reporting System (NFIRS). The Emergency Reporting System (ERS) is the automated software system that Fort Bliss FES uses to record fire reports, record training and report fires to NFIRS. Contact the DoD NFIRS Program Manager at the Naval Safety Center, 375 A Street, Norfolk, VA 23511-4399 or at http://www.safetycenter.navy.mil for technical assistance. DPW-E Conservation Branch should receive a copy of each wildfire report along with any other data including GPS points in order to update and maintain the wildfire database for Fort Bliss.

4.5.11 Public Relations

The Fort Bliss Public Affairs Office (PAO) will be notified at 915 744-8435/8406 or 568-4505 and integrated into the incident operations whenever wildfires escape initial attack, when wildfires are in close proximity to Fort Bliss boundaries and whenever prescribed fire events are planned. Fort Bliss PAO maintains a contact list of media outlets in order to get information out to the public quickly. This helps to inform and assure the public that the incident is under control or that efforts to control the incident are under way. Whenever wildfires threaten to cross installation boundaries, close coordination between Fort Bliss FES and WFPM, Fort Bliss PAO, the federal wildland firefighting agencies, municipal and volunteer fire departments, the affected public and private landowners must occur. Table 4.4-5 lists cooperators that can assist Fort Bliss with wildland fire management (list may not be all-inclusive).

Table 4.5-5 Wildland Fire Cooperators

Fort Bliss Fire Dispatch	915 744-1283/2115
Fort Bliss Public Affairs Office	915 744-8435/8406
Alamogordo Interagency Fire Dispatch Center	575 437-0778/7353 or 877-695-1663
Las Cruces District-BLM	575 525-4300
Lincoln NF-US Forest Service	575 434-7200
Cherokee Range Control	575 678-8000
Centennial Range Control	575 572-5716
McGregor Range Control/Range Operations	915 744-9546/9547/9548/9554
Holloman AFB Fire Dept.	575 752-7228
WSMR Fire Dept.	575 678-5105/0470/4187
Timberon Volunteer FD	575 987-2640 or 987-2202
Otero County Emergency Svc Dispatch	575-885-2111
Oro Vista Volunteer FD (Serving Orogrande)	575 434-6999
Chaparral Volunteer Fire Department	575 824-4755
Texas Dept of Public Safety	915 849-4155
NM State Police	575 827-9309
El Paso County Sheriff	915 849-4000 (DPS)
Holloman AFB PAO	575 572-5406
WSMR PAO	575 678-1134
NM Air Quality Bureau	800 224-7009
Dona Ana County Fire Marshall	575 647-7921
Silver City Interagency Dispatch Center	575 538-5371/5372
NM State Forestry-Capitan District	575 354-2231

4.5.12 Wildland/Urban Interface (WUI)

The wildland/urban interface (WUI) is described as areas where wildlands meet or intermix with structures or other human developments (NWCG 2012). Suppressing wildfires as well as providing structure protection within a wildland environment presents significant safety and operational challenges to firefighters. **Appendix J Wildland/Urban Interface/Intermix (WUI) Wildfire Safety Considerations and Operations** details common safety considerations, tactics and strategies for firefighters operating in the WUI environment. Within the FBTC, there are numerous areas of WUI, including Range Camps, targets, training area facilities and firing complexes. These areas on Fort Bliss are described more specifically in **Fire Management Units-Appendix A** along with specific actions to prevent or mitigate wildfire threats to the WUI where they exist within each FMU.

WUI community areas outside Fort Bliss boundaries that can be threatened by wildfires occurring on the installation include the unincorporated communities of Timberon, Chaparral and Orogrande.

Timberon is the most vulnerable area for severe wildfire damage or loss due to heavy fuels of piñon, juniper and ponderosa pine that surround this community. Fort Bliss and the Las Cruces District-BLM have completed a substantial fuel break on McGregor Range along the military/private land boundary and adjacent to the village of Timberon. This project consisted of mechanical thinning in mostly dense piñon-juniper stands, followed by prescribed burns to consume the slash that had been cut and piled. To date, there have been no wildfires that have crossed the fuel break or the Fort Bliss/private land boundary in this area. The Timberon fuel break needs to be prescribed burned every 10-15 years to keep fuel loads from building up in this area again.

The communities of Chaparral and Orogrande are situated within the Tularosa Basin and normally do not have the fuel loads, within the surrounding area, to support large wildfires. However, during fire seasons that are preceded by seasonal monsoons with above normal precipitation, the fuel growth of annual weeds and grasses can be sufficient to allow for the growth of wildfires in these areas. Wildfire history and precipitation records show that, about 2-3 years per decade, portions of these areas will have sufficient plant growth to fuel the spread of wildfires.

Developed subdivisions near Las Cruces, NM at the base of the Organ Mountains, at the south end of the Bishop's Cap Hills and on the outskirts of northeast El Paso, south and east of TA 2C and 2E can be threatened by wildfires started on Fort Bliss. Again, these areas will not support wildfire growth except during fire seasons that are preceded by above normal precipitation during the monsoon season.

Facilities located on WSMR at the base of the Organ Mountains can also be threatened by wildfires started on Fort Bliss. There are higher fuel loads near the mountains and wildfires can spread here. The main post of WSMR is well protected from wildfires due to its location on the desert floor and due to firebreaks that have been put in place on the west side of the main post nearest the Organ Mountains.

4.6 Fort Bliss Wildland Fire Organizational Structure and Responsibilities

- Fort Bliss FES has direct responsibility for suppression of all human-caused fires within Fort Bliss boundaries including structural fires and wildfires. The Wildland Fire Program Manager (WFPM) position falls within the management of Fort Bliss FES (Table 4.6-1). The WFPM is responsible for ensuring that the components of the IWFMP are implemented. The WFPM is responsible for review, approval and execution of prescribed fire burn plans, and for maintaining records of FES individuals' wildland fire trainings and qualifications. The Fort Bliss WFPM will report annually the installation's staffing requirements for the tasks associated with wildland fire management activities, including monitoring. At this time, the Fort Bliss FES Fire Chief is designated as the WFPM.

- Fort Bliss FES is in the process of developing a wildland fire response team that will meet all National Wildfire Coordinating Group (NWCG) guidelines and standards pertaining to command structure, equipment and training. One goal is to have two or three qualified Incident Commanders (IC) Type 4 that can lead teams of NWCG certified wildland firefighters with associated wildland fire engines, UTVs and water tenders on initial and extended attack wildfires. The plan is to eventually centralize and domicile this group at the Orogrande Range Complex. Currently, wildfire suppression resources are mostly located at McGregor Range Base Camp.

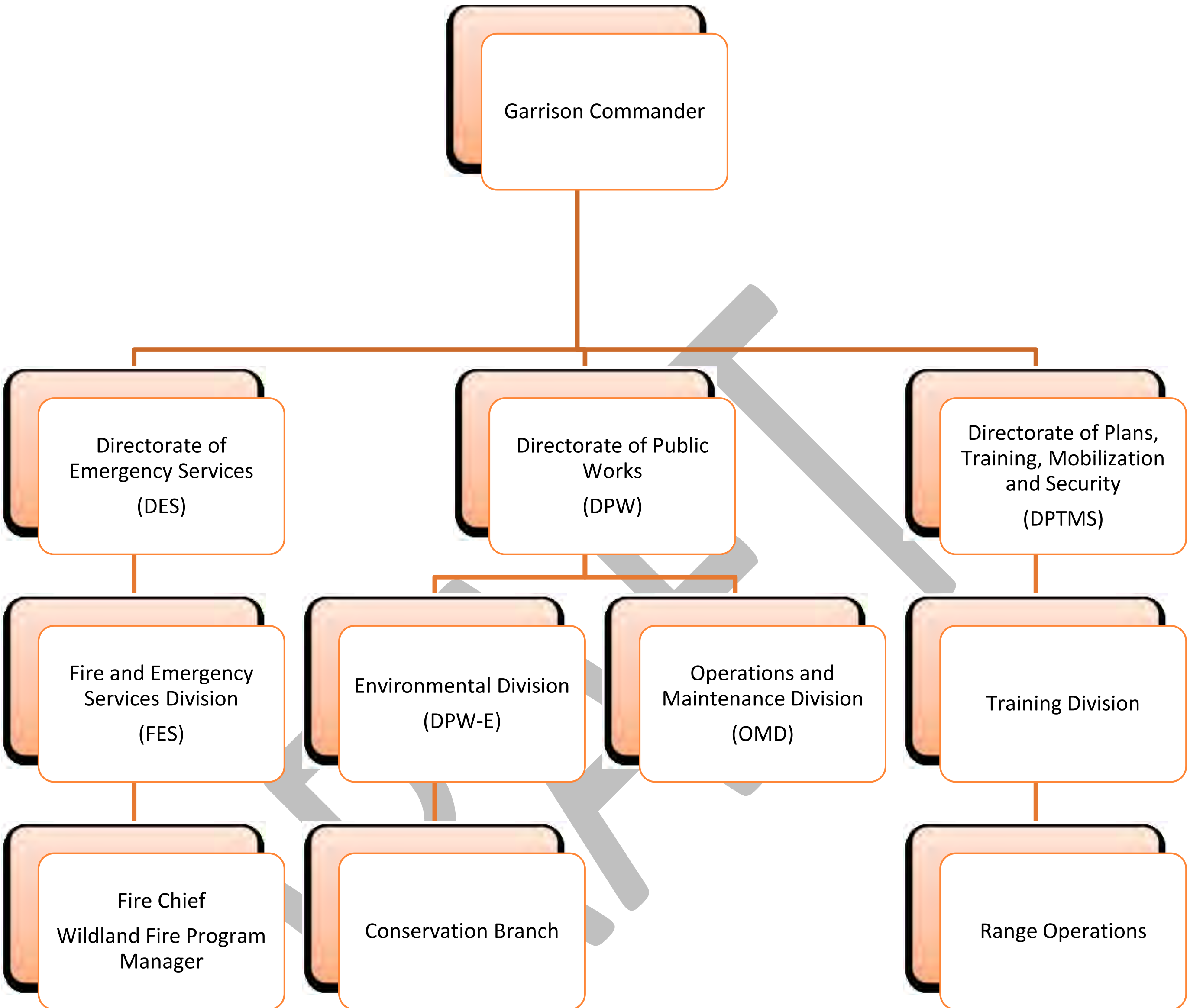
- The Directorate of Public Works-Environmental Division (DPW-E) Conservation Branch is responsible for managing the natural resources of Fort Bliss in such a manner that the military mission is sustained and there is no net loss of training lands or training capabilities (U.S. Army 2011). This responsibility includes the management of wildfire and prescribed fire for sustaining and enhancing training lands natural environments. DPW-E and Fort Bliss FES work together to implement fuels projects including prescribed burns for ecosystem benefits and for fuels reduction. DPW-E designs and proposes projects which help sustain ecosystem components. These projects may include prescribed burning, chemical control of vegetation and/or mechanical treatments of vegetation, such as tree thinning and piling. DPW-E is responsible for ensuring that all prescribed burn projects meet NEPA requirements, that monitoring is completed for burn objectives and for maintaining the database for all wildfires and prescribed fire projects on Fort Bliss.

- DPW-E Conservation Branch creates, maintains and updates this IWFMP. The IWFMP is integrated with the Fort Bliss Integrated Natural Resources Management Plan (INRMP) and the Integrated Cultural Resources Management Plan (ICRMP) which are also created and maintained by DPW-E Conservation Branch.

- DPW Operations and Maintenance Division (O&M) is responsible for the construction and maintenance of access and fire break roads, including bulldozer firebreaks, throughout the FBTC.

- The Directorate of Plans, Training Mobilization and Security (DPTMS), Range Operations Branch is responsible for Training Area (TA) and live-fire Range management and maintenance including Range roads, facilities, infrastructure and targets. The Range Operations Firing Desk and Safety Office ensures that Soldiers are aware of wildfire potential and live-fire restrictions on a daily basis throughout the fire season by tracking, posting and announcing wildfire hazard ratings. Range Operations Firing Desk documents all wildfire occurrences on Ranges, coordinates the need to suspend training for fire suppression and requires military units that are training on Ranges to provide a firefighting detail in the event that their training activity starts a wildfire and requires immediate action (See **Appendix D** for procedures for training unit firefighting details and Fort Bliss Range Regulations for wildfire management).

Table 4.6-1 Fort Bliss Heirarchy for Wildland Fire



4.6.1 Personnel Training and Certification Standards and Recordkeeping

All Fort Bliss FES personnel engaged in wildfire suppression and prescribed fire duties will meet NFPA 1051-*Standard for Wildland Fire Fighter Professional Qualifications* requirements for the positions they are assigned. A Fort Bliss goal is for all firefighters involved in wildfire suppression operations to meet NWCG minimum guidelines. All firefighters on the fireline will be certified, at a minimum, as Firefighter Type II (FFT2) under NWCG guidelines. Requirements for all wildland firefighter positions are established in the NWCG Publications Management System (PMS) 310-1, Wildland Fire Qualifications Guide and in NFPA 1051.

Per NFPA and NWCG requirements, all courses of instruction shall be taught by an NWCG or NFPA certified instructor experienced in the skills being taught. Fort Bliss provides its own instructors for basic level courses

(100/200 level) but will bring in outside qualified personnel to teach more advanced courses as necessary (NFPA 1051).

The WFPM is responsible for selecting potential trainees, scheduling courses, proper use of Position Task Books (PTBs), documenting course completion and certification of trainees. The WFPM develops an annual schedule of course instruction and a training plan. The WFPM coordinates the training plan with FES and outside agencies for cross-leveling and sharing of training opportunities (NFPA 1051).

Individuals will not be assigned to duties for which they lack training and/or certified experience. All personnel dispatched or assigned to wildfires or prescribed fires will be qualified for their assigned position unless assigned as trainees under the direct supervision of higher qualified personnel. Each firefighter is responsible for showing proof of qualifications and completed training. This is usually in the form of an Incident Qualifications Card, commonly known as a 'Red Card'. NWCG utilizes PTBs to document trainee's on-the-job performance. PTBs will be used by Fort Bliss managers and supervisors to keep track of each individual's training experience. It is the responsibility of the trainee to maintain their PTBs and to carry it with them on wildfire assignments (NFPA 1051).

All required training courses will be completed prior to issuance of a PTB. The training courses are required to prepare the employee to perform in the position. The WFPM has sole discretion over which individuals will be provided training courses. Certification of courses and PTBs completed will be documented and tracked by the WFPM. The WFPM is responsible for maintaining all certifications and issuing red cards.

Currency requirements follow NWCG protocols. The maximum time allowed for maintaining currency is three (3) years for air operations and dispatch positions and five (5) years for all others (NWCG PMS 310-1).

Currency for a position can be maintained by meeting any of the following requirements (NFPA 1051):

- By successful performance in the position qualified for within the given timeframe.
- By successful performance in a position identified in PMS 310-1 as Other Position Assignments That Will Maintain Currency.
- By successful performance in a higher position(s) for which that position is a prerequisite, providing the individual was previously qualified in that position.

An annual safety refresher (NWCG course RT-130) is required for most Incident Command System (ICS) positions, including all fireline positions.

All primary and secondary wildland firefighters will be certified, as a minimum requirement, in Cardio-Pulmonary Resuscitation (CPR) and Standard First Aid by the American Red Cross or a comparable certification authority.

It is the responsibility of the WFPM to annually certify the qualifications of all Fort Bliss wildland firefighting personnel. Under certain circumstances Fort Bliss personnel, both FES and non-FES personnel, may be requested to assist in wildland fire operations off-post. The decision to send qualified personnel to incidents off-post is at the discretion of the individual's supervisor, the WFPM and the GC.

4.6.2 Physical Fitness Standards

All Fort Bliss FES firefighters will meet criteria for physical fitness standards for wildland firefighters as contained in NFPA 1500-*Standard on Fire Department Occupational Safety and Health Program* and receive a physical examination as specified in NFPA 1582-*Standard on Medical Requirements for Fire Fighters*. All other personnel assigned to fireline duties on Fort Bliss (not including FES personnel) must pass the NWCG pack test at the arduous level, possess documentation of qualifications for positions assigned and attain a red card. The arduous level of the pack test consists of a requirement for the individual to walk three miles carrying a 45-lb. pack within 45 minutes. The WFPM has sole discretion over fitness requirements for all other duties (e.g. non-fireline duties). NWCG fitness categories are defined in PMS 310-1 as well as the required fitness level for each ICS position. Work capacity tests shall meet requirements in PMS 307/NFES 1109.

4.7 Interagency Cooperation and Mutual Agreements

Wildland firefighters require the cooperation of multiple agencies. In particular, the National Weather Service whose local offices produce daily fire weather forecasts; the US Forest Service which maintains a fleet of aerial firefighting resources including lead planes, aerial supervision platforms, air tankers, smokejumper aircraft and helicopters; the Bureau of Land Management which has available engines and overhead; the Alamogordo Interagency Dispatch Center which is open year-round for aid in ordering crews, overhead, equipment and aircraft. These assets are available to all land management agencies. Interagency Hotshot Crews (IHC) are 20 person, organized, professional wildland firefighting crews that are sponsored by the BLM, USFS, National Park Service and the BIA and are available for use on a national level. IHCs are often utilized in remote backcountry or in rugged terrain that is unsuitable for engines and other mechanized equipment. IHCs are equipped with chain saws and handtools for the purposes of constructing hand-built firelines and putting out wildfires.

Mutual Aid Agreements (MAAs) are signed documents that allow for resources from one agency to aid another agency without being ordered through a dispatch center. The agencies agree to aid each other during initial attack and can cross respective boundaries to render aid without the need for written authorization for every incident. Fort Bliss and the BLM's Las Cruces District Office have a formal, signed Mutual Aid Agreement (Sec. 4.7.2) **(Appendix B).**

4.7.1 Cooperators in Wildland Fire Management

Fort Bliss may cooperate with adjoining fire departments and agencies for the purposes of managing wildland fires near and on the installation. These include but are not limited to:

- Bureau of Land Management-Las Cruces District Office
- Alamogordo Interagency Dispatch Center
- El Paso Municipal Fire Department
- Otero, Doña Ana and El Paso Counties Fire and Emergency Services Departments
- Alamo West Volunteer Fire Department
- Oro Vista Volunteer Fire Department
- Timberon Volunteer Fire Department
- US Forest Service-Lincoln National Forest
- El Paso and Hudspeth County Sheriffs and Fire Marshalls
- Chaparral Volunteer Fire Department

- Las Cruces Fire Department
- Talavera Volunteer Fire Department
- White Sands Missile Range Fire and Emergency Services
- Holloman Air Force Base Fire and Emergency Services
- New Mexico State Forestry-Capitan District Office

4.7.2 Mutual Aid Agreements-Existing

Lands within McGregor Range are administered under Public Law 106-65 (Military Lands Withdrawal Act of 1999) and are co-managed by the Army and the BLM (DOI 2007). For the purposes of fire management, the BLM has responsibility for managing and suppressing natural or lightning-caused fires on withdrawn lands (DOI, 2007). The Army has responsibility for suppressing military-caused fires. Both agencies respond to wildfire incidents on the FBTC when needed or called upon and work together under a signed mutual-aid agreement for wildfire suppression (BLM and Fort Bliss, 2009). The text version of the **Mutual Aid Agreement between Fort Bliss and Las Cruces District-BLM** is located in **Appendix B**.

4.7.3 Mutual Aid Agreements-Future

Future needs for additional mutual aid agreements exist. Fort Bliss will pursue a mutual aid agreement for fire suppression with the US Forest Service-Lincoln National Forest for lands on both sides of their common boundary and for lands surrounding the village of Timberon. Both agencies will benefit from the agreement, particularly in the areas of increased communications, mutual accessibility of roads, increased public security, increased awareness of firefighting capacities and also, in the sharing of firefighting resources. This agreement with the Lincoln National Forest must include guidance for accessing and communicating with the Alamogordo Interagency Dispatch Center (ADC). ADC controls movement of wildland firefighting resources and aircraft within southeastern and south central New Mexico and west Texas. This will aid Fort Bliss when wildfires threaten the installation's resources or boundaries by being able to promptly obtain firefighting resources, including air tankers, lead planes, aerial supervision modules (ASMs), engines, crews and helicopters.

The New Mexico State Forestry Division (NMSF) of the New Mexico Energy, Minerals and Natural Resources Department has the responsibility for wildfire protection and suppression on private and state lands within New Mexico. There are several thousand burnable acres in New Mexico adjoining Fort Bliss that are private and state lands, particularly in the vicinity of Timberon, NM, where many of the adjoining acres have houses or other improvements on them.

NMSF is the host agency for the New Mexico Wildland Fire Management Joint Powers Master Agreement (JPA). This agreement's purpose is to share the responsibility for initial attack on all wildfires in New Mexico with the federal land management agencies, regardless of land ownership (JPA, 2008). The JPA embraces the closest forces concept which means that the nearest firefighting resources, regardless of ownership or agency, respond and initiate wildfire suppression. Generally, the land owner agency will also respond and will take command once they arrive on scene.

Fort Bliss will seek to become a signatory of the JPA. This could benefit Fort Bliss particularly on Fort Bliss lands near the village of Timberon and on Fort Bliss lands on the west side of the Organ Mountains adjacent to homes in the Talavera subdivision. These areas are located far from Fort Bliss FES fire stations. Response times for Fort Bliss FES resources to these areas can be hours. The closest firefighting resources in these areas are nearby

Volunteer Fire Departments who are participants within the JPA. These local resources can provide a quick response to wildfires located on Fort Bliss near their areas of responsibility (AOR).

4.8 Fort Bliss Prescribed Fire Management

Prescribed fire is the controlled application of fire to wildland fuels under specified conditions that limits the fire spread to a predetermined area and at the same time produces the desired intensity necessary to achieve resource management objectives. On Fort Bliss, there are two recognized types of prescribed burns. The first falls under the guidance of the Sustainable Range Program Activities for Environmental Programs and is for the purpose of ecosystem management, and for the protection or benefit of listed or proposed threatened or endangered species. The second type of prescribed burn falls under the guidance of the Sustainable Range Program Activities for Facilities and is for the purpose of protecting people, property, equipment or mission capability (SRP 2005).

All Fort Bliss prescribed fires are ignited and conducted only if environmental conditions are within the parameters of an authorized prescribed fire plan. Fire plan prescriptions can be used to establish connections between ecosystem management objectives, military objectives and fire fighting objectives. This process helps to achieve mutual goals and objectives and improves program efficiency.

Fort Bliss has completed prescribed fire (RX) projects including the Timberon RX and the Hay Meadow RX (See Table 4.8-1). These burns were completed for meeting ecosystem management objectives. Burn plans for these projects are located within the DPW-E Conservation Branch and Fort Bliss FES offices and are available digitally. A burn plan for burning within Soledad and Boulder Canyons has been completed by BLM's Las Cruces District Office and is called the Soledad Canyon RX. Future prescribed fire projects for meeting ecosystem management goals and objectives, including more burning in the aforementioned RX areas, are planned for Martin Canyon, along Hay Meadow Canyon Road between Ranges 83 and 88, Castner Draw, El Paso Canyon and Owl Canyon (Table 4.8-1). http://www.nwcg.gov/pms/RxFire/rxfireguide.pdf provides interagency prescribed fire plan guidance within the *Prescribed Fire Planning and Implementation Procedures Guide* (USDA and USDI 2008).

4.8.1 Prescribed Fire Objectives

1. Support Fort Bliss' military training mission and ecosystem management goals through a prescribed fire program that uses strategically-placed firebreaks to burn from and that consumes combustible fuels within designated boundaries. This system of strategically placed firebreaks backed up by prescribed burns, once completed, can effectively stop wildfires from crossing boundaries because fuels are no longer available for wildfire consumption. This allows for military training to continue uninterrupted as long as wildfires are not threatening Fort Bliss infrastructure and are burning within designated Fire Management Unit (FMU) boundaries.
2. Support ecosystem management goals of maintaining Otero Mesa grassland habitats. Prescribed burns are necessary for the protection and enhancement of mesa grasslands and numerous grassland bird species, including the aplomado falcon, which is federally listed as endangered and the Sprague's pipit which is a candidate species for federal listing. Re-establish natural fire-adapted ecosystems by introducing prescribed fire for the purposes of sustaining or enhancing vegetative biodiversity and rehabilitating and enhancing wildlife habitat. See **Appendix G** for species specific guidelines for prescribed burning.

3. Assist in the control of invasive plant species and pre-empt erosion problems associated with intense wildfires.
4. Enhance forest health dynamics by prescribed burning within piñon-juniper woodland ecosystems to diversify age structure and reduce stand densities to a more open juniper savanna type and create mosaic patterns of burned and unburned patches that are important to both wildlife and vegetative diversity.
5. Establish a professional wildland firefighting group within Fort Bliss FES that can manage Fort Bliss prescribed fires as part of their duties. The use of outside resources to implement prescribed burns is costly and creates logistical problems when needing to feed, transport and house extra firefighters. The use of trained Fort Bliss FES personnel will open windows of opportunity to implement prescribed burns because FES personnel will be available when Training Areas and Ranges are available and also when prescribed burning weather and fuel moisture conditions are favorable and within burn plan prescriptions.

4.8.2 Prescribed Fire Constraints

The following are factors to consider that may limit, require additional mitigations, or delay the use of prescribed fire on Fort Bliss.

1. Military training is the priority for Fort Bliss over all other projects. Burning within the required weather and fuel conditions dictated by the burn plan prescription while working around training missions is a challenge. Flexibility is important for burn managers and firefighters as weather and training missions will change frequently and suddenly. Small prescribed fire projects with simple logistical needs that can be executed in a single burning period are more likely to be completed than large complex multiple-day burns.
2. Long-term drought conditions put additional stress on plants to the point that prescribed fire treatments may cause undesired mortality within vegetative communities. This is particularly true in grassland ecosystems where moisture must be sufficient either pre or post-prescribed fire to enable desirable grasses to recover. Burn managers use long-term weather forecasts and should not burn when there are long-term drought indications.
3. Fort Bliss complies with all EPA regulations and adheres to the states of New Mexico and Texas Air Quality Bureaus' (AQB) requirements for air pollution and smoke generation. All prescribed burns planned on Fort Bliss must be registered with either the New Mexico or Texas AQB. AQBs rely on smoke ventilation forecasts from the local offices of the National Weather Service (NWS) and upon the smoke mitigation techniques that are written into prescribed fire plans to base decisions on whether or not permitted burns will be allowed to occur (NM Environment Department, 2013). Fort Bliss must request a waiver from the New Mexico or Texas AQB if attempting to burn during NWS forecasts for poor or fair smoke ventilation conditions. Waiver requests are more likely to be granted when Fort Bliss prescribed burns are located far from human populations and when smoke mitigation techniques are included within the prescribed fire plan. Most days in the wintertime on Fort Bliss have NWS ventilation forecasts calling for poor or fair smoke ventilation.
4. Prescribed fire projects require months of preparation, coordination and planning prior to implementation. All prescribed fire projects require a detailed written plan. Fort Bliss prescribed fire plans must meet compliance with NEPA, the National Historical Preservation Act (NHPA) and

the Endangered Species Act (ESA) (USDA and USDI 2008). Fort Bliss DPW-E resource professionals have the expertise in archaeology, wildlife biology and NEPA requirements to help ensure that the prescribed fire plan meets mandated environmental regulations.

5. After the written prescribed fire plan is approved and signed, notification of the planned event must be made to inform and coordinate with adjacent landowners, agencies and cooperators. Additional or contingency resources (usually wildland fire engines) must be contacted and be available to respond on the planned burn day in the event that the prescribed fire escapes the allowable burn perimeter and additional resources are needed to bring the burn under control.
6. In order to implement and lead Fort Bliss prescribed fire projects, a Prescribed Fire Burn Boss is required. Burn Bosses must meet NWCG/NFPA requirements for the position. It generally takes 3-5 years of prescribed fire experience and additional prescribed fire training for an individual to obtain the necessary abilities, skills and knowledge to qualify as a Prescribed Fire Burn Boss at the Type 3 level.

Table 4.8-1 Fort Bliss Prescribed Fire Projects

Prescribed Burn (RX) Projects	Frequency	Size (Acres)	Comments
Timberon RX	5-10 Yrs	1000	This is a multi-year project, jointly funded by BLM and Fort Bliss that has included thinning and prescribed burning. Three engines, 1 water tender, 2 UTVs, 12-20 personnel needed for burn projects; 1-3 days to implement.
Centennial RX	Annually	420	This is an annual prescribed burn, funded by the US Air Force and implemented by BLM to reduce hazard fuels around the perimeter of the Centennial Range. Two engines, 1 water tender, 2 UTVs, 12-15 personnel needed; single day burn.
Hay Meadow RX	As Needed	150	Three engines, 1 water tender, 3 UTVs, 15-20 personnel needed; two day burn.
Soledad Canyon RX	5-10 Yrs	2500	Four engines, 1 water tender, 4 UTVs, 20-30 personnel needed to burn along roads, firebreaks and handlines; multi-day project(3-6 days to implement fully).
Martin Canyon	As Needed	250	Two engines, I water tender, 2 UTVs, 12-15 personnel needed; one day burn.
Castner Draw	As Needed	200	Two engines, 1 water tender, 2 UTVs, 12-15 personnel needed; one day burn.
Crest Garden	5-15 Yrs	800	This is a multi-year project, jointly funded by BLM and Fort Bliss that includes thinning and prescribed burning. Three engines, 1 water tender, 2 UTVs, 12-20 personnel needed for burn projects; 1-3 days to implement.
Owl Canyon	As Needed	200	Two engines, 1 water tender, 2 UTVs, 12-15 personnel needed; one day burn.

Route Green (Hay Meadow Canyon Rd)	As Needed	150	Two engines, 1 water tender, 2 UTVs, 12-15 personnel needed; one day burn.
Hackberry Tank	As Needed	200	Two engines, 1 water tender, 2 UTVs, 12-15 personnel needed; one day burn.
Sacramento Foothills Mule Deer Habitat Enhancement (East Culp Canyon RX)	10-15 Yrs	1500	This is a multi-year project of prescribed burning in strategic locations to reduce decadent shrubs and increase browse. Two engines, 2 UTVs, 10-20 personnel are needed for 3 days over 3-5 years to fully implement.
Organ Mountains Mule Deer habitat Enhancement	10-15 Yrs	1500	This is a multi-year project of prescribed burning in strategic locations to reduce decadent shrubs and increase browse. Two engines, 2 UTVs, 10-20 personnel are needed for 3 days over 3-5 years to fully implement.
Totals		8870	

4.8.3 Prescribed Fire Plans

The Prescribed Fire Plan is the site-specific implementation document. It is a legal document that provides the WFPM or the agency administrator the information needed to approve the plan and the Prescribed Fire Burn Boss with all the information needed to implement the prescribed fire. Prescribed fire plans describe the project area, burn objectives, fuel loads and vegetative conditions, desired outcomes and the conditions (prescription) necessary to achieve the desired results. The level of detail in a burn plan is commensurate with the project complexity (USDA and USDI 2008).

An interagency template for prescribed fire plans will be used and has been used for prescribed fire plans implemented on Fort Bliss. See http://www.nwcg.gov/pms/RxFire/rxfireguide.pdf for the *Prescribed Fire Planning and Implementation Procedures Guide* (USDA and USDI 2008) and for the fill-able format Interagency Prescribed Fire Plan template. Each element must be addressed and then assembled in the sequence identified in the template. Should an element not apply to a specific prescribed fire plan, not applicable (N/A) may be utilized. Programmatic plans for multiple burns under like conditions may be appropriate. Additional information may be added as appendices. Use of the Prescribed Fire Plan template assures that Fort Bliss' burn plans will meet all the criteria required for other agencies personnel to be used in implementation of prescribed burn projects, including the use of other agencies' burn bosses.

4.8.4 Notifications and Coordination

Fort Bliss prescribed fire proponents will coordinate with the WFPM (Ft. Bliss Fire Chief in this case) for project management and implementation. The WFPM will work with the proponent and DPW-E Conservation Branch to complete a prescribed fire plan for the proposed project. The WFPM will notify and inform the GC of the proposed prescribed fire project. If the proposed project is near the boundaries of Fort Bliss, adjoining fire departments, landowners and land management agencies should be notified for their input into the prescribed fire plan. Neighboring fire departments should be requested to help with the implementation of the project. This fosters good working relationships and helps to train them in wildland fire operations.

Coordination with Range Operations and Range Scheduling must occur. With plenty of advance notification, Range Operations/Scheduling will be able to block time for implementing the prescribed burn project.

Land management agencies such as the USFS and the BLM will often provide technical assistance and can also provide engines and overhead to help manage the burn. At the very least, outside agency engines can usually be listed as contingency resources to be called in the event the prescribed fire escapes its allowable burn perimeter.

The Fort Bliss PAO must be notified once a prescribed fire is scheduled. They, in turn, will provide pre-burn, burn day and post-burn information to installation command, the local media and other external interested parties (See Section 4.5.11 Public Relations for PAO contact information).

4.8.5 Smoke Management and Air Quality

Federal regulations specified by Section 118 of the Clean Air Act of 1997 as amended, require that all prescribed fire projects must comply with all applicable pollution control requirements. In New Mexico, the Clean Air Act is administered by the New Mexico Environment Department's (NMED) Air Quality Bureau (AQB) (http://www.nmenv.state.nm.us/aqb). NM AQB requires prescribed fires to be conducted under specific conditions and to be registered with the state of New Mexico. In Texas, the Clean Air Act is administered by the Texas Commission on Environmental Quality (TCEQ) (http://www.tceq.texas.gov/publications). TCEQ requires notification and grants permission to Fort Bliss to burn from the regional TCEQ office located at: 401 E Franklin Ave, Ste 560, El Paso, TX 79901-1212. Phone 915 834-4949.

Prescribed fire managers within the FBTC will consider wind direction and not allow ignitions if smoke could impact populated areas. Generally, on Fort Bliss, prevailing wind direction is from the southwest to northeast which allows for smoke generation from most prescribed fires to be transported away from populated areas of El Paso, the Rio Grande corridor and the cantonment area of Fort Bliss. In order to assure that winds will be favorable for burning, prescribed fire Burn Bosses will request a spot weather forecast prior to ignitions. The National Weather Service Office in Santa Teresa, NM (575 589-3972) accepts online requests for spot weather forecasts and will provide, in about an hour's time, a site specific forecast covering the next 24 hours (http://gacc.nifc.gov/swcc/predictive/weather/weather.htm).

Outside of the Cantonment area, FBTC has few limitations on the use of prescribed fire due to its remote nature. Still, Fort Bliss fire managers must consider and mitigate smoke impacts when burning in the vicinity of the following areas:

3. Communities, due to their proximities to Fort Bliss boundaries. This includes the unincorporated communities of Timberon, Orogrande, Chaparral, and the main post at WSMR. Several subdivisions are located adjacent to Fort Bliss boundaries in the southeast portions of the FBTC, west and south of the Hueco Mountains, along the western boundary south of Bishop's Cap and at the base of the Organ Mountains in the vicinity of Achenbach Canyon and Bar Canyon.
4. The main travel corridors through Fort Bliss, primarily US 54, NM 506 and War Road where travelers could be affected by smoke.
5. Fort Bliss military facilities, Base Camps and training complexes in the Tularosa Basin.
6. Scattered ranches and residences near the installations' boundaries.

Prescribed fire burn bosses will utilize numerous mitigation techniques to reduce emissions and impacts of smoke to humans from prescribed fires. These mitigation techniques include:

- When burning near smoke receptor sites of communities, highways, facilities or residences use weather forecasts to predict wind direction and only burn when winds are favorable to carry smoke away from populated areas.
- Check the burn area for combustible human trash and refuse. Remove, when possible, to minimize toxic emissions.
- Be aware of conditions capable of creating higher levels of emissions such as high fuel moistures, high ground-level wind speeds, temperature inversions, and stable atmospheric conditions.
- Rotate burn crews in and out of high smoke exposure situations.
- Keep crews upwind of fire and smoke whenever possible.
- Limit burns during inversions and stable atmospheric conditions to a few hours during the middle of the day.
- Utilize spot weather forecasts on the day of the burn and update forecasts throughout the burn.
- Utilize backing fires to lessen the impacts of smoke.
- Monitor dispersal of smoke throughout the burn.
- If smoke becomes problematic, initiate termination of the burn.
- Utilize Fort Bliss PAO to contact local and regional agencies, newspapers, radio stations, etc., before the burn. This gives those individuals with respiratory ailments the opportunity to leave the vicinity before the burn begins.
- If the burn is near major roads or facilities, initiate mop-up as soon as possible to lessen the impacts of smoke on visibility and human health.
- Keep records on smoke direction, thickness, and dispersion during and after the burn until all smoke has dissipated.
- Minimize nighttime burning.
- Conduct awareness training for firefighters and soldiers on the dangers of smoke exposure.

4.8.6 Use of Fire Breaks

Fire breaks and fuel breaks are the best places to ignite prescribed burns because they facilitate egress along an escape route to a safety zone and they facilitate wildland fire engines ability to move up and down the fire's edge and keep the burn under control. Fire breaks are man-made or natural barriers to wildfire spread. Fort Bliss has a system of roads, some of which are designated as fire break roads (Figure 4.1-5). There are five bulldozer fuel breaks that are not considered roads. Driving on them should be discouraged, except during a wildfire incident or a prescribed fire project, as driving destroys water bars. Water bars are built at angles across bulldozer lines to channel water off of the bulldozer line to help minimize soil erosion.

4.8.7 Contingencies for Escapes

The Prescribed Fire Burn Boss has authority and responsibility to declare when a prescribed fire escapes its allowable burn perimeter and becomes a wildfire. Minor slopovers and small spot fires will not generate a declaration of a wildfire if contained quickly. However, if any slopovers or spots occur, all ignitions will be halted and all resources necessary to bring the slopover or spot fire under control will be utilized. Prescribed burning can resume, with added caution, once the slopover or spot fire is declared controlled by the Burn Boss.

A critical part of the planning process for utilizing prescribed fire is to have contingency resources identified and available in the event that the prescribed fire escapes pre-planned boundaries. Contingency resources needed to bring the escaped burn under control must be aware of their pre-planned role. These resources do not need to be on scene but they must be committed to being available to respond. Land management agencies with wildland fire responsibilities are usually willing to provide contingency wildland engine resources. The Lincoln National Forest, Las Cruces District-BLM, Carlsbad Field Office-BLM and Mescalero BIA are good sources for contingency resources. Two to three engines are sufficient contingency resources for Fort Bliss prescribed fires. These resources must be within the regional geographic area and be listed in the burn plan.

Burn managers can contact the local interagency dispatch center in Alamogordo, NM to enlist their aid in locating contingency resources and also to find out what types and numbers of ground and aerial assets are available in the region during the time of the planned burn, just in case they are needed.

4.8.8 Prescribed Fire Monitoring

Prescribed fire monitoring is the collection and analysis of observations or measurements to evaluate changes in vegetation and to help determine whether management objectives are being met. During the prescribed fire, monitoring is required to assure the project stays within prescription. Assigned personnel monitor weather, fire behavior, and smoke dispersal during all phases of the project. Observed weather indices are also recorded and broadcast to prescribed fire personnel throughout the duration of the burn project.

Post-fire monitoring methods range from the utilization of advanced technology (GIS, GPS, and remote sensing) to standard field monitoring methods such as transects, quadrats, and photo points. Monitoring and documenting post-burn results and fire effects helps to determine if the prescribed fire objectives were met. Long-term monitoring (post burn to 5 years) for vegetation response after prescribed fires helps to determine if habitats are degrading or progressing towards a desired management objective.

4.8.9 Scheduling

Fall and winter are ideal times to schedule prescribed burns. Fuels are dormant and cured after the first heavy freeze and will help to carry the burn. Winds are usually lighter in the fall and winter when compared to springtime and prolonged moisture events are rare. Firefighting resources are not usually committed to wildfires at this time of year and should be available for assisting or listing as contingency resources.

Prescribed fire projects are scheduled for implementation through Range Operations (Phone # 915 569-5103) several weeks before the burn is planned. Planned projects are also input through the Range Facilities Management Support System (RFMSS) which is an automated tool for managing the use of firing ranges and Training Areas. The best opportunities for scheduling prescribed fire projects and receiving authorization is on weekends, as there will be fewer conflicts with military missions. If possible, plan to schedule 5-7 days to implement the burn. This will allow for weather events that may take the prescribed fire out of prescription for a day or two.

4.8.10 Post Prescribed Fire Reporting Requirements

Every prescribed fire project that is accomplished on Fort Bliss requires a post-burn narrative or report. The narrative is a concise record of what was accomplished; what was not accomplished that had been planned for; and a summary of the after-action review of what went right and what could have been done better from the firefighters point of view. Along with the narrative there will be a list that includes the following quantifiable information:

- Planned perimeter of prescribed burn in acres (taken from the burn plan)
- Actual perimeter of the prescribed burn in acres (computed from a GPS that recorded points around the actual burned perimeter)
- percentage of planned burn that actually burned
- burn severity estimate that includes a combination or percentage of the classes given below:

  (a) Unburned.

  (b) Scorched. Foliage is yellow; litter and surface vegetation are barely burned or singed.

  (c) Low severity. Small diameter woody debris is consumed; some small twigs may remain. Leaf litter may be charred or consumed, and the surface of the duff may be charred. Original forms of surface materials, such as needle litter or lichens may be visible; essentially no soil heating occurs.

  (d) Moderate severity. Foliage, twigs, and the litter layer are consumed. The duff layer, rotten wood, and larger diameter woody debris is partially consumed; logs may be deeply charred; shallow ash layer and burned roots and rhizomes are present. Some heating of mineral soil may occur if the soil organic layer was thin.

  (e) High severity. Deep ash layer is present; all or most organic matter is removed; essentially all plant parts in the duff layer are consumed. Soil heating may be significant where large diameter fuels or duff layers were consumed. The top layer of mineral soil may be changed in color; the layer below may be blackened from charring of organic matter in the soil.

4.9 Wildland Fire Safety and Risk Analysis

Appendix A Fire Management Units (FMU) contains specific safety considerations for each of the 52 FMUs on Fort Bliss and these should be incorporated into risk analyses when wildfires occur.

The risk analysis process incorporates a commitment that public and firefighter safety is the highest priority and takes precedence over property and resource loss on every wildland fire. With that commitment firmly in place, sound risk management is the foundation for all fire management activities. ***Risk management*** is defined as the process whereby management decisions are made and actions taken concerning the control of hazards and acceptance of remaining risk. The risks involved with any fire activity must be identified, assessed, and mitigated (or eliminated) when possible and practicable. The remaining risk must be considered acceptable to everyone involved and be weighed against the potential benefit during the management decision of continuing or discontinuing the activity.

Fort Bliss will use this five-step risk analysis and mitigation process:
Step 1 – Establish situation awareness.
Step 2 – Identify hazards and benefits and assess the risk.
Step 3 – Control, mitigate, or eliminate hazards.
Step 4 – Make go/no-go decision based on acceptability of remaining risk.
Step 5 – Evaluate effectiveness of hazard controls and continuously reevaluate.

Practice risk management to minimize firefighters' exposure to inherent hazards in fire operations while still accomplishing management objectives. The following list includes hazards commonly faced by wildland firefighters on Fort Bliss:

- smoke inhalation
- burns from flames
- burns from skin contact with smoldering vegetation
- sharp cutting hand tools
- chainsaws
- mobile apparatus
- heavy equipment
- aircraft
- uneven footing on steep slopes
- loose, rolling rocks
- vegetation that has thorns or spines
- fire-weakened roots of trees that may fall at any time
- poisonous insects and reptiles
- daytime/nighttime air temperature extremes
- dusty conditions
- night operations with limited visibility
- long working shifts leading to physical and mental fatigue
- low humidity and hot temperatures leading to dehydration
- Unexploded ordnance (UXO)
- toxic waste and hazardous materials on fire
- structures surrounded by wildlands

Wildland fire safety is a process and a culture that must be promoted and communicated at every operational level. All wildland firefighters carry a "red card" which certifies that they have received basic wildland fire safety and operational training. Wildland firefighters receive training that teaches them to use a common set of guidelines to help communicate important safety-related information. The first set of guidelines that every wildland firefighter must know and understand is called **LCES**. Along with **LCES**, the "**Ten Standard Fire Orders**" and the "**18 Watch Out Situations**" are common practices and safety considerations for all red-carded wildland firefighters. See **Appendix C** or go to http://www.nifc.gov/safety/safety_10ord_18sit.html for further information on these important guidelines. Special safety considerations for the wildland/urban interface are detailed in **Appendix J.**

4.9.1 Unexploded Ordnance Safety

Unexploded ordnance (UXO) has the potential to be encountered anywhere on Fort Bliss. Firefighters will treat all UXO as if it were explosive. UXO poses a potential risk of injury or death to anyone in the vicinity (DoD 2004). Firefighters do not fight wildfires within impact areas and must be at least 725 meters away from the boundaries of impact areas that may contain 155mm shells or larger before engaging in wildfire operations.
See **Appendix F:** 3Rs for Explosives Safety for Firefighting Safety (Recognize, Retreat, and Report) or go to http://www.denix.osd.mil/uxo/SafetyTopics/Firefighting.cfm.

Situation Awareness

- Early identification of potential UXO is the first and most important step in reducing risks posed by UXO.
- Many types of UXO may be encountered: Small arms munitions; projectiles; grenades; rockets; mortars; guided missiles; bombs; sub-munitions.
- UXO may be found fully intact or in fragments. All UXO, whether intact or in fragments, presents a potential hazard and should be treated as such.
- Deteriorated UXO presents a particular hazard because it may contain chemical agents that could become exposed.

Hazard Control

- If you see UXO, stop and do not move closer.
- Isolate and clearly mark the area, take a GPS point and take a photograph.
- Deny entry to others.
- Never transmit radio frequencies near UXO.
- Never remove anything near UXO.
- Never touch, move, or disturb UXO.
- Keep a minimum of 725 meters away from areas on fire that may contain suspected UXO of 155mm or larger shells.
- Report discovery of UXO to Range Operations and to your immediate supervisor.

4.10 Funding Requirements

Funding is needed in order to meet the requirements that are set forth in the Fort Bliss IWFMP to reduce severity, intensity and numbers of wildfires, to implement a wildfire prevention program, and to implement a prescribed burn program for reducing wildland fuels and for enhancing wildlife habitat and ecosystem functions.

Funding for IWFMP implementation, wildland fire prevention, fuels management for hazard reduction, wildland fire suppression/response, prescribed burning, and other wildland fire management is an installation responsibility. The appropriate MDEP: QDPW (Fire and Emergency), should reflect requirements to address this policy guidance for proper planning and programming (US Army 2009).

Wildland fire management activities conducted for the purpose of ecosystem management and compliance with environmental laws and regulations will be supported by environmental conservation funds. Environmental Quality (EQ) program funding (MDEP VENQ) includes recurring activities associated with the use of prescribed burning for (a) conserving a species under the Endangered Species Act (ESA) when required by a biological opinion or Endangered Species Management Component (ESMC) when part of an approved INRMP and (b) invasive species control as required for ecosystem management. Wildland fire management for ecosystem management includes the use of fire under prescribed conditions and management of wildfires under prescribed conditions. Wildland fire management initiatives for conserving a species under the ESA should be identified under MDEP VENQ with AMSCO 131*53.34. When required for ecosystem management, activities should be reported under MDEP VENQ with AMSCO 131*53.24 (US Army 2009). For future reference, consult most recent Army Environmental Funding Guidance.

1. Fort Bliss has need for funding in order to train FES personnel to NFPA and NWCG standards for wildland firefighters and also to obtain qualifications for individuals at the Crew Boss and Incident Commander Type 4 levels.

2. DPW O&M and/or Range Operations funding is needed to purchase two Bush Hog 3810 15’ Rotary Mowers or other similar mowers and a 60-110 hp tractor to maintain Fort Bliss roadway shoulders across the FBTC to help prevent the spread of wildfires.

3. DPW-Environment Division has need for funding to implement prescribed burns in the Organ and Sacramento Mountains to enhance big game habitat and improve ecosystem health.

4. DPW-Environment Division has need for funding to implement prescribed burns to protect grassland habitats for federal candidate or listed bird species and improve ecosystem health in Hay Meadow Canyon, Martin Canyon, Owl Tank Canyon and Castner Draw.

5. DPW-E has need for funding to send one or two employees to a Resource Advisor Training course administered through the NWCG. This training will enable employees that are already knowledgeable in natural and cultural resources protection to safely accompany firefighting resources and help them avoid damage to Fort Bliss’ important natural and cultural resources. See http://www.nwcg.gov/pms/pubs/RAguide_2004.pdf for the manager’s guide for this position.

Funds are already programmed for the following activities and this funding should continue for the implementation of this plan.

- Wildland fire preparedness funding used for training and certifying FES personnel and for procuring wildland fire equipment necessary for responses to wildland fire incidents is a Fort Bliss DES/FES responsibility.
- Funding for prescribed fire activities related to the benefit, sustainment or restoration of ecosystem components is a DPW-Environment Division, Conservation Branch responsibility (SRP, 2005).
- Funding for prescribed fire activities related to fuels reduction and wildfire prevention is a DPW O&M responsibility (SRP, 2005).
- Funding for fire break roads maintenance throughout the majority of the FBTC is a DPW O&M responsibility.
- Funding for fuel break construction and maintenance within live-fire Ranges is a DPTMS Range Operations responsibility.
- DPW-O&M is responsible for wildland fire control and prescribed fires needed to reduce hazardous fuel loads (DA 2006).

All operational costs incurred to fight wildfires occurring as results of military activities, unknown causes, or on unimproved grounds will be charged to the O&M appropriated Army Management Structure (AMS) codes, the military unit causing the fire, or a combination of both (DA 1995).

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6 Glossary of Terms

Air Quality A term to describe the relative concentration of airborne particles and gases which may affect the health and well-being of organisms.

Airshed A geographical area where local topography and meteorology limit the dispersion of pollutants away from the area. Also, a geographical boundary for air quality standards.

Anchor point An advantageous location, usually a barrier to fire spread, from which to start constructing a fireline.

Backfire (or backburn) A fire set along the inner edge of a fire control line to stop a spreading wildfire by reducing available fuel or a prescribed fire set to burn against the wind, resulting in a slow burn.

Best Management Practices Environmental resource management practices designed to prevent or reduce undesirable side-effects of management actions.

Blackline Purposely burning fuels, normally adjacent to a control line before igniting the main prescribed fire - blackline denotes a condition or area in which there is no unburned fine fuel.

Burn Boss The person responsible for managing a prescribed fire from ignition through mop-up.

Canopy The overhead branches and leaves in a forest, shrub or brush land.

Conservation The protection, improvement, and wise use of natural resources to provide the greatest social and economic value for the present and future.

Containment (fire) A fire management strategy used to keep a wildfire within a particular area.

Control (a fire) Extinguish a fire by completing control lines, burning out unburned areas, and monitoring hotspots until fire threat under prevailing conditions has been eliminated.

Control Line An inclusive term for all constructed or natural fire barriers; a treated (fire) edge used to control a prescribed fire or wildfire.

Cover type A natural group or association of different species of plants, which commonly occur together over a large area (e.g.,piñon-juniper, grasslands, or mixed).

Crown fire A fire that advances from top to top of trees or shrubs, more or less independently of the surface fire.

Cultural Resources Historic properties as defined in the National Historic Preservation Act (NHPA); cultural items as defined in the Native American Graves Protection and Repatriation Act (NAGPRA); archeological resources as defined in the Archeological Resources Protection Act (ARPA); and sacred sites as defined in Executive Order (EO) 13007 to which access is provided under the American Indian Religious Freedom Act (AIRFA).

Defensible space Creating a fire safe landscape for at least 30 feet around structures (and out to 100 feet or more in some areas), to reduce the chance of a wildfire spreading and burning through the structures. This is the basis for creating a “defensible space” - an area that will help protect the structure and provide a safety zone for the firefighters who are battling the flames.

Density The quantity of trees, shrubs or grasses basal area, volume, or some other measure, per unit of area. Some common measures are basal area per acre, tons per acre or stems per acre at a given age.

Direct attack A method of fire suppression in which suppression activity takes place on or near the fire perimeter.

Dozer Line A control line that is mechanically cleared to mineral soil and used to contain wildfires or prescribed burns.

Drip Torch A firing device consisting of a fuel tank and wick designed to allow flaming fuel droplets to ignite vegetative fuel for use in a prescribed fire or back-burn.

Duff Tree, shrub and understory plant needles and leaves that constitute ground surface floor litter and detritus. Duff includes all soil organic horizons from fresh leaf litter to very decomposed organic matter on top of mineral soil.

Ecosystem A spatially explicit, relatively homogenous unit that includes all interacting organisms and components of the abiotic environment within its boundaries.

Ecosystem Management An ecological approach to vegetation management; it attempts to maintain the complex processes, pathways, and interdependencies of ecosystems and keep them functioning in a sound state over long periods of time in order to provide resilience to short-term stress and adaptation to long-term change.

Ecosystem Sustainability The ability to maintain diversity, productivity, resilience to stress, health, renewability, and/or yield of desired values, resource uses, products, or services from an ecosystem, while maintaining the integrity of the ecosystem over time.

Endangered Species Plant or animal species vulnerable to extinction throughout all or a significant portion of its range within the foreseeable future; identified in the federal register in accordance with the Endangered Species Act of 1976.

Erosion The decomposition of land surface by rain, running water, wind, ice, gravity, or other natural or anthropogenic agents, e.g., road construction.

Fire Behavior The manner in which a fire reacts to the variables of fuel, weather, and topography as in the shape, direction, and intensity of a fire.

Fire Danger Rating A rating system based on fuel moisture, relative humidity, wind, and temperature that provides guidelines to the military on training and the allowable use of pyrotechnics.

Fire Frequency The number of times that a fire occurs naturally within an ecosystem or the prescribed burning rotation applied to an area.

Fire Hazard The ease of ignition and resistance to control of the fuel complex, determined by the volume, type, condition, arrangement, and location of fuels.

Fire Prevention Activities directed at reducing the number of fires that start, including public and military education and reduction in fuel hazards, i.e., prescribed burning.

Fire Season The period(s) of the year during which wildfires are likely to occur, spread, and cause sufficient damage to warrant organized fire control.

Firebreaks Constructed roads designed to impede or stop wildfires by creating a discontinuity in potential fuels. The term can also apply to natural fire barriers such as rockslides or areas devoid of vegetation.

Fireline The part of a wildfire control line that is scraped to mineral soil.

Firing Technique Any of the multiple ignition patterns that may be used in a prescribed burn to attain desired fire characteristics for the purpose of accomplishing a specific resource management objective.

Forage Vegetation dominated by non-woody plants that provide food to grazing animals.

Forest Health The perceived condition of a forest derived from such factors as its age, structure, composition, vigor, and the resilience to disturbances including insects, disease, animals, various abiotic factors, and other environmental stressors (e.g., lightning, wind, fire).

Forest and Rangeland Management The practical application of biological, physical, quantitative, economic, social, and policy principles to the administration and working of a forest or rangeland for specific objectives including maintaining forest or rangeland health, vigor, production, and other values such as soil condition, water quality, wildlife preservation, and, specifically, to support the military training mission on Fort Bliss.

Fuel Accumulation A condition characterized by the buildup of woody or other vegetation that increases the risk of destructive wildfire.

Fuel Loading The oven dry weight of fuels in a given area, usually expressed in tons per acre.

Fuel Moisture The quantity of moisture in fuel expressed as a percentage of the weight when thoroughly dried at 212ºF.

Fuel Type An identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control.

Fuels Materials, living or dead, which are capable of burning.

Fusee A red signal flare that can be used as a firing tool in prescribed burns or wildfire suppression.

Global Positioning System (GPS) A satellite-based navigational device that records X, Y and Z coordinates and other data allowing users to determine their location on the surface of the earth.

Habitat The place or natural environment of a specific plant, animal, or fungus. An area containing all the necessary resources for the plant, animal, or fungus to live, grow, and reproduce. For wildlife, habitat is the combination of food, water, cover, and space.

Handline Firebreak constructed by fireline personnel using hand tools to expose bare mineral soil.

Headfire A fire spreading or set to spread with the wind.

Impact Area Areas designated for military training involving live ordinance; the boundaries of these areas are designated with frequent signs and no other activities occur within the boundaries.

Incident Commander (IC) This ICS position is responsible for overall management of the incident and reports to the Agency Administrator for the agency having incident jurisdiction.

Incident Command System (ICS) A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries.

Incident Management Team (IMT) – The incident commander and appropriate general and command staff personnel assigned to an incident.

Indirect Attack – A method of fire suppression in which suppression activities takes place some distances from the fire perimeter, and often takes advantage of fire barriers.

Installation Boundaries Fort Bliss property border.

Live-Fire Exercise Military training involving live ammunition and occurring on ranges and around impact areas.

Management Prescription A set of management practices, fuels and weather parameters scheduled for application on a specific area to satisfy multiple uses or other goals and objectives.

Military Operations Any mission, function, or activity related to military training.

Mopup Extinguishing or removing burning material, especially near control lines after an area has burned to reduce fire escape risks or to reduce residual smoke.

NEPA (National Environmental Policy Act) A federal policy enacted in 1969 that established a national Council on Environmental Quality to oversee government activities that could affect the environment, and also required federal agencies to file environmental impact statements before taking any major action.

Nomex Clothing Fire-protective garments made of synthetic, fire-resistant material to be worn during prescribed burning or wildfire suppression activities.

Non-Attainment Area A geographic area in which levels of a criteria air pollutant exceed the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant.

Physiographic Class/Unit A classification describing the terrain or landform of a management unit as it relates to soil texture, soil structure, and water infiltration.

Predictive Services Those Geographic Area and National-level fire weather or fire danger services and products produced by wildland fire agency meteorologists and intelligence staffs in support of resource allocation and prioritization.

Prescribed Burn The application of fire in a predetermined area, usually under specific conditions of weather and fuel moisture, to control or reduce vegetation for optimal military training, enhance wildlife habitat, or to reduce wildfire potential.

Pyrotechnics Devices involved with igniting a rocket or producing an explosion and used in military training simulations.

Red Flag Warning Term used by fire weather forecasters to alert users to an ongoing or imminent critical fire weather pattern.

Rehabilitation The activities necessary to repair damage or disturbance caused by wildfire or the wildfire suppression activity.

Relative Humidity The ratio of the amount of moisture in a given volume of space to the amount that volume would contain if it were saturated. Usually expressed in percent.

Riparian Area Related to or located in conjunction with a wetland, on the bank of a river or stream, or also at the edge of a lake or tidewater; on Fort Bliss it includes low-lying areas, canyon bottoms and arroyos that are normally dry but where water is concentrated during precipitation events and produces a high diversity of plants when compared to the surrounding vegetation.

Savanna (Juniper) An area dominated by irregularly scattered, large diameter, open grown trees, with grass understory.

Sensitive Species Plant or animal species whose populations are susceptible to habitat changes or impacts from various kinds of disturbance.

Silviculture The art of producing and tending forest stands by applying scientifically acquired knowledge to control or influence stand establishment, composition, and growth by applying different treatments to make forests or woodlands more productive and useful, and integrating biologic and economic concepts to devise and carry out treatments to meet objectives.

Site Preparation An activity intended to make conditions favorable for planting, direct seeding, or for the establishment of natural regeneration by clearing, chemical vegetation control, burning, disking, chopping, bedding, windrowing, raking, or some combination thereof.

Slop-over – A fire edge that crosses a control line or natural barrier intended to confine the fire.

Smoke Management Conducting a prescribed fire under suitable conditions with firing techniques that keep smoke impacts from violating air quality standards.

Snag A standing dead tree from which the leaves and most of the branches have fallen.

Spot Fire or Spotting A small fire that is ahead of the main fire that is caused from hot embers being carried to a receptive fuel bed. Spotting indicates extreme fire conditions.

Structural Diversity Refers to the variety of horizontal and vertical features of an area including vegetation and topography.

Swamper A person that is a part of a saw team that removes brush, trees and limbs after they are cut by a chainsaw operator.

Training Area (TA) A designated piece of ground within the Fort Bliss Training Complex used for military training purposes.

Understory The lower vegetation layers in a forest, shrubland or woodland found beneath the canopy (overstory), including shrubs, grasses and forbs.

Unexploded Ordinance (UXO) Explosive devices that have been fired, projected, dropped, or placed in such a way that they could detonate and pose the risk of injury or death to personnel in the vicinity.

Vegetation Encroachment The undesired growth of trees, grasses, or shrubs in designated areas.

Vegetation Management Treatments such as mowing, chopping and herbicide applied to control undesirable trees, shrubs, and grasses occurring in a natural setting, or, as in the case of prescribed burning, to reduce vegetation densities and increase openings.

Wetlands A transitional area between aquatic and terrestrial ecosystems that is inundated or saturated for periods long enough to produce hydric soils and support hydrophytic vegetation.

Wildfire Any uncontrolled, non-structure fire, other than prescribed fire, occurring on lands covered wholly or in part by timber, brush, grass, or other flammable vegetation.

Wildfire Suppression The act of aggressively restricting the growth or spread of a fire occurring within the wildlands.

Wildland A natural environment on Earth that has not been significantly modified by civilized human activity.

Wildland Fire Any fire, controlled or uncontrolled, occurring on lands covered wholly or in part by timber, brush, grass, or other flammable vegetation. Wildland fire encompasses both prescribed fire and wildfire.

Wildland/Urban Interface (WUI) The line, area, or zone where structures and other human development meet or intermingle with wildlands or vegetative fuels.

6.1 Acronyms

AAF	Army Airfield
ACEC	Area of Critical Environmental Concern
ACSIM	Assistant Chief of Staff for Installation Management
AD	Armored Division
ADC	Alamogordo Dispatch Center
ANSI	American National Standards Institute
AOR	Area of Responsibility
AQB	Air Quality Bureau
AR	Army Regulation
ASP	Ammunition Supply Point
ATACMS	Army Tactical Missile System
ATV	All-Terrain Vehicle
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure Act
CAB	Combat Aviation Brigade
CACTF	Combined Arms Collective Training Facility
COL	Contingency Operating Location
CPR	Cardio-Pulmonary Resuscitation
DAGIR	Digital Air-Ground Integration Range
DES	Directorate of Emergency Services
DIA	Duded Impact Area
dNBR	Differenced Normalized Burn Ratios
DoD	Department of Defense
DOI	Department of the Interior
DPTMS	Directorate of Plans, Training, Mobilization, and Security

DPW	Directorate of Public Works
DPW-E	Directorate of Public Works, Environmental Division
DPW O&M	Directorate of Public Works, Operations and Maintenance Division
EIS	Environmental Impact Statement
EMNRD	Energy, Minerals and Natural Resources Department
EOD	Explosive Ordnance Disposal
EQR	Engineer Qualification Range
ESA	Endangered Species Act
FBTC	Fort Bliss Training Center
FES	Fire and Emergency Services
FIRECON	Fire Conditions rating
FMU	Fire Management Unit
FOB	Forward Operating Base
FRI	Fire Return Intervals
FUDS	Formerly-Used Defense Sites
FWZ	Fire Weather Zone
GC	Garrison Commander
GPM	Gallons per Minute
HAFB	Holloman Air Force Base
HQ	Headquarters
IAP	Incident Action Plan
IAW	In Accordance With
IC	Incident Commander
ICRMP	Integrated Cultural Resources Management Plan
ICS	Incident Command System
IFC	Integrated Fire Control
IHC	Interagency Hotshot Crew

IHOG	Interagency Helicopter Operations Guide
IMT	Incident Management Team
IPBC	Infantry Platoon Battle Course
IWFMP	Integrated Wildland Fire Management Plan
JPA	Joint Powers Master Agreement
LCES	Lookouts, Communications, Escape routes, and Safety zones
LNF	Lincoln National Forest
LUA	Limited Use Area
MAA	Mutual Aid Agreement
MGRS	Military Grid Reference System
MLWA	Military Lands Withdrawal Act
MOA	Memorandum of Agreement
MSL	Mean Sea Level
NBR	Normalized Burn Ratio
NEPA	National Environmental Policy Act
NF	National Forest
NFDRS	National Fire Danger Rating System
NFIRS	National Fire Incident Reporting System
NFPA	National Fire Protection Association
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NMED	New Mexico Environmental Department
NMSF	New Mexico State Forestry
NWCG	National Wildfire Coordinating Group
NWS	National Weather Service
OIC	Officer in Charge
OLA	Off Limits Area

PAO	Public Affairs Office
PEIS	Programmatic Environmental Impact Statement
PEO STRI	Program Executive Office for Simulation, Training, and Instrumentation
PMS	Publication Management System
PTB	Position Task Book
RAWS	Remote Area Weather Station
RCMP	Range Complex Master Plan
RFMSS	Range Facilities Management Support System
RX	Prescribed
SDZ	Surface Danger Zone
SEIS	Supplemental Environmental Impact Statement
SOG	Standard Operating Guidelines
SOP	Standard Operating Procedure
SRP	Sustainable Range Program
TA	Training Area
TAC	Tactical Air Command
TCEQ	Texas Commission on Environmental Quality
USAF	United States Air Force
USFS	United States Forest Service
UTV	Utility Terrain Vehicle
UXO	Unexploded Ordnance
VFD	Volunteer Fire Department
VTR	Vertical Reference
WFPM	Wildland Fire Program Manager
WSA	Wilderness Study Area
WSMR	White Sands Missile Range
WUI	Wildland/Urban Interface

7 Appendices

7.1 Appendix A Fire Management Units and Maps

This section is designed to be a stand-alone document that firefighters can take to the field with them. It can be downloaded, printed and set up in a notebook.

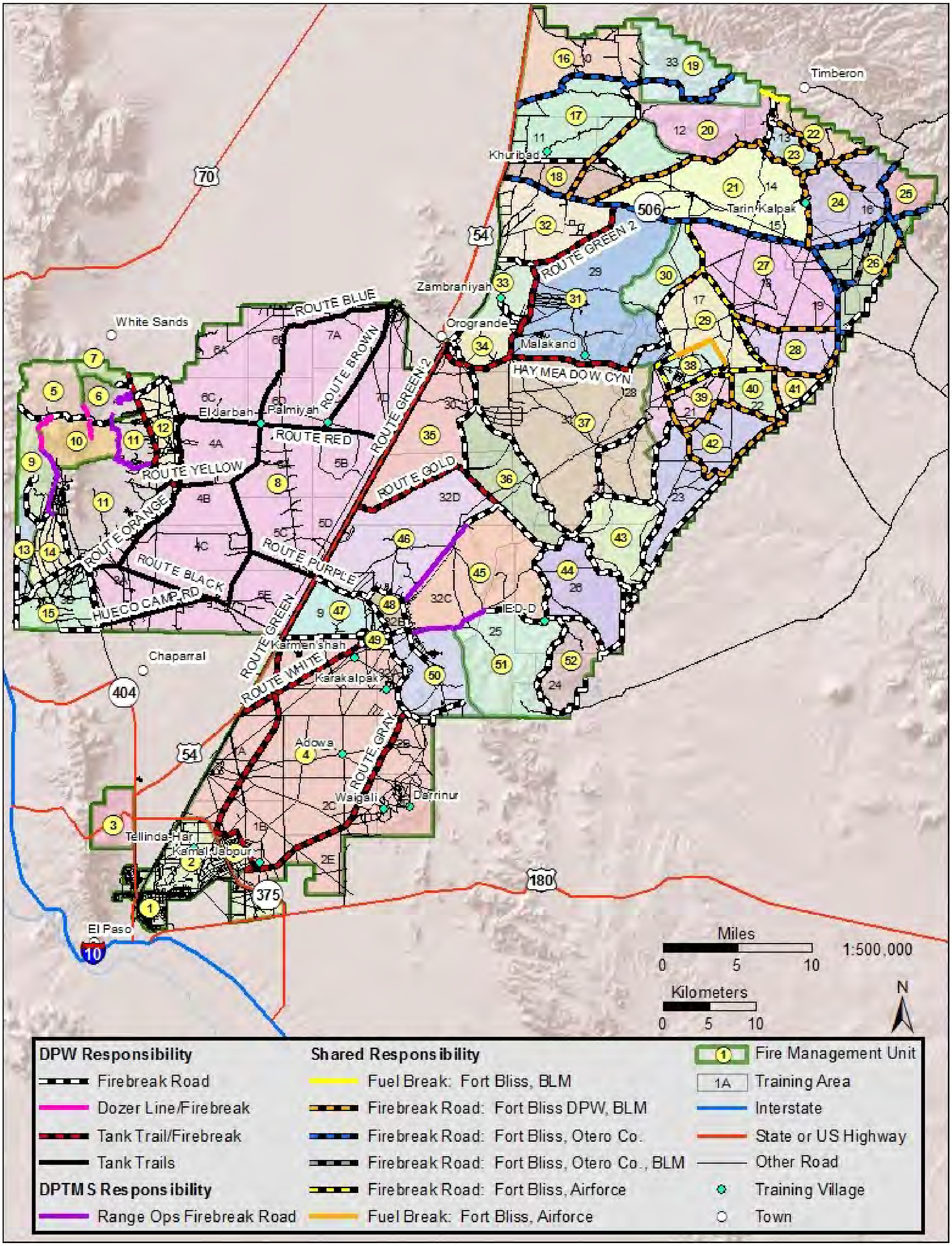
Best Management Practices Common to all FMUs on Fort Bliss

1. **Pre-fire season fuels management and wildfire containment:**
    a. Maintain defensible space around range infrastructure. Mow living vegetation to 3-6 inches in height within 30 feet of infrastructure. Any live vegetation within 30 feet of structures that is not mowed or cut to near ground level should be watered regularly to maintain greenness. Clear dead accumulations of vegetation for 30' from structures.
    b. Maintain designated firebreak roads by removing all vegetative and organic material down to mineral soil on road surfaces, by mowing roadway shoulders where practical and by maintaining erosion control features. Fort Bliss needs two Bush Hog Model 3810 15' or similar rotary mowers to accomplish mowing of firebreak road shoulders. These mowers are PTO-driven and are pulled behind a 60-110 hp tractor.
    c. Pre-position Fort Bliss FES firefighting equipment to High Hazard live-fire ranges (Table 4.1-1) during training exercises that are occurring on Very High to Extreme fire danger days.
    d. Use prescribed fires to strengthen fire break effectiveness for stopping a wildfire by blacklining (burning combustible fuels in long parallel strips) alongside roads and firebreaks where it is feasible and practical to do so.
    e. Fort Bliss firefighters will familiarize themselves with the FBTC by driving roads. Firefighters should have knowledge of locations of firebreaks and firebreak roads, Training Area and Range boundaries, water fill sites, and FMU locations and boundaries. Firefighters also need to recognize the different types of flammable wildland fuels found on Fort Bliss (See Section 3.3 Fort Bliss Fuel Types).

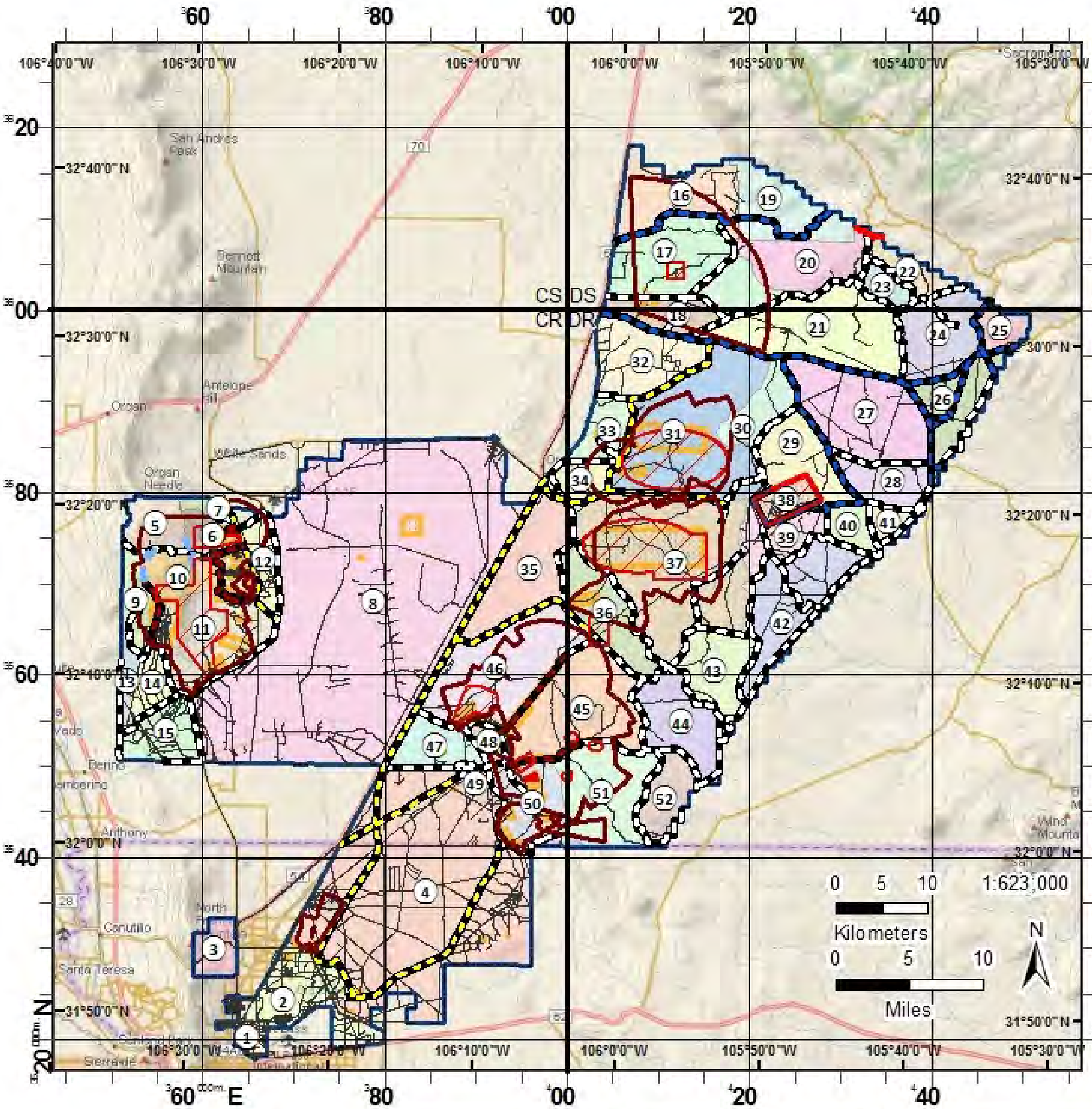
2. **Wildfire Suppression:**
    a. Due to safety and resource considerations, the main fire suppression strategy to be implemented by Fort Bliss firefighters in the 27 Low hazard FMUs (Identified with light blue shading in Fig. 4.2-1) is to monitor wildfires within FMU boundaries from firebreak roads and suppress wildfires if they advance to firebreak roads. These firebreaks can be burned out in advance of a flaming fire front if it is deemed advantageous to do so by the Incident Commander provided there are trained personnel available and in place. In most cases, firefighters will allow wildfires to consume combustible fuels within the confines of the FMU boundaries and burn out on their own. Most Fort Bliss FMUs are bounded by roads or constructed firebreaks (See Appendix A).
    b. In the 25 High hazard FMUs wildfires will be immediately suppressed at the earliest opportunity. Direct attack is the preferred tactic for fighting wildfires, but in areas where the fire intensity is too high (>4 foot flame lengths) then indirect attack tactics will be used.
    c. The decision to utilize helicopters on Fort Bliss wildfires should be based on an assessment of values at risk (See Section 4.5.4). Most wildfires burning on Fort Bliss will not require helicopter

support. Helicopters equipped with buckets shall be used whenever wildfires threaten to cross Fort Bliss boundaries and when structures or FBTC infrastructure are threatened by wildfires or when requested by the Fort Bliss Wildland Fire Program Manager.

d. Fort Bliss FES will contact DPW-E Conservation Branch for guidance on avoiding cultural resources when wildfires are burning outside established firing ranges and suppression efforts are being planned. DPW-E Conservation Branch should be contacted whenever cultural resources are involved or affected by wildfires on Fort Bliss so that DPW-E staff archaeologists can do immediate damage assessments.



Fort Bliss Fire Management Units, Firebreak Roads and Identified Routes



- Surface Danger Zone
- Dudded Impact Area
- Military Range
- Installation Boundary
- Dozer Line/Firebreak
- Fuel Break
- Range Ops Firebreak Road
- Firebreak Road
- Tank Trail Firebreak
- Firebreak Road: Non-Fort Bliss
- Other Roads

FMU #	FMU Name	Acres
1	Cantonment	4,581
2	Biggs	19,237
3	Castner Range	6,773
4	South Training Area	122,965
5	North Organs	9,194
6	Ranges 66B-70	6,023
7	WSMR Boundary	3,327
8	North Training Area	199,655
9	West Organs	8,476
10	South Organs	9,383
11	Ranges 50-66A	30,285
12	16 Bay	7,300
13	Lords Ranch	4,370
14	South 50	5,945
15	Stewart Lake	11,811
16	NW McGregor	20,615
17	Khuribad	32,513

FMU #	FMU Name	Acres
18	Range 91	10,148
19	Lincoln NF	18,259
20	Culp Canyon	17,160
21	Wildcat Canyon	34,691
22	Timberon	7,218
23	El Paso Canyon	4,769
24	McAfee Canyon	18,668
25	Chatfield Canyon	5,733
26	Prather	15,553
27	Mesa Horse Camp	31,367
28	Toy Tank	11,227
29	Double Tree	15,714
30	Broke Tank	10,050
31	DMPRC	47,955
32	Wright	19,615
33	Wilde-Benton	8,845
34	Aerial Target Launch	6,751

FMU #	FMU Name	Acres
35	Desert	24,881
36	IPBC	17,762
37	DAGIR/Mack	62,250
38	Centennial Range	5,346
39	Martin Canyon	11,333
40	End of Line Tank	5,997
41	Antelope	4,349
42	Shiloh	25,920
43	Owl Tank	15,006
44	Castner Draw	18,528
45	Borrego	32,528
46	Alvarado North	35,886
47	Alvarado South	11,148
48	IFC North	3,030
49	McGregor Base Camp	945
50	Meyer Range	17,046
51	Hueco Mountains	24,916
52	East Hueco Mountains	11,100

Fort Bliss Fire Management Units

FMU 1 CANTONMENT 4,581 Acres

Physical Characteristics

FMU 1 consists of the main post (cantonment) of Fort Bliss, also known as West Bliss and includes the William Beaumont Army Medical Center and the residential area of Logan Heights.

Topography in FMU 1 is varied from flat to rolling to mountainous foothills adjoining the Franklin Mountains. Most of FMU 1 is developed as residential, business and commercial property. There is open space particularly around William Beaumont Army Medical Center and on the west side of Logan Heights along Alabama Street. During fire season, following wet years, there can be sufficient fuel accumulations in the form of dried weeds and grasses to sustain small wildfire spread in open areas.

Fire history does not show any wildfires in FMU 1 since 1990.

Infrastructure/Assets to be Protected

FMU 1 is a mixture of structures and infrastructure for supporting the military mission on Fort Bliss.

There are numerous historic cultural assets in FMU 1.

Risk to Firefighters

Normal environmental factors of heat, dust, wind and low humidity are here and can contribute to hazardous conditions. Wildfire fuels such as grasses, weeds and shrubs are located in isolated pockets associated with open space areas but are not conducive to large wildfire growth within FMU 1. Any areas where dry, cured brush, weeds or grass has accumulated can burn, spread quickly and threaten nearby wooden structures.

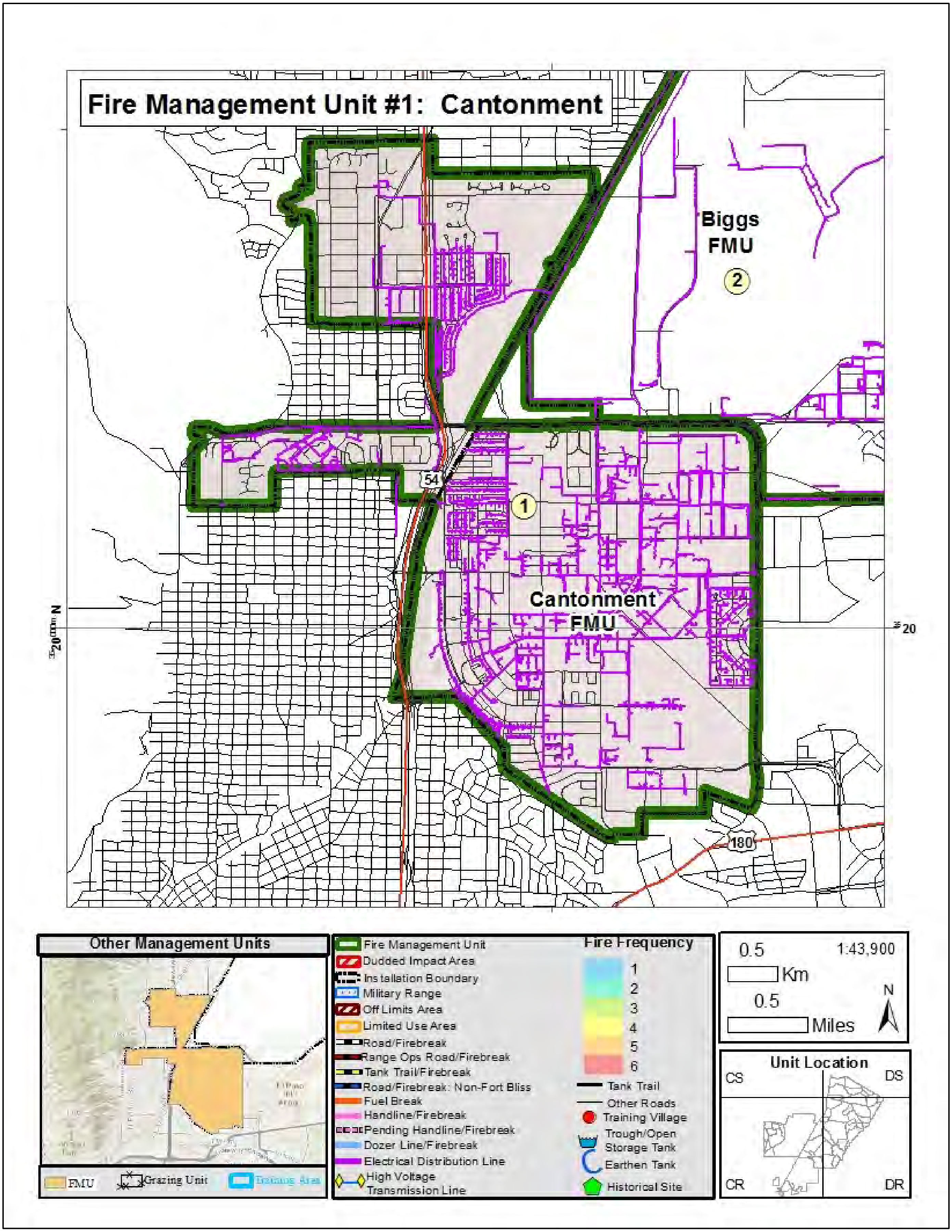
Pre Fire Season Fuels Management Actions

Open spaces in FMU 1 should be assessed by Fort Bliss fire personnel on an annual basis. Accumulations of dry, cured tumbleweeds or other flashy fuels that pose a risk to nearby structures should be removed or crushed and scattered as necessary.

Wildfire Management

All wildfires in FMU 1 are to be extinguished as rapidly as possible using direct attack suppression methods with engines.

35



Fire Management Unit #1: Cantonment
Biggs
FMU
2
1
54
Cantonment
FMU
180
Other Management Units
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage
Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open
Storage Tank
Earthen Tank
Historical Site
0.5
1:43,900
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 2 BIGGS 19,237 Acres

Physical Characteristics

FMU 2 is bounded on the north by Loop 375 from railroad Drive to its intersection with Sergeant Major Boulevard on the north side of the East Bliss portion that is located east of Loop 375. The east boundary is the perimeter road around East Bliss known as Sergeant Major Boulevard and Liberty Expressway to where it intersects Loop 375 again, then south and east on Loop 375 to its intersection with Montana Avenue. The south boundary is Montana Avenue (US 180/62) along the Fort Bliss Military Reservation boundary from Loop 375 to a north-south line of the Fort Bliss Military Reservation boundary that runs north to Constitution Ave. The south boundary follows Constitution Ave to the west to its intersection with Loop 601 (Liberty Expressway), then west along Loop 601 to the intersection with Railroad Drive. The west boundary is the rail line from Loop 601 (aka Fred Wilson Drive) northeast to its intersection with Loop 375.

Topography in FMU 2 is flat desert floor. Vegetation is sparse and dominated by mesquite coppice dunes. Fire history does not show any wildfires in this FMU since 1990.

Infrastructure/Assets to be Protected

There are numerous training assets located within FMU 2 including Ranges H, I and J. Biggs Army Airfield is located within FMU 2. The First Armored Division HQ and support structures, including housing, are located within FMU 2.

Risk to Firefighters

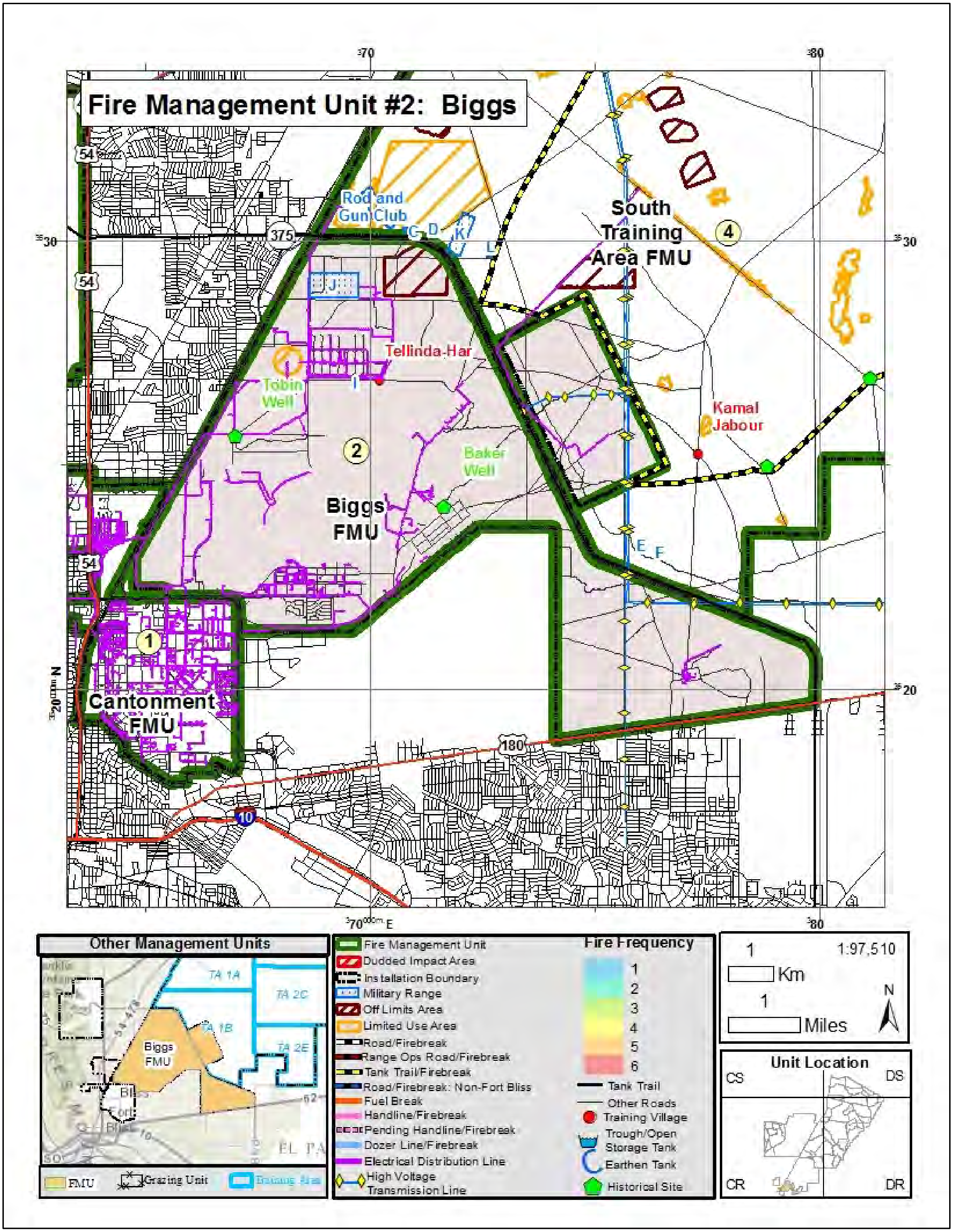
Normal environmental factors of heat, dust, wind and low humidity are here. Wildland fuels are not conducive to large fire spread within FMU 2.

Pre Fire Season Fuels Management Actions

Tumbleweeds are prevalent in FMU 2. Fences around the airfield and other places that can collect and trap tumbleweeds should be assessed by Fort Bliss fire and Range Operations personnel on an annual basis. Accumulations of tumbleweeds should be removed, piled and burned in cleared areas or crushed and scattered as necessary.

Wildfire Management

Wildfires in FMU 2 should be extinguished as rapidly as possible using direct attack suppression methods with engines.



Fire Management Unit #2: Biggs
Rod and Gun Club
South Training Area FMU
Tellinda-Har
Tobin Well
Kamal Jabour
Baker Well
Biggs FMU
Cantonment FMU
Other Management Units
TA 1A
TA 2C
TA 1B
TA 2E
Biggs FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:97,510
Km
Miles
N
Unit Location
CS
DS
CR
DR

FMU 3 CASTNER RANGE 6,773 Acres

Physical Characteristics

FMU 3 is bounded on the north by an unmarked boundary that begins at the edge of the Franklin Mountains and heads east to its northeastern corner where the Castner Range abuts the North Hills subdivision in northeast El Paso. Here the boundary is fenced. The east boundary is Martin Luther King Jr Boulevard south to its intersection with Gateway Boulevard South, then south adjacent to Gateway Boulevard South to the northeast corner of the El Paso Border Patrol Station. The south boundary surrounds the perimeter of the Border Patrol Station in the southeast corner of the FMU and then runs adjacent to Hondo Pass Drive to the west until the road ends, and then the south boundary is unmarked to the west. The west boundary is an unmarked north-south line high in the Franklin Mountains. FMU 3 is bisected by Transmountain Drive (TX Loop 375). The El Paso Museum of Archaeology and the National Border Patrol Museum are located within FMU 3 and are adjacent to Transmountain Drive near Gateway Boulevard South.

Topography in FMU 3 is gently sloping bajadas on the eastern edge. The central and western portions of the FMU are steep, rocky east-facing slopes of the Franklin Mountains. Vegetation on the bajadas is creosote, mesquite, catclaw, agave, cactus and desert grasses. Mountain slopes are agaves, ocotillo, sotol, catclaw, cacti and desert grasses. Fuels are patchy within FMU 3. Fire history does not show any wildfires in this FMU since 1990.

Infrastructure/Assets to be Protected

There are no military assets located within FMU 3. There is a high-voltage power line with wooden poles that roughly parallels the southern boundary and is accessible by 4WD vehicles, then UTV or ATV accessible only, then by foot only as the power line climbs the mountainous portions of the Franklin Mountains.

Risk to Firefighters

The Castner Range is an old, duded impact area and has potential for UXO hazards. Entry into impact areas is prohibited. Environmental factors of heat, dust, wind, steep slopes, rolling rocks and low humidity contribute to hazardous conditions.

Pre Fire Season Fuels Management Actions

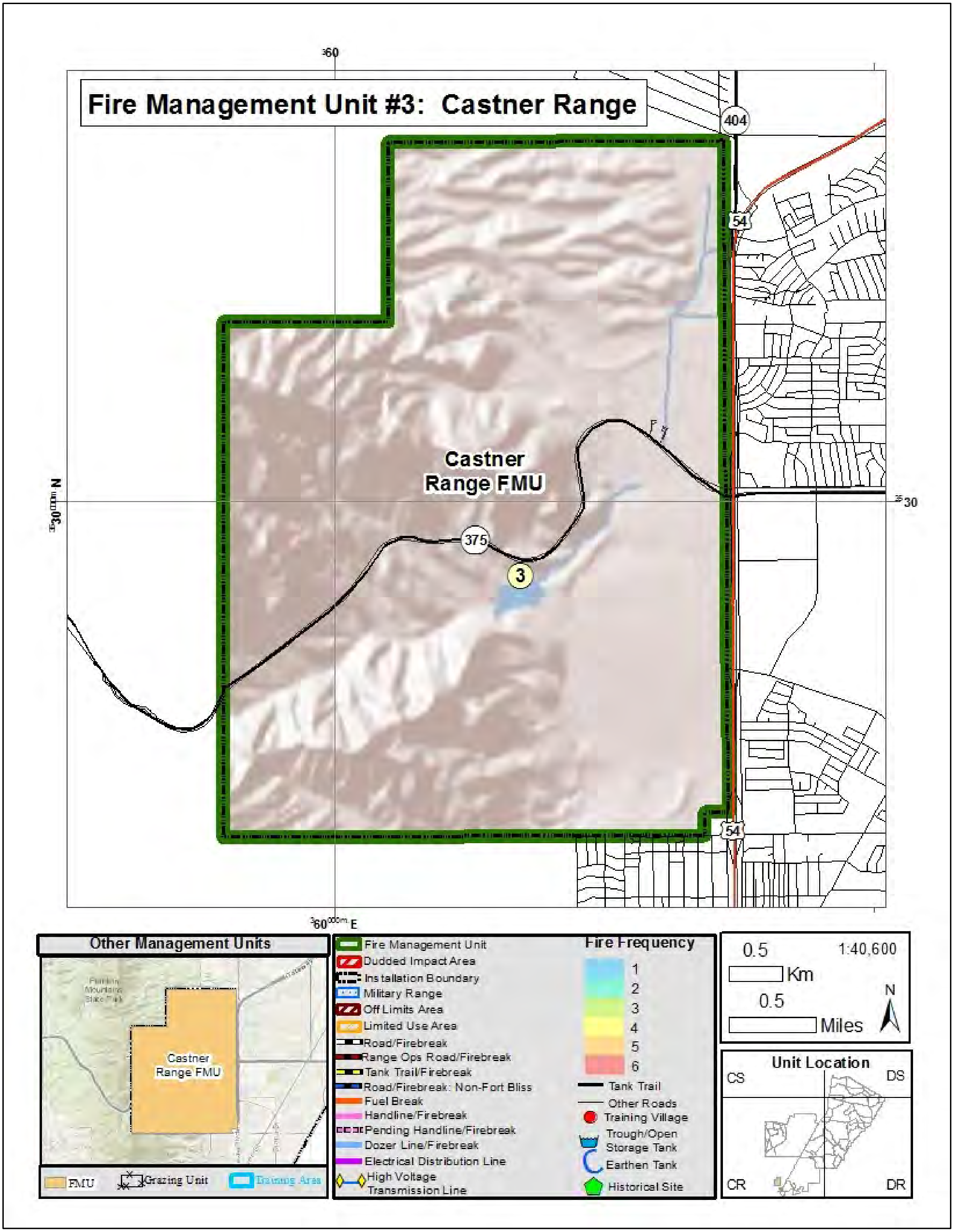
Foot entry by firefighters is not allowed in FMU 3. There are no military assets to protect in FMU 3. The power line is protected from wildfire effects in most locations due to the rocky terrain and sparse fuels. Assessment of fuel loading around the power line poles should be done annually by firefighters from roads or trails only and accumulations of live and dead fuel should be removed and crushed down for at least 10 feet in radius from every pole.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 3 unless they are near flammable structures. Coordinate with El Paso Municipal and County Fire Departments on any structure fires or wildfire starts near dwellings.

Firefighters will monitor all wildfires and keep equipment on established roads. Keep wildfires from crossing onto private lands in the north, south and east sides of FMU 3. Remote wildfires within the Franklin Mountains should be allowed to burn themselves out. If wildfires do not die and continue to spread within the Franklin Mountains, the Incident Commander should consider using aerial assets such as helicopters and air tankers to contain wildfire spread.

102



Fire Management Unit #3: Castner Range
Castner Range FMU
375
3
404
54
54
360
360000m E
3530000m N
3530
Other Management Units
Franklin Mountains State Park
Castner Range FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:40,600
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 4 SOUTH TRAINING AREA 122,965 Acres

Physical Characteristics

FMU 4 contains all of TAs 1A, 1B, 2A, 2B, 2C, 2D, 2E, 8 and 32A. This FMU is bounded on the north by the main access road from US 54 to McGregor Base Camp, then around the south boundary of McGregor Base Camp on firebreak roads to the intersection with IFC S road. The east boundary is IFC S road heading south from the McGregor Base Camp past Meyer Range then east to the Fort Bliss Military Reservation boundary corner on the state line between Texas and New Mexico, then south along the east boundary of the Fort Bliss Military Reservation in Texas. The eastern boundary is fenced up to the rugged foothills of the Hueco Mountains then is unmarked to the southeastern corner of Fort Bliss within the Hueco Mountains. The south boundary is the border between private lands and the southern boundary of the Fort Bliss Military Reservation and is mostly fenced as it heads west from the southeast corner of TA 2D, then south then west to Loop 375, then along Loop 375 to the north then around the perimeter of East Bliss back to Loop 375 north, then along Loop 375 to the west to its intersection with Railroad Drive. The west boundary is north along Railroad Drive from Loop 375 to US 54, then north along US 54 to the McGregor Base Camp turnoff.

The very large FMU 4 is nearly flat on the western 4/5 and includes some of the lowest portions of the Tularosa Basin on Fort Bliss. The eastern 1/5 of FMU 4 is bajadas leading up into the Hueco Mountains. Much of the Basin vegetation is typical Chihuahuan desert scrub with mesquite, creosote and tarbush covering large expanses of desert floor with tobosa, dropseeds and black grama grasses intermixed. Vast areas of FMU 4 are covered by mesquite coppice dunes.

Fire history records show at least 11 wildfires have burned within FMU 4 since 1990. All of the wildfires were associated with sandy soils and low-lying grassland areas and did not burn into adjacent coppice dune areas or into the rocky limestone hills of the Hueco Mountains due to the lack of continuous fuels. Two large wildfires burned in the southeast quadrant of FMU 4. One wildfire crossed the Fort Bliss boundary east of Mesquite tank. These wildfires were associated with a fire season following a year of heavy grass growth after above normal precipitation.

Infrastructure/Assets to be Protected

FMU 4 contains Ranges A, B, C, D, E, F, G, K, L, the villages of Kamal Jabour, Adowa, Waigali, Darrinur, Kara kalpak and Karmen’shah, COL Westbrook and the McGregor Range Ammunition Supply Point (ASP). The Fred Hervey Water Treatment Plant is located within FMU 4 and is adjacent to Railroad Avenue. This is an El Paso city-owned asset and is off limits to Fort Bliss personnel. Most of the structures and infrastructure within FMU 4 do not present a wildfire hazard due to their location within cleared areas, the lack of surrounding vegetative fuels and their construction materials.

The southern boundary of Fort Bliss abuts El Paso. There are private dwellings adjacent to this border in a number of places.

There are 13 Off Limits Areas (OLAs) within this FMU. These areas are marked by siber stakes and are not to be disturbed or entered by any personnel.

Risk to Firefighters

UXO can be found anywhere in FMU 4. Normal environmental factors of heat, dust, wind and low humidity are safety concerns here.

There is a Surface Danger Zone (SDZ) in TA 1A associated with Range D. Permission to enter SDZ areas must be obtained from Range Operations prior to engaging in wildfire operations in this area.

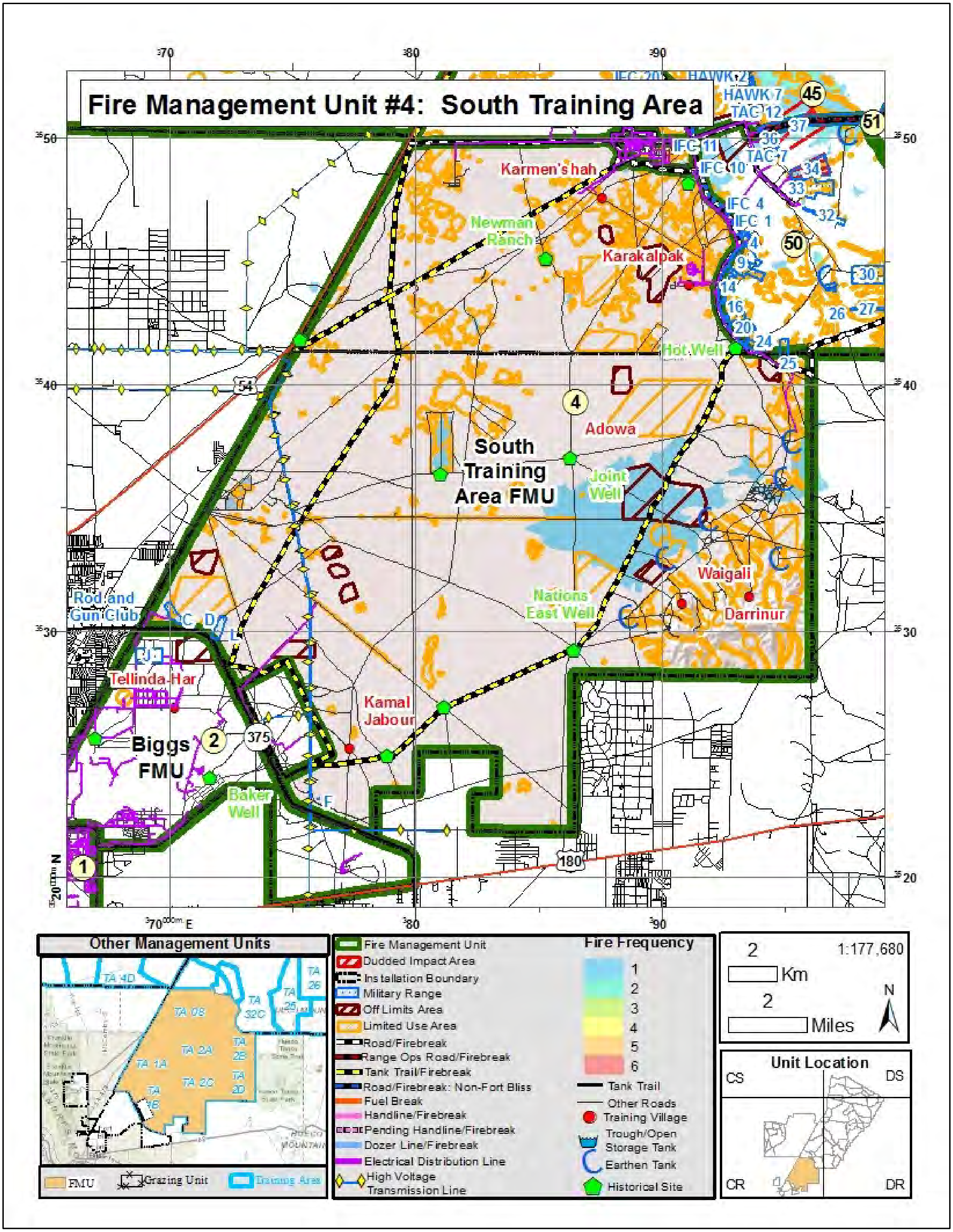
Pre Fire Season Fuels Management Actions

FMU treatments: DPW O&M is responsible for maintaining all firebreak roads and tank trails within FMU 4. All fire break roads should be inspected annually and scraped as needed to keep them vegetation-free. Fire break road shoulders should be mowed where feasible with a brush-hog during growing seasons when there are abundant weeds.

Training Asset treatment: Range facilities and targets, COL Westbrook and training villages should be inspected annually by firefighters for fuel build-up near structures. Vegetated areas around flammable structures need to be kept mowed out to a distance of 30' to keep vegetation short. Mowing (brush hog) of vegetation at 6 to 8 inches in height should be done around flammable structures wherever possible, twice yearly (once in May or June, and again in late October before present year's vegetative growth dries out) or as needed, primarily to prevent tumbleweeds from growing large and breaking off and becoming a fire hazard. After weeds are cured out in the fall, look for tumbleweed accumulations against fences and structures. Pile tumbleweeds and burn them in a cleared area or crush them down and scatter as needed.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 4 unless adjacent to man-made structures. Firefighters will monitor all wildfires and keep equipment on roads. Keep wildfires from crossing onto private lands to the south and to the east in FMU 4 near the Fort Bliss boundary line. Use water from engines and fight fire from roads. Firefighters may blackline or burnout along roads inside the installation, when deemed advantageous by the Incident Commander.



Fire Management Unit #4: South Training Area
South Training Area FMU
Biggs FMU
Karmen'shah
Newman Ranch
Karakalpak
Hot Well
Adowa
Joint Well
Waigali
Darrinur
Nations East Well
Rod and Gun Club
Tellinda-Har
Kamal Jabour
Baker Well
Other Management Units
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:177,680
Km
Miles
Unit Location

FMU 5 NORTH ORGANS 9,194 Acres

Physical Characteristics

FMU 5 is located within Doña Ana Range. FMU 5 is bounded on the north by an unmarked boundary of BLM and Fort Bliss Military Reservation lands starting in Fillmore Canyon in the Organ Mountains just north of the Dripping Springs Natural Area and heading east along section lines to the boundary line where White Sands Missile Range (WSMR) lands, BLM lands and Fort Bliss lands meet. The east boundary is unmarked and heads south from the Fort Bliss /WSMR boundary and follows a ridge line to Granite Peak. The unmarked boundary then runs east then south and follows the ridgeline east of Granite Peak between Rucker Canyon and Glendale Canyon down to a spur ridge that runs southwest into Rucker Canyon then follows a constructed bulldozer line southeast across a boulder-strewn bajada to the Soledad Canyon Road. The south boundary is the Soledad Canyon Road west to the Fort Bliss Military Reservation boundary with BLM and private lands near Chimney Rock. The west boundary is the boundary between Fort Bliss Military Reservation, private lands and the BLM from Bar Canyon trail north past the Dripping Springs Natural Area to Fillmore Canyon.

FMU 5 is mountainous and is entirely within the rugged Organ Mountains. Vegetation on the mountains is diverse with a mixture of cool and warm season grasses and diverse shrubs and trees. Agave, prickly pear, catclaw, sotol, yucca, mountain mahogany, apache plume, mesquite, piñon pine, juniper and ocotillo are found on the drier south-facing slopes. North slopes have piñon and ponderosa pine, several species of oak, Douglas fir, one-seed and alligator juniper, rocky mountain maple and mountain mahogany.

Fire history records show 3 large wildfires within this FMU since 1990.

Infrastructure/Assets to be Protected

FMU 5 contains no military assets or infrastructure. There are historic wooden structures in Soledad Canyon and in North Canyon that are at risk from wildfires.

Risk to Firefighters

FMU 5 is remote and access is limited. Roads in Soledad Canyon are narrow, rocky and limited to four-wheel drive vehicles only. Vehicles can become trapped by fast-moving wildfires. Environmental factors of very steep terrain, loose rocks, heat, dust, wind and low humidity are here. Wildfires in the Organ Mountains have exhibited extreme fire behavior with very high rates of spread in the past. Crown fires can occur in wooded areas. The chimney effect wildfires can exhibit is due to narrow, steep-walled canyons that can funnel wind currents and lead to blow-up conditions of fire whorls and flame lengths over 100 feet. Spotting from firebrands carried by wind currents ahead of the main flaming fire front can cause new fires up to 1/2 mile away from the main fire.

UXO is a possibility anywhere in FMU 5.

Much of FMU 5 is within the SDZ for Ranges 66 A/B and Range 70. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations in these areas.

Pre Fire Season Fuels Management Actions

FMU treatments: The firebreak road in the bottom of Soledad Canyon should be maintained by DPW O&M to keep it vegetation-free and navigable for brush engines with four-wheel drive. The bulldozer line from Soledad Canyon Road heading northwest to the rock face on the north side of Rucker Canyon is now complete and DPW O&M will maintain the fire break to be vegetation-free.

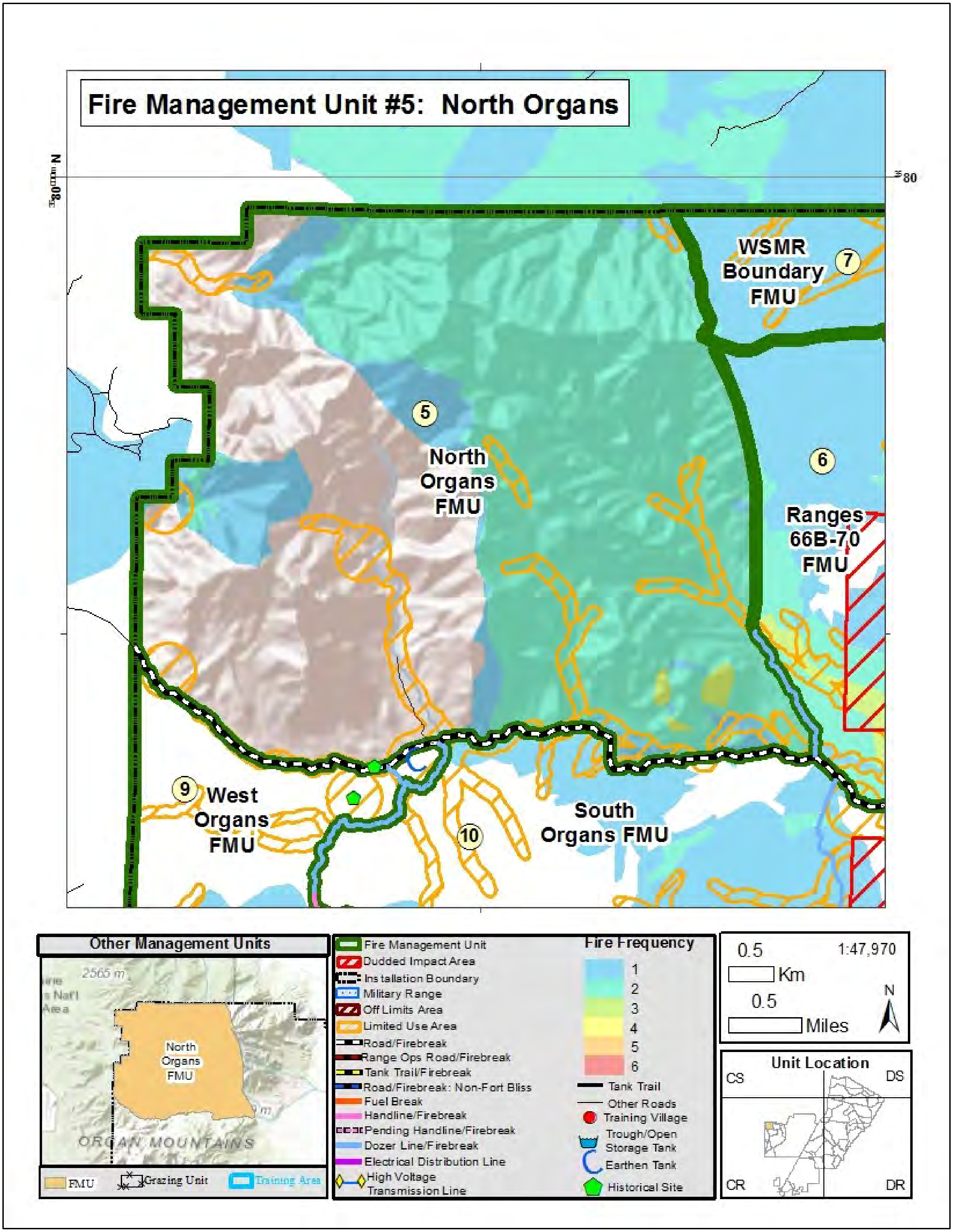
Cultural Asset treatments: Historic structures in Soledad Canyon and North Canyon should be inspected for fuel build ups around structures. Use handtools or weed whips or weedeaters to keep weeds and grasses down to around 6 inches in height and away from the structures for about 30 feet.

Wildfire Management

All wildfires in FMU 5 will need a suppression response. In some cases, wildfires may just need monitoring. This usually will only occur after the monsoon rains have set in and is associated with lightning caused fires in remote areas. Rapid, aggressive initial attack is warranted for all man-caused wildfires in FMU 5. If the wildfire is in remote, rugged country consider using aerial assets. Aerial assets may include helicopters with buckets or internal tanks and/or air tankers. Smokejumpers have been used effectively in the Organ Mountains in the past. Coordinate with BLM firefighters who will respond to wildfires here under the guidance from the Fort Bliss/BLM Mutual Aid Agreement for sharing firefighting resources.

Be extra cautious with placing engines in Soledad Canyon. Provide point protection with engines around historic structures in Soledad and North Canyon but only after ascertaining that there are good safety zones and escape routes for engines. Bulldozers can be used in Soledad Canyon as needed for structure protection, to build fireline and to construct safety zones.

250



Fire Management Unit #5: North Organs
WSMR Boundary FMU
7
5
North Organs FMU
6
Ranges 66B-70 FMU
9
West Organs FMU
South Organs FMU
10
Other Management Units
North Organs FMU
ORGAN MOUNTAINS
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:47,970
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 6 RANGE 66B-70 6,023 Acres

Physical Characteristics

FMU 6 is located within Doña Ana Range. FMU 6 is bounded on the north by an unmarked boundary beginning on an east-west oriented ridgeline in the Organ Mountains just east of Granite Peak and heading east down the ridgeline just north of Johnson Canyon to a Range firebreak road at the base of the Organ Mountains, then along the Range firebreak road to the east to its terminus at the Firing Line Road. The east side of FMU 6 is bounded by the Firing Line Road past Ranges 70, 68 and 67 to its intersection with a DPW firebreak road at the Range Operations Control Area (ROCA) for Ranges 66 A/B. The south boundary is the Range Operations firebreak road heading west from Firing Line Road past the Range 66 A/B ROCA buildings and through the middle of the mechanized targets on Range 66B past the last targets and continuing west to the gated entrance into Soledad Canyon, then up the Soledad Canyon firebreak road about 100 yards further west to the intersection of the completed bulldozer line that accesses Rucker Canyon. The west side of FMU 6 is the bulldozer line that runs northwest from Soledad Canyon Road crosses the bottom of Soledad Canyon and crosses a boulder-strewn bajada to its terminus in the bottom of Rucker Canyon at a sheer rock face on the north side of Rucker Canyon, then along an unmarked boundary heading north from the end of the bulldozer line to a ridgeline between Rucker Canyon and Glendale Canyon then along that ridge north to its intersection with other ridgelines just east of Granite Peak.

FMU 6 is mostly east-facing, steep mountainous slopes from Granite Peak (Elev. 8,400’) to the Tularosa Basin floor (Elev. 4,000’). The slopes of the Organ Mountains within FMU 6 are very rocky and steep. Vegetation is not continuous in many places. Vegetation is mixed grasses and shrubs of juniper, oak, sotol, catclaw, prickly pear, agave and mesquite. Canyon and arroyo bottoms contain large shrubs of hackberry, one-seed juniper, little leaf sumac and apache plume. Moving down slope from the mountains are bajadas or piedmont areas characterized by rocky, gently-sloping plains cut by steep-sided arroyos. Vegetation on the bajadas is mainly creosote, mesquite, tar bush, catclaw, cacti, agave, sotol and yucca with a variety of grasses intermixed.

At least 7 wildfires have burned in FMU 6 since 1990.

Infrastructure/Assets to be Protected

FMU 6 contains Ranges 66 B, 67, 68, 69 and 70. Each range has a collection of infrastructure that consists of lookout towers, buildings, firing platforms, targets, facilities and storage containers. None of these assets represent a significant fire hazard due to their location within clearings as well as their construction materials.

Risk to Firefighters

There are potential UXO issues throughout FMU 6. There is a large duded impact area that is off limits to all personnel. Risks associated with extreme fire behavior, steep, rugged slopes, loose rocks, upslope erratic winds, chimney effects in narrow canyons and light, flashy fuels make fighting wildfires in FMU 6 hazardous to firefighters.

FMU 6 is within the SDZ from Ranges 63, 65, 66A, 66B and 70. Permission to enter SDZ areas must be granted by Range Operations prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

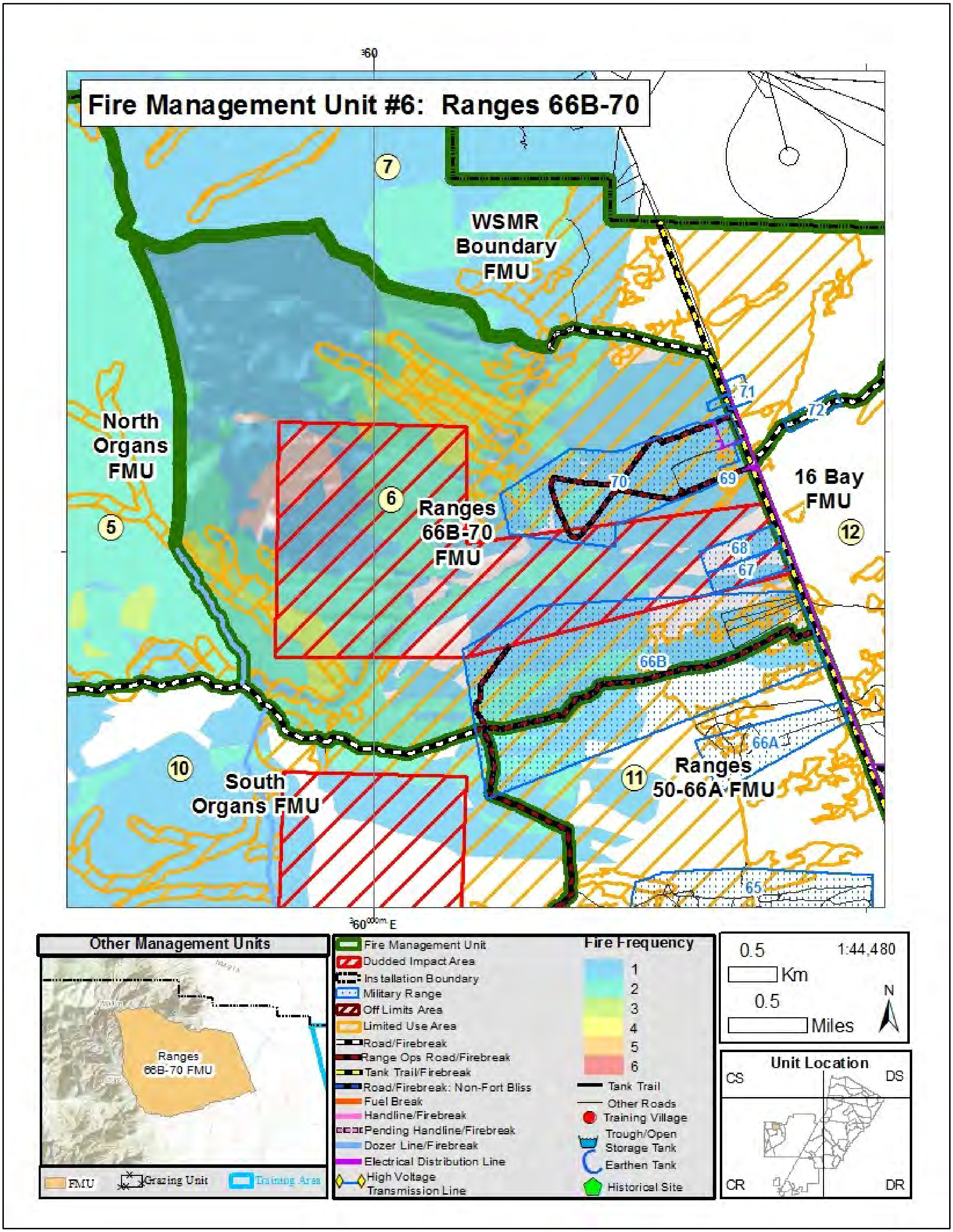
<u>FMU treatments:</u> The bulldozer line to Rucker Canyon needs to be maintained to be vegetation-free. A prescribed burn to blackline along the east side of the bulldozer line should be a high priority. This burn will strengthen the effective width of the fuel break. This will help keep wildfires contained within FMU 6 and will help to prevent wildfires from spreading into the Organ Mountains.

<u>Training Asset treatment:</u> Vegetated areas around flammable structures need to be kept mowed to keep vegetation short. Mowing (brush hog) of vegetation at 6 to 8 inches in height should be done around targets and other flammable structures wherever possible, twice yearly (once in May or June, and again in late October before present year's vegetative growth dries out) or as needed, primarily to prevent tumbleweeds from growing large and breaking off and becoming a fire hazard. Yearly assessments should be done by Fort Bliss fire personnel to assess the amount of fuel loading as fuel loads may vary greatly from year to year and determine the need for mowing or removal of fuels around structures.

Annual maintenance by DPW O&M needs to occur on firebreak roads leading to Soledad Canyon. Range firebreak roads through and north of Range 70 and Range 66 B should be maintained by Range Operations to be vegetation-free.

Wildfire Management

Let wildfires burn in impact areas. Use direct attack suppression methods in all other areas of FMU 6. Consider utilizing aerial assets to help extinguish wildfires in inaccessible terrain in FMU 6. Rock outcroppings, maintained firebreak roads and sparse fuels on south and east-facing slopes should keep wildfires contained to the desert floor in the majority of FMU 6. Firefighters may use fire to burn out fuels along roads ahead of a wildfire, if deemed advantageous by the Incident Commander.



Fire Management Unit #6: Ranges 66B-70
WSMR Boundary FMU
North Organs FMU
Ranges 66B-70 FMU
16 Bay FMU
South Organs FMU
Ranges 50-66A FMU
7
5
6
12
10
11
71
72
70
69
68
67
66B
66A
65
360000m E
Other Management Units
Ranges 66B-70 FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:44,480
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

313

FMU 7 WSMR BOUNDARY 3,327 Acres

Physical Characteristics

FMU 7 is located within Doña Ana Range. FMU 7 is bounded on the north by the unmarked boundary between Fort Bliss and WSMR beginning at the point where Fort Bliss, WSMR and private lands meet then heading east along the Fort Bliss/WSMR boundary past the intersection with Firing Line Road past the intersection with a DPW firebreak road to the intersection of the Fort Bliss boundary and War Road (NM 213). The east boundary is a fire break road from War Road beginning north of the boundary between Fort Bliss and WSMR and heading southwest across the unmarked boundary between Fort Bliss and WSMR through Range 72 to an intersection with the Firing Line Road then north along the Firing Line Road past Range 70 past Range 71 to an intersection with a Range fire break road. The south boundary is the Range firebreak road that heads west from the Firing Line Road north of Range 71 to the base of the Organ Mountains then bearing west along an unmarked line following a ridge north of Johnson Canyon to Granite Peak. The west side of FMU 7 is an unmarked ridge that runs north from Granite Peak to the boundary between Fort Bliss and WSMR.

FMU 7 is diverse in terms of topography. FMU 7 runs from the relatively flat desert floor on the Tularosa Basin at 4000' elevation to Granite Peak in the Organ Mountains at an elevation of 8400'. Terrain is flat in the eastern portion of FMU 7 changing quickly to steep, rocky mountainsides in the western portion of FMU 7. Vegetation on the desert floor is creosote, mesquite, desert willow, four wing saltbush, cacti and yucca with grasses intermixed. Mountain vegetation is oak, juniper, mountain mahogany, cacti, agave, ocotillo and catclaw with mixed grasses.

Fire history records show at least two wildfires have burned in FMU 7 since 1990.

Infrastructure/Assets to be Protected

Range 71 (UAC) and the north half of Range 72 (MOUT) are located within FMU 7. The adobe-like structures at Range 72 are not at risk from wildfires due to their construction materials.

The main cantonment of White Sands Missile Range and numerous other US Army assets are located just north of the Fort Bliss boundary. The proximity of these structures to the boundary means that they are at risk of burning from wildfires spreading within FMU 7.

Risk to Firefighters

There are environmental risks associated with low humidity, high air temperatures, steep slopes, rolling rocks, chimney effects in chutes and narrow canyons, dust and strong, variable winds in FMU 7. There is the possibility of UXO in FMU 7.

The fire break road leading to Range 72 is within an SDZ from live-fire ranges to the south. Permission to enter SDZ areas must be obtained from Range Operations prior to engaging in wildfire operations.

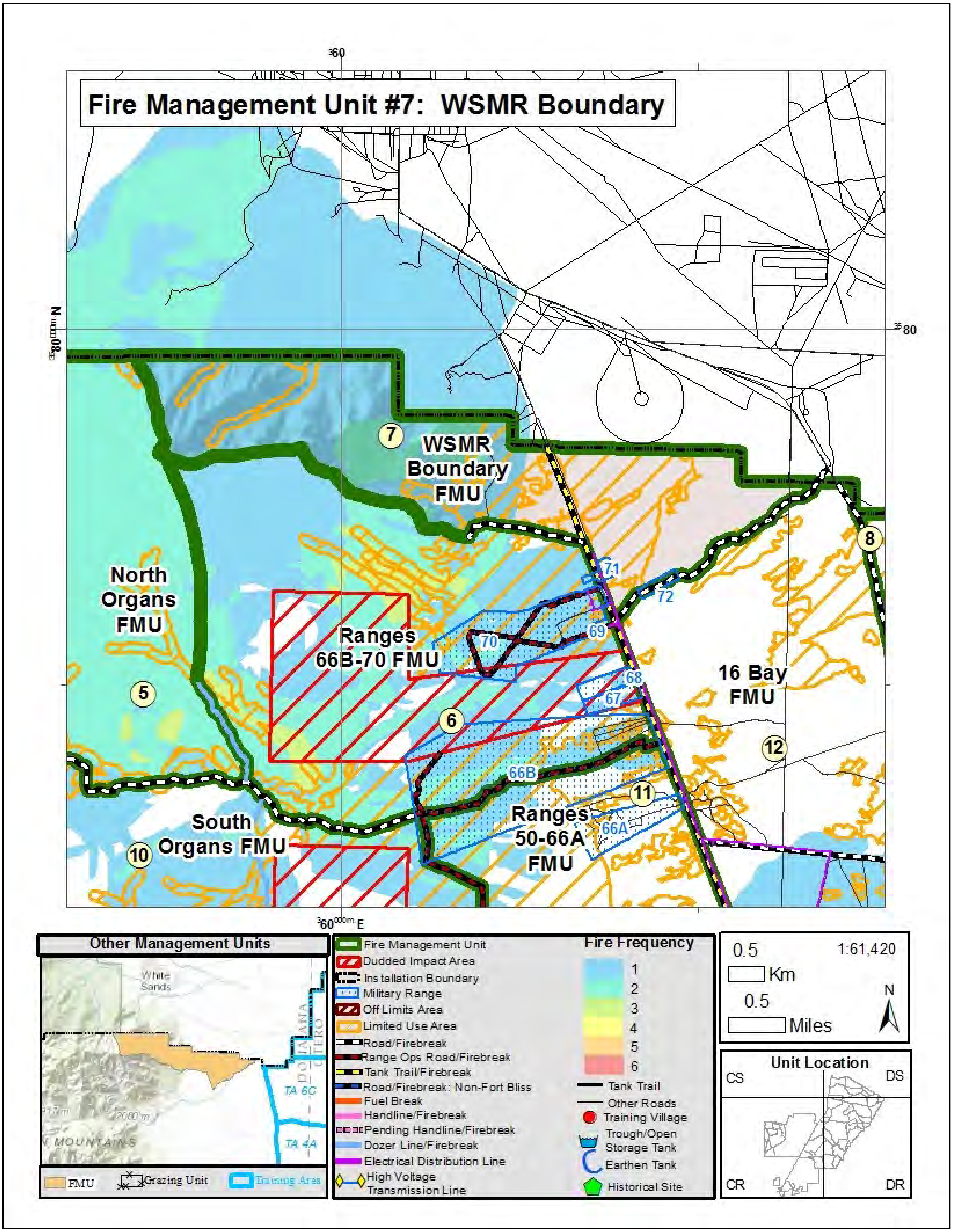
Pre Fire Season Fuels Management Actions

FMU treatments: The Firing Line Road along the west side of FMU 7 is maintained by DPW O&M and is kept vegetation-free. The fire break road through Range 72 should be maintained by DPW O&M to be vegetation-free and passable by wildland fire engines. Range Operations is responsible for maintaining the firebreak road west of the Firing Line Road.

<u>Training Assets treatments:</u> Buildings, targets and infrastructure on Ranges 71 and 72 should be inspected annually by firefighters to assess fuel build-up around structures. Remove tumbleweed accumulations around structures and burn after piling or crush down to sticks and scatter when/where it is feasible.

Wildfire Management

Suppress wildfires in FMU 7 using direct attack methods with engines and on foot. Interior and boundary roads within FMU 7 are suitable to blackline or burn out from as necessary. Fight fire with fire if deemed advantageous by the Incident Commander. Consider using aerial firefighting assets if a wildfire becomes established in the inaccessible Organ Mountains. Consider using CAB assets on the desert floor if, after initial engagement, wildfire continues to spread near or beyond Fort Bliss boundaries.



Fire Management Unit #7: WSMR Boundary
WSMR Boundary FMU
North Organs FMU
Ranges 66B-70 FMU
16 Bay FMU
South Organs FMU
Ranges 50-66A FMU
Other Management Units
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:61,420
Km
Miles
Unit Location

392

FMU 8 NORTH TRAINING AREA 199,655 Acres

Physical Characteristics

TAs 3A, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D, 5E, 6A, 6B, 6C, 6D, 7A, 7B, 7C, 7D are located in FMU 8. FMU 8 is bounded on the north by the boundary between White Sands Missile Range and the Fort Bliss Military reservation from War Road (NM 213) east past the Orogrande Base Camp to the boundary of the Fort Bliss Military Reservation. The north boundary is unmarked from War Road heading east then north in a stair step fashion mostly following section lines until its intersection with the access road from WSMR HQ to Orogrande Base Camp (Nike Avenue). The north boundary then follows Nike Avenue heading east past the Orogrande Base Camp to where the Fort Bliss boundary turns south along a fence line now between Fort Bliss and BLM lands and then turns east to its intersection with US Highway 54. The east boundary of FMU 8 is US 54 from the Fort Bliss/BLM boundary south to the Fort Bliss southern boundary at the intersection of US 54 and the access road to McGregor Base Camp. The south boundary of FMU 8 is the southern boundary of Fort Bliss from US 54 west to War Road (NM 213). The south boundary follows a fence line and dirt roads west past the Otero County prison facility past the community of Chaparral to its intersection with NM 213. The west boundary of FMU 8 follows NM 213 from the south boundary of Fort Bliss north to its intersection with the north boundary of Fort Bliss and WSMR.

The very large FMU 8 is mostly flat and to gently rolling and includes some of the lower portions of the Tularosa Basin on Fort Bliss. Topographical features are few. Coe Lake is on the western edge of FMU 8 and is a large playa lakebed and is dry for most of the year. Elephant Mountain is located in the extreme northeast portion of FMU 8 just south of Orogrande Base Camp. Much of the vegetation is typical Chihuahuan desert scrub with mesquite, creosote, snake weed, cacti and tarbush with desert grasses intermixed in low-lying areas. Vast areas of FMU 8 are mesquite coppice dunes.

Fire history records show at least 6 wildfires within FMU 8 since 1990. All of the wildfires were associated with low-lying grass and brush in areas near playas and did not burn into adjacent desert areas due to the lack of continuous burnable fuels.

Infrastructure/Assets to be Protected

FMU 8 contains the EQR, Hueco Camp, Orogrande Base Camp, the villages of Palmiyah and El Jarbah and a cluster of structures atop Elephant Mountain. There are high voltage power lines that run through FMU 8. One is on the eastern side and parallel to US 54. Another power line runs from Orogrande Base Camp west across the northern end of FMU 8. There are smaller power lines and telephone lines that cross portions of FMU 8. Few of the structures and infrastructure within FMU 8 are at risk from damage by wildfires due to their location, the lack of surrounding vegetative fuels and their construction materials.

The southern boundary of Fort Bliss abuts the community of Chaparral. There are private dwellings adjacent to the Fort Bliss boundary in a number of places.

There are a few historic cultural sites located in FMU 8, mostly windmills and remains of ranches near NM 213. These features are worth protecting but there is little risk to them from damage by wildfire due to the lack of burnable fuels in the surrounding area.

Risk to Firefighters

There is potential for UXO to be found anywhere in FMU 8. Normal environmental factors of heat, dust, wind and low humidity are here. There are few additional potential risks here due to flat terrain and a lack of continuous, burnable fuels. There are several Off Limits Areas within FMU 8. These areas are marked by siber stakes. Entry into these areas is prohibited by all personnel, including firefighters.

Pre Fire Season Fuels Management Actions

Annual inspections by firefighters for accumulations of dried tumbleweeds and brush need to occur near the community of Chaparral, at the Otero County prison facility, around cultural sites at Cox's windmill, Blevins' windmill and the Coe Ranch and around military training facilities. Excessive accumulations of tumbleweeds or brush need to be piled and burned or crushed and scattered to reduce fire hazard.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 8 unless wildfires are adjacent to wooden man-made structures including power poles. Provide point protection for structures and cultural assets with engines and extinguish wildfire if it advances towards structures. Firefighters will monitor all wildfires and keep equipment on roads.

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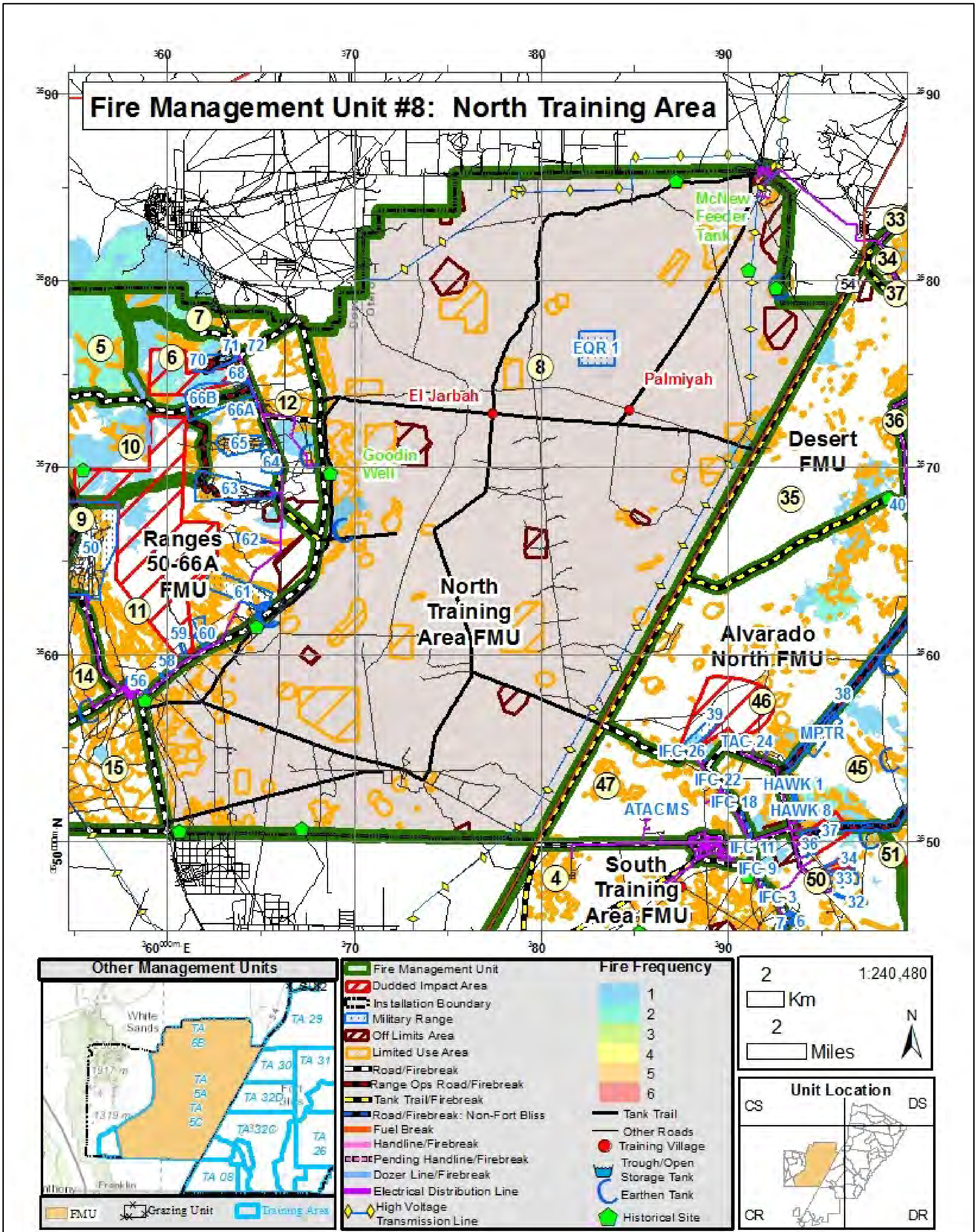

Fire Management Unit #8: North Training Area
North Training Area FMU
Ranges 50-66A FMU
Desert FMU
Alvarado North FMU
South Training Area FMU
El Jarbah
Palmiyah
Goodin Well
McNew Feeder Tank
EQR 1
ATACMS
TAC 24
MPTR
HAWK 1
HAWK 8
IFC 26
IFC 22
IFC 18
IFC 11
IFC 9
IFC 3
Other Management Units
White Sands
TA 6B
TA 54
TA 5C
TA 29
TA 30
TA 31
TA 32D
TA 32C
TA 26
TA 08
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:240,480
2 Km
2 Miles
N
Unit Location
CS
DS
CR
DR

FMU 9 WEST ORGANS 8,476 Acres

Physical Characteristics

FMU 9 is located within Doña Ana Range. FMU 9 is bounded on the north by the firebreak road in Soledad Canyon starting at the boundary gate between BLM and Fort Bliss just southwest of Chimney Rock then east to where the bulldozer line around the Beasley Homestead joins the Soledad Canyon firebreak road. The east boundary is the bulldozer line that goes south from Soledad Canyon just to the east of the Beasley rock house and goes to a point near the divide to Boulder Canyon, then becomes a hand-constructed firebreak from the end of the bulldozer line in Soledad Canyon heading south over the divide into Boulder Canyon. The hand line ends at the bulldozer line that runs south down Boulder Canyon to its terminus with a Range firebreak road near Dripping Springs tank. The east boundary continues south along the Range firebreak road and then roughly follows the western edge of Range 50, then south of Range 50 across a broad plain to its junction with a firebreak road to Finley Canyon. The south boundary is the Finley Canyon firebreak road heading north to an unmarked point at the northern end of North Hill. The west boundary is an unmarked boundary line heading west from Finley Canyon firebreak road around North Hill to the Fort Bliss Military Reservation boundary and then north along the Fort Bliss boundary which is unmarked to its terminus at Soledad Canyon firebreak road.

FMU 9 is mountainous in terms of topography. The northern two-thirds of FMU 9 are dominated by the southern end of the steep, rugged Organ Mountains. The southern one-third is broad bajadas that slope downwards to the south from the base of the Organ Mountains. Vegetation on the mountains is diverse with a mixture of cool and warm season grasses and includes shrubs of mesquite, agave, prickly pear, catclaw, mountain mahogany, yucca and ocotillo on south-facing slopes. North-facing slopes have piñon, several species of oak, one-seed and alligator juniper, little-leaf sumac, mountain mahogany and various grasses. Vegetation on the bajadas is mesquite, creosote, tarbush, prickly pear, agave, bear grass, sotol and grasses.

Fire history records show 3 large wildfires have burned within FMU 9 since 1990.

Infrastructure/Assets to be Protected

FMU 9 contains no military assets or infrastructure.

There are historic wooden structures at the Beasley Homestead sites in Soledad Canyon that are at risk from wildfires.

Risk to Firefighters

Environmental factors of very steep terrain, loose rocks, heat, dust, wind and low humidity are here. Wildfires in the past, in the Organ Mountains have exhibited extreme fire behavior with high rates of spread. The chimney effect wildfires can exhibit here is due to narrow, steep-walled canyons that can funnel wind currents and lead to blow-up conditions of fire whorls and flame lengths over 100 feet. Spotting from firebrands carried by wind currents ahead of a main flaming fire front can cause new fires up to 1/4 mile away.

UXO is a danger in FMU 9. Much of FMU 9 is within the SDZ for Range 50. Permission to enter SDZ areas must be obtained from Range Operations prior to engaging in wildfire operations in FMU 9.

Pre Fire Season Fuels Management Actions

FMU treatments: The firebreak road in the bottom of Soledad Canyon should be bladed by DPW O&M as needed to keep it vegetation-free and navigable for brush engines with four-wheel drive. The bulldozer fireline heading south from Soledad Canyon towards Boulder Canyon should be inspected on an annual basis. Vegetation on this line can be removed by hand tools or by re-blading with a bulldozer if necessary. The handline between Soledad and Boulder Canyons should be inspected annually and kept vegetation free. The firebreak road in Boulder Canyon should be maintained by Range Operations and the fire break road into Finley Canyon should be maintained by DPW O&M and kept vegetation free.

Prescribed fire should follow road and bulldozer line improvements in Boulder Canyon and Soledad Canyon to strengthen effectiveness of fire breaks. Plans are in place to burn from the divide between Soledad and Boulder Canyons, southward down Boulder Canyon to Range 50 or to a point where fire will no longer carry effectively.

Cultural Asset treatment: Historic structures in Soledad Canyon should be inspected annually for fuel build up around structures. Use handtools or weed whips or weedeaters to keep weeds and grasses down to around 6 inches in height and away from the structures to about 30 feet. There is an important cultural asset in the form of a large oak tree adjacent to the Beasley Rock House site in Soledad Canyon. This historic tree should be raked around it to remove flammable litter and protect it from wildfire.

Wildfire Management

All wildfires in FMU 9 require a suppression response. In some cases, fires may just need monitoring. This usually will occur after the monsoon rains have set in and is generally associated with lightning caused fires. Rapid initial attack is warranted for all man-caused wildfires here. If the wildfire is in remote, rugged country consider using aerial assets. Aerial assets may include CAB helicopters with buckets or air tankers. Smokejumpers can be ordered and have proved to be effective on remote wildfires in the Organ Mountains. Coordinate with BLM firefighters who will respond to wildfires here under guidance within the Fort Bliss/BLM mutual aid agreement. Keep wildfires contained within Fort Bliss perimeters. Use point protection with engines around historic structures in Soledad Canyon. Provide safety zones and escape routes for engines in Soledad Canyon. Bulldozers can be used in Soledad Canyon as needed for structure protection, improving roads, building safety zones and building fireline.

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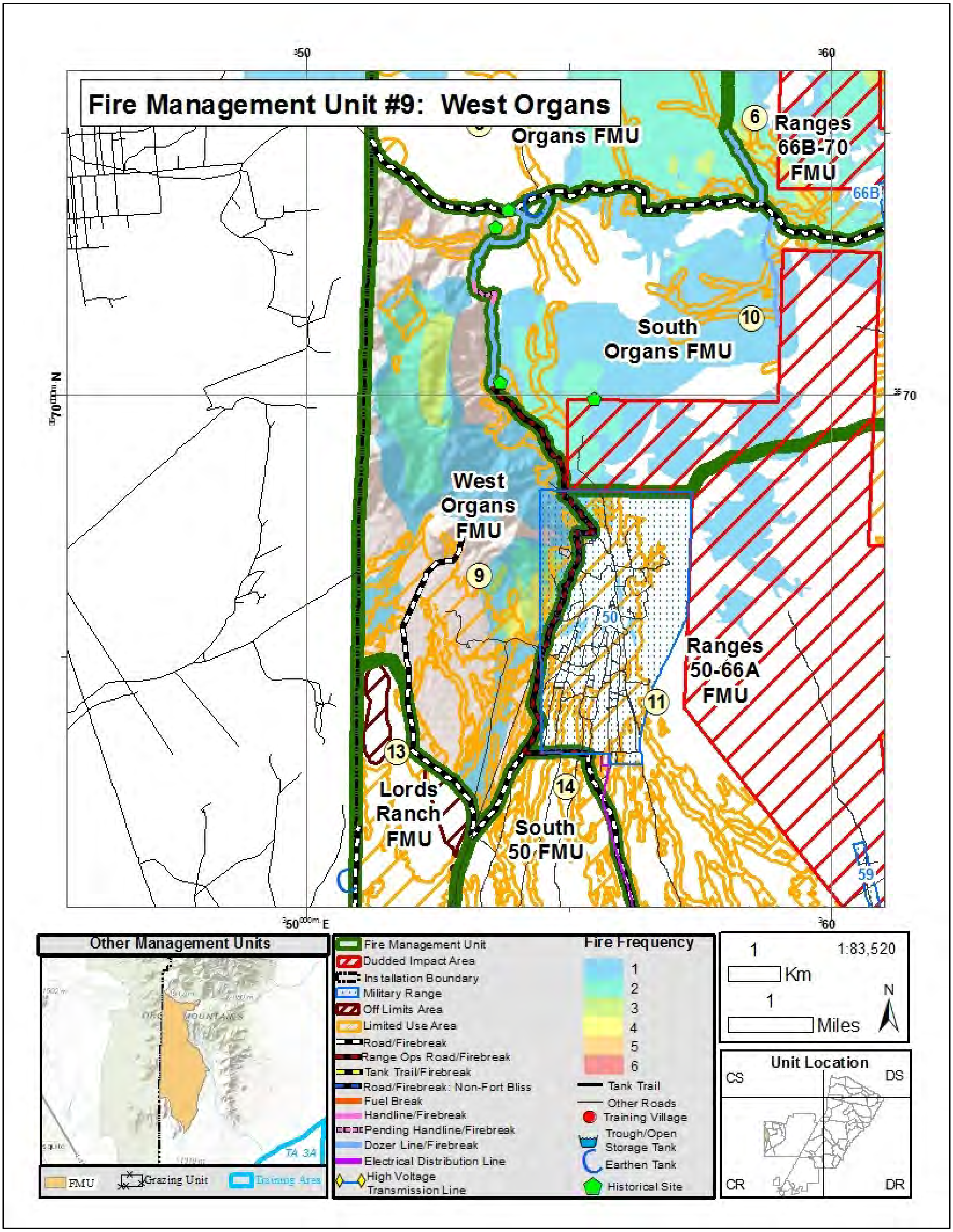


Fire Management Unit #9: West Organs
Organs FMU
Ranges 66B-70 FMU
66B
South Organs FMU
West Organs FMU
Ranges 50-66A FMU
Lords Ranch FMU
South 50 FMU
50
59
6
9
10
11
13
14
350
360
370
350000m E
Other Management Units
ORGAN MOUNTAINS
TA 3A
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1
1:83,520
Km
1
Miles
N
Unit Location
CS
DS
CR
DR

FMU 10 SOUTH ORGANS 9,383 Acres

Physical Characteristics

FMU 10 is located within Doña Ana Range. FMU 10 is bounded on the north by the firebreak road that follows the bottom of Soledad Canyon beginning just downstream from the Beasley Homestead near the mouth of North Canyon and heading east down Soledad Canyon to an intersection with a Range firebreak road. The east boundary is the Range firebreak road that runs south from Soledad Canyon road at the west end of Range 66B, just west of the last mechanized target and runs west of Range 65 into the west end of Range 63. The southern boundary is an unmarked line running west from the western-most portion of Range 63 up an arroyo bottom, through the impact area to the crest of Rattlesnake Ridge, then continuing west down Rattlesnake Ridge to the northern boundary of Range 50, then continuing due west along the northern boundary of Range 50 to the firebreak road that goes north into Boulder Canyon. The western boundary is the firebreak road from the west edge of Range 50, then north on that firebreak road in Boulder Canyon to Dripping Springs tank, then along a bulldozer firebreak that continues up the bottom of Boulder Canyon to a hand line firebreak that goes to the top of the ridge, then along a ridge to the north where the firebreak ties into a bulldozer line firebreak, then along the bulldozer line north and east to where it ties into the Soledad Canyon firebreak road.

This FMU is diverse in terms of topography and vegetation. The southern and eastern portions of FMU 10 slope towards the Tularosa Basin and away from the Organ Mountains. The lowest elevations contain creosote bajadas and are typical of the Tularosa Basin. Moving upslope towards the mountains are gently-sloping rocky plains cut by steep-sided washes or arroyos. Mountainous terrain in the northern and central portions of FMU 10 consists of the rocky ridges and peaks of the Organ Mountains south of Soledad Canyon and includes the north-facing slopes of Soledad Canyon down to the riparian areas in the bottom of Soledad Canyon.

Bajadas include areas of creosote, cacti, agave, sotol, snakeweed, bear grass and yucca with pockets of grasses intermixed. Little leaf sumac, desert willow, mesquite and four-wing saltbush are found in swales and arroyos. Mountainous slopes contain shrubs of mountain mahogany, cacti, ocotillo, piñon pine, juniper, oak and mesquite. Grasses include tobosa, gramas and dropseeds. The Organ Mountains rise steeply from the desert and have a diverse array of vegetation depending on aspect, soil type and elevation. Grasses are the primary carrier of wildfires and grasses are found in abundance throughout the Organ Mountains. Exceptions are some south-facing slopes and numerous bare rock areas. The north-facing slopes south of Soledad Canyon are piñon-juniper woodlands with oak intermingled. These fuels can burn readily under the right conditions. Fire history records show that some areas within the Organ Mountains have burned several times since 1990.

Fire history records show at least 15 wildfires have burned in FMU 10 since 1990.

Infrastructure/Assets to be Protected

FMU 10 contains no military assets or infrastructure.

Risk to Firefighters

Terrain features of steep slopes and loose rocks combined with live and dead vegetation that burns readily, combined with continuous grass fuels, combined with weather features of hot temperatures, low humidity and erratic winds pose serious risks to firefighters in FMU 10. Past wildfires have exhibited extreme fire behavior in the Organ Mountains. Safety zones for firefighters are few to non-existent in the Organ Mountains. There is poor ingress/egress for engines and firefighters in Soledad Canyon. Roads in this area are rocky and steep and require four-wheel drive.

UXO has been found throughout FMU 10. There is a very large duded impact area within FMU 10 that contains UXO. Entry into impact areas is prohibited. Keep firefighters at least 725 meters from the boundary of the impact area if fires are burning in the impact area. Nearly all of FMU 10 is within an SDZ for one or more of the Ranges 50-66. Permission must be obtained from Range Operations prior to entering SDZ areas in FMU 10.

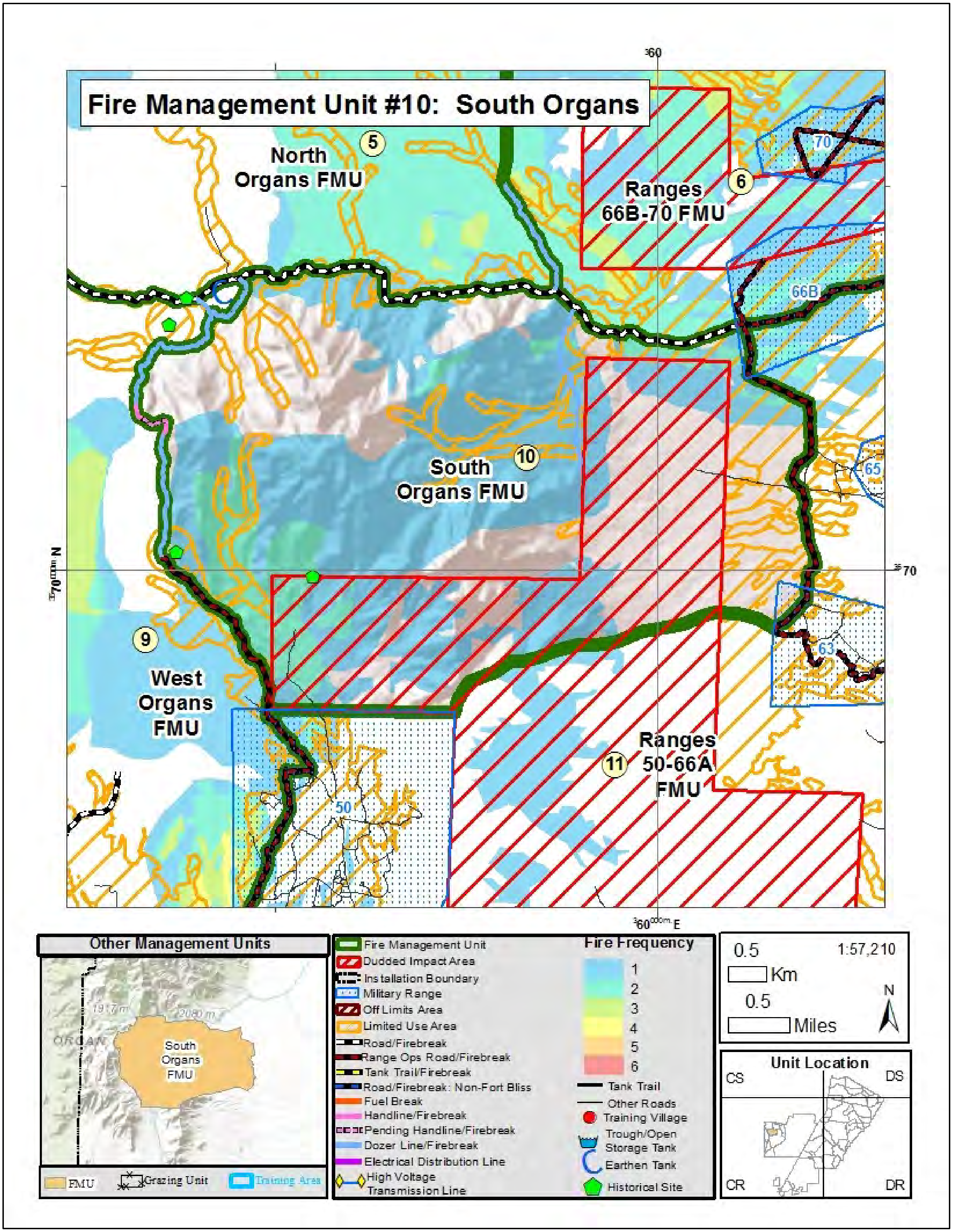
Pre Fire Season Fuels Management Actions

FMU treatments: New fire breaks have been completed in FMU 10. One of them is in grass/shrub fuels at the mouth of Soledad Canyon and is located just west of the impact area and west of Ranges 65 and 66 A/B. This bulldozer fire break runs south from the Soledad Canyon road and eventually ties into South Canyon. This firebreak is close to the impact area and is off-limits to all personnel when wildfires are burning in the impact area due to UXO hazards. The second bulldozer line is in Boulder canyon at the north end of Range 50 and is designed to skirt the edge of the impact area and contain grass and brush wildfires from spreading west towards Long Canyon. The third bulldozer fire break is within Soledad Canyon and surrounds the Beasley homesteads and ties into the existing bulldozer fire break from Soledad Canyon road which ends on the ridge line just north of Boulder Canyon. An existing handline ties this bulldozer line to the bulldozer line in Boulder Canyon. A prescribed fire plan has been completed and approved for prescribed fires around the west and the north perimeters of FMU 10's boundaries. Yearly assessments should be done along the fuel breaks in FMU 10 to determine when fuel loads are adequate to carry fire. When fuel loads are adequate, plan to implement prescribed burning to blackline firebreak roads/bulldozer lines in the winter before fire season onset.

Training Asset treatments: DPW firebreak roads and Range firebreak roads around the perimeter of FMU 10 should be maintained to keep them vegetation-free.

Wildfire Management

Wildfires should be suppressed in all areas of FMU 10 except within and adjacent to the impact area. Safety regulations for Fort Bliss require all personnel to remain at least 725 meters distant from the boundaries of impact areas that may contain 155mm artillery rounds. This impact area in FMU 10 contains 155mm shells. Let wildfires burn themselves out in impact areas and in adjacent areas. Use aerial assets outside of impact areas if wildfires are spreading. Use direct attack methods to keep wildfires small. CAB assets may be the only way to fight wildfires within the Organ Mountains once wildfires become established. After all the bulldozer fire breaks are reinforced by prescribed fire treatments then the firefighting strategy should allow for wildfires to burn within the boundaries of FMU 10.


Fire Management Unit #10: South Organs
North Organs FMU
5
Ranges 66B-70 FMU
6
70
66B
South Organs FMU
10
65
West Organs FMU
9
63
Ranges 50-66A FMU
11
50
360
370
360000m E
370000m N
Other Management Units
South Organs FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:57,210
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

615

FMU 11 RANGES 50 to 66A 30,285 Acres

Physical Characteristics

FMU 11 is located within Doña Ana Range. FMU 11 is bounded on the north by an unmarked line that heads east from the northwest corner of Range 50 and follows the northern boundary of Range 50, then east through the impact area and over the top of Rattlesnake Ridge, then continuing east down Rattlesnake Ridge to a point on the Range firebreak road that is the western-most point in Range 63, then north on that Range firebreak road from Range 63 to its terminus with the Soledad Canyon Road. The northern boundary continues east along the firebreak road that accesses Soledad Canyon, through the middle of the mechanized targets on Range 66B, past the ROCA for Ranges 66 A/B and continuing east to the Firing Line Road. The east boundary is the Firing Line Road as it runs south from its intersection at Range 66 B and runs first past Range 66 A, Range 65, Range 64 and Range 63 to its terminus at War Road (NM 213). The south boundary of FMU 11 is the War Road from its junction with the Firing Line Road running south and west to its junction with the main access road into Doña Ana Base Camp. The south boundary continues west on Anzio Road around the southern portion of Doña Ana Base Camp to its junction with the firebreak road that is the main access road for Range 50. The west boundary of FMU 11 is the firebreak road to Range 50 from Anzio road, then west at the Range 50 ROCA around the southern boundary of Range 50 to the western edge of Range 50, then north along a firebreak road that follows the western edge of Range 50 to a point just west of the impact area near the mouth of Boulder Canyon just north of the last target mechanism (most northern) on Range 50.

FMU 11 is mostly south and east-facing bajadas from the base of the Organ Mountains to the desert floor of the Tularosa Basin. The bajadas are characterized by rocky, gently-sloping plains cut by steep-sided washes or arroyos. Vegetation is creosote, mesquite, catclaw, cacti, agave and yucca with grasses intermixed. Little leaf sumac, desert willow, mesquite and four-wing saltbush are found in swales and arroyos. Lower areas on the east side of the FMU have sandier soils and vegetation is grasses with mesquite intermixed. These areas can support wildfires in years following above average precipitation.

Fire history records show 8 wildfires in FMU 11 have burned since 1990.

Infrastructure/Assets to be Protected

FMU 11 contains Fort Bliss Live Firing Ranges 50 through 65. Each range has a collection of infrastructure that consists of lookout towers, buildings, firing platforms, targets, facilities and storage containers. There is small danger of damage from wildfires to these assets. This is due to their location in cleared areas as well as their construction of mostly non-combustible materials. Some target mechanisms and structures can accumulate sufficient amounts of brush, weeds, grass and old tumbleweeds that a wildfire threat exists to the mechanism or structure.

Risk to Firefighters

There are potential UXO issues throughout FMU 11. Environmental factors of high heat, low humidity and strong winds present additional hazards to wildland firefighters.

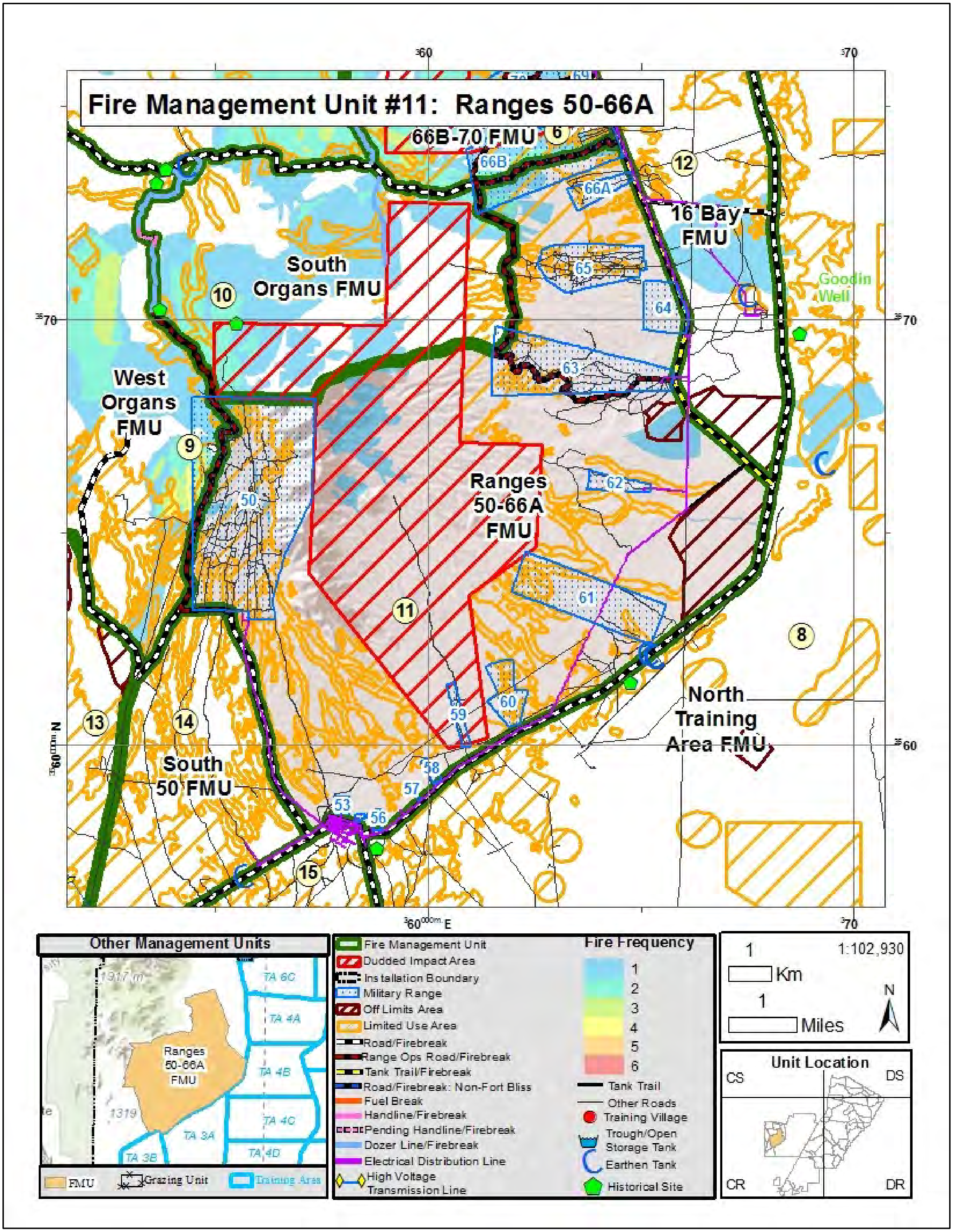
Nearly all of FMU 11 is within an SDZ for the Ranges 50-66 A/B. Obtain permission from Range Operations prior to entering SDZ areas and engaging in wildfire operations in FMU 11. There is a very large duded impact area within FMU 11 that contains UXO. Entry into impact areas is prohibited. Keep firefighters at least 725 meters from the boundary of the impact area if fires are burning in the impact area

Pre Fire Season Fuels Management Actions

DPW and Range firebreak roads around the perimeter of FMU 11 should be maintained to keep them vegetation-free.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 11. Military training should continue on all ranges unabated, even if wildfires are burning. Fire history shows that wildfires extinguish themselves as they run into sparse fuels in FMU 11 except in the northwest corner of FMU 11. Wildfires here have burned across firebreaks and have become large. Safety regulations for Fort Bliss require all personnel to remain at least 725 meters distant from the boundaries of impact areas that may contain 155mm artillery rounds. This impact area in FMU 11 may contain 155mm shells. Let wildfires burn themselves out in impact areas and in adjacent areas. Firefighters and equipment will stay on firebreak roads and may use fire to burn out fuels along roads and firebreaks ahead of a wildfire, if deemed advantageous by the Incident Commander.



Fire Management Unit #11: Ranges 50-66A
66B-70 FMU
16 Bay FMU
South Organs FMU
West Organs FMU
Ranges 50-66A FMU
North Training Area FMU
South 50 FMU
Goodin Well
Other Management Units
Ranges 50-66A FMU
TA 6C
TA 4A
TA 4B
TA 4C
TA 4D
TA 3A
TA 3B
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:102,930
Km
Miles
N
Unit Location
CS
DS
CR
DR

668

FMU 12 16 BAY 7,300 Acres

Physical Characteristics

FMU 12 is located within Doña Ana Range. FMU 12 is bounded on the north by the firebreak road from the Firing Line Road to the War Road (NM 213) and provides the access for Range 72. The east boundary is the War Road from the northern boundary of Fort Bliss south to its intersection with the Firing Line Road. The south and west boundary is the Firing Line Road that runs northwest from War Road past Ranges 63-72 to the intersection with the firebreak road that is also the access road to Range 72.

FMU 12 is nearly flat with sandy soils in the southern half. Vegetation is typical Chihuahuan desert scrub with mesquite, creosote, mariola, little leaf sumac, apache plume and tarbush with desert grasses intermixed.

Fire history records show one large wildfire in the center of FMU 12 since 1990.

Infrastructure/Assets to be Protected

FMU 12 contains facilities at 16 Bay that consists of buildings, fueling facilities and storage containers. There are isolated buildings surrounded by berms adjacent to the Firing Line Road. These structures do not represent a significant wildfire hazard due to their location inside a dirt compound as well as their construction materials. There are non-flammable structures located within Range 72.

There is a large off limits area (OLA) in the southern 1/3 of this FMU.

Risk to Firefighters

There are few potential risks here. The fueling facilities at 16 Bay are not at risk due to their location which is well away from any flammable vegetation within a cleared area.

The northern ¼ of FMU 12 is within an SDZ. Obtain permission to enter SDZ areas from Range Operations.

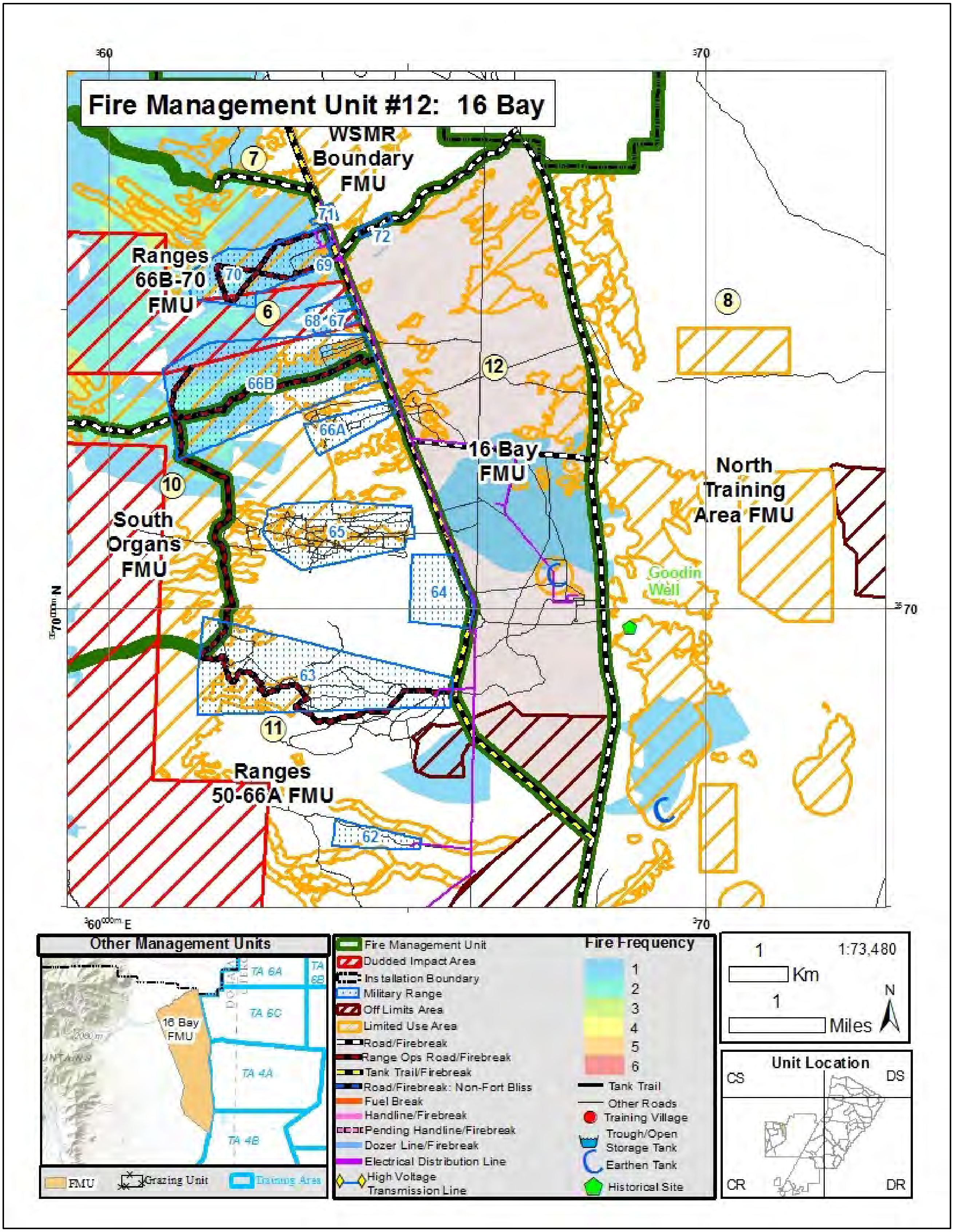
Pre Fire Season Fuels Management Actions

Firefighters should inspect all facilities for flammable fuel accumulations around buildings, infrastructure and fences. Remove accumulated flammable weeds and dispose by burning in piles or crushing and scattering. The roads surrounding FMU 12 are so heavily used that there is no danger of fuel accumulations. Normal maintenance by heavy equipment to keep the road smooth suffices for maintaining firebreaks.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 12. Fire history shows that wildfires extinguish themselves as they run into sparse fuels in FMU 12. Firefighters and equipment should stay on roads and monitor wildfires. Extinguish wildfires as they near roads. In rare circumstances, firefighters may use fire to burn out fuels along roads ahead of a wildfire in FMU 12, if deemed advantageous by the Incident Commander.

703



Fire Management Unit #12: 16 Bay
WSMR Boundary FMU
Ranges 66B-70 FMU
16 Bay FMU
North Training Area FMU
South Organs FMU
Ranges 50-66A FMU
Goodin Well
Other Management Units
16 Bay FMU
TA 6A
TA 6B
TA 6C
TA 4A
TA 4B
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:73,480
1 Km
1 Miles
N
Unit Location
CS
DS
CR
DR

704

FMU 13 LORD'S RANCH 4,370 Acres

Physical Characteristics

FMU 13 is located within Doña Ana Range. FMU 13 is bounded on the north by an unmarked line that begins on the Fort Bliss Military Reservation boundary west of North Hill at the northern extent of the Bishop's Cap Ranch and heads east around the north end of North Hill to a firebreak road. The east boundary is the firebreak road from North Hill heading south to Booker Hill, then south-southwest on a two-track road to the high-voltage power line road, then along the power line road heading southeast to where it intersects with a firebreak road known as the Anzio Road. FMU 13 is bounded on the south by the Anzio Road from the power line heading west to its intersection with the western boundary of the Fort Bliss Military Reservation. The FMU boundary on the west is a firebreak road that follows the western boundary of the Fort Bliss Military Reservation heading north from Anzio Road to the road terminus at the south end of North Hill, then continuing north on an unmarked boundary of the western edge of Fort Bliss to the northwest side of North Hill. .

FMU 13 is nearly flat in the southern half. Vegetation is typical of Chihuahuan desert scrub with mesquite, creosote, tarbush, cacti and desert grasses intermixed. The northern half is a limestone ridge that rises abruptly from the desert floor. Vegetation is agave, ocotillo, cacti, sotol, yucca, bear grass and creosote with a few desert grasses intermixed.

Fire history records show no fires within this FMU since 1990.

Booker Hill is a prominent physical feature located within FMU 13. There is a road to the top of this hill and this makes it an excellent lookout point for firefighters to view the surrounding area.

Infrastructure/Assets to be Protected

There is a high-voltage power line that crosses through the southern part of FMU 13. The wooden poles could be at risk during fire seasons following wet precipitation years. There are numerous private residences just west of the Fort Bliss boundary fence in the southern portion of FMU 13.

Risk to Firefighters

Hazards associated with downed power lines is a risk if wildfire burns creosote-soaked power poles. Extreme environmental factors of high heat, low humidity and strong winds can present hazards to wildland firefighters.

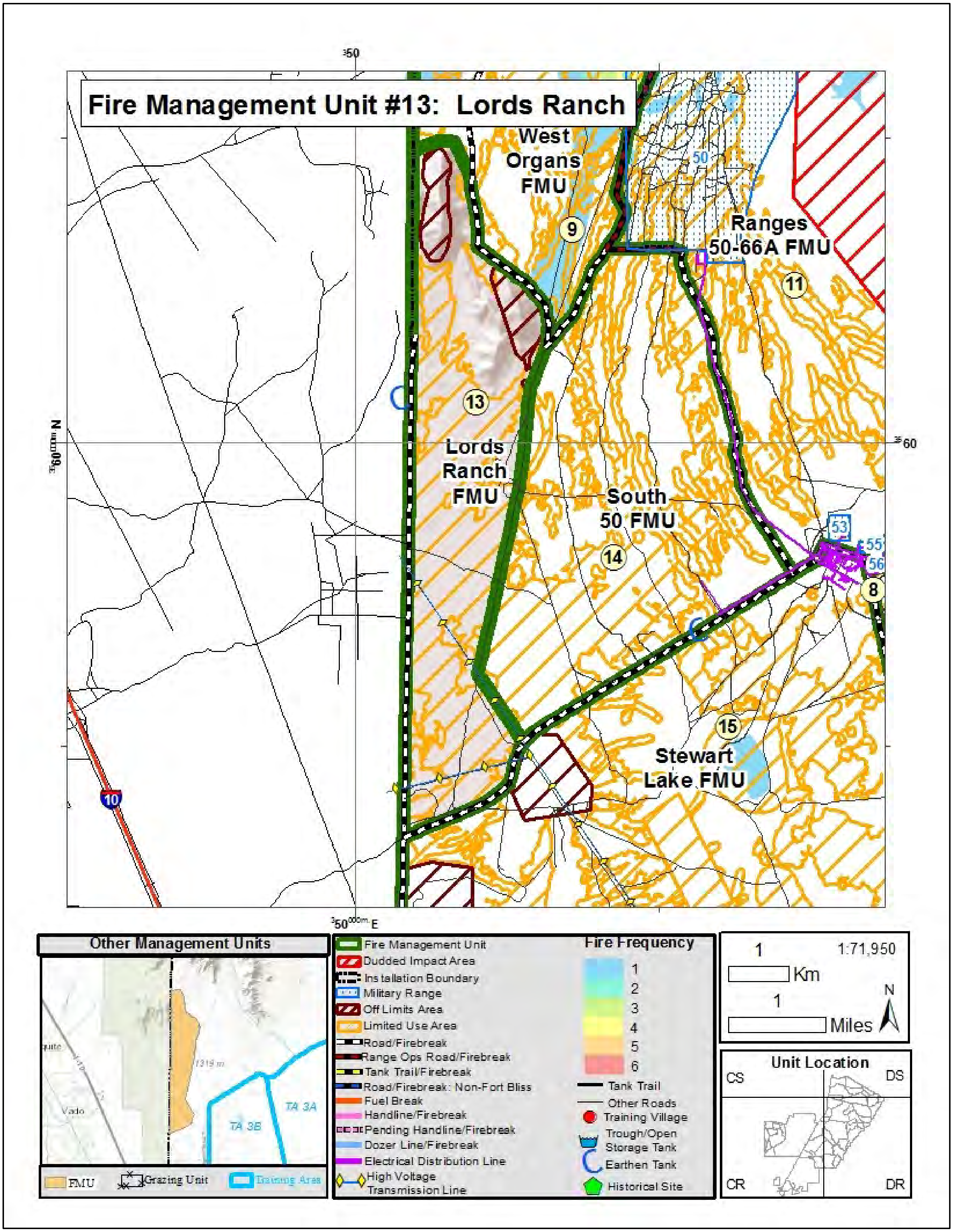
There are no SDZ areas in FMU 13.

Pre Fire Season Fuels Management Actions

Firebreak roads around the perimeter of this FMU and particularly, along the Fort Bliss boundary adjacent to private residences should be maintained by DPW O&M to keep them vegetation-free. The power line road and poles should be inspected annually by Fort Bliss firefighters. El Paso Electric Company should be notified if the road needs maintenance. The west fenced boundary should be inspected annually by Fort Bliss firefighters and should be kept free of tumbleweed accumulations especially near private structures.

Wildfire Management

Use direct attack suppression tactics in FMU 13 with the goal of keeping wildfires as small as possible. This is due to the proximity of private land and structures just across the Fort Bliss western boundary. Fuels in this area are not conducive to wildfire spread, but fire seasons following wet precipitation years could see enough fuel to carry wildfires across the boundary here.


Fire Management Unit #13: Lords Ranch
West Organs FMU
9
Ranges 50-66A FMU
11
13
Lords Ranch FMU
South 50 FMU
14
8
15
Stewart Lake FMU
50
53
55
56
10
Other Management Units
TA 3A
TA 3B
Vado
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1 Km
1 Miles
1:71,950
N
Unit Location
CS
DS
CR
DR

745

FMU 14 SOUTH 50 5,945 Acres

Physical Characteristics

FMU 14 is located within Doña Ana Range. FMU 14 is bounded on the north by a Range firebreak road beginning at the southwest corner of Range 50 and heading east to an intersection just west of the Range 50 ROCA. The east boundary of FMU 14 is the firebreak road and also the primary access road to Range 50 from Range 50 ROCA south to its intersection with a firebreak road also known as the Anzio Road. The south boundary of FMU 14 is the firebreak road that runs southwest from Doña Ana Base Camp and is called Anzio Road to an intersection with a road along a high voltage power line. The west boundary of FMU 14 is the power line access road heading northwest from Anzio Road to an intersection with a firebreak road and then runs north-northeast along the firebreak road to the southwest corner of Range 50.

FMU 14 is gently sloping from the north downhill to the south and is cut by numerous rocky washes that drain into the Tularosa Basin in the area of Stewart Lake. Vegetation is typical of Chihuahuan desert scrub with mesquite, creosote and tarbush and grasses intermixed in low-lying areas. Upland areas in the northern part of FMU 14 are vegetated with a mixture of desert grasses and shrubs such as creosote, agave, prickly pear, catclaw, mesquite and ocotillo.

Fire history records show no wildfires within FMU 14 since 1990.

Infrastructure/Assets to be Protected

FMU 14 contains an Ammunition Handling Area (AHA), a power line to the Range 50 ROCA and a few structures scattered around the FMU. None of these represent a significant wildfire hazard due to their location, the light fuel loads and their construction materials.

Risk to Firefighters

Normal environmental factors of heat, dust, wind and low humidity are here. UXO may be found in FMU 14.

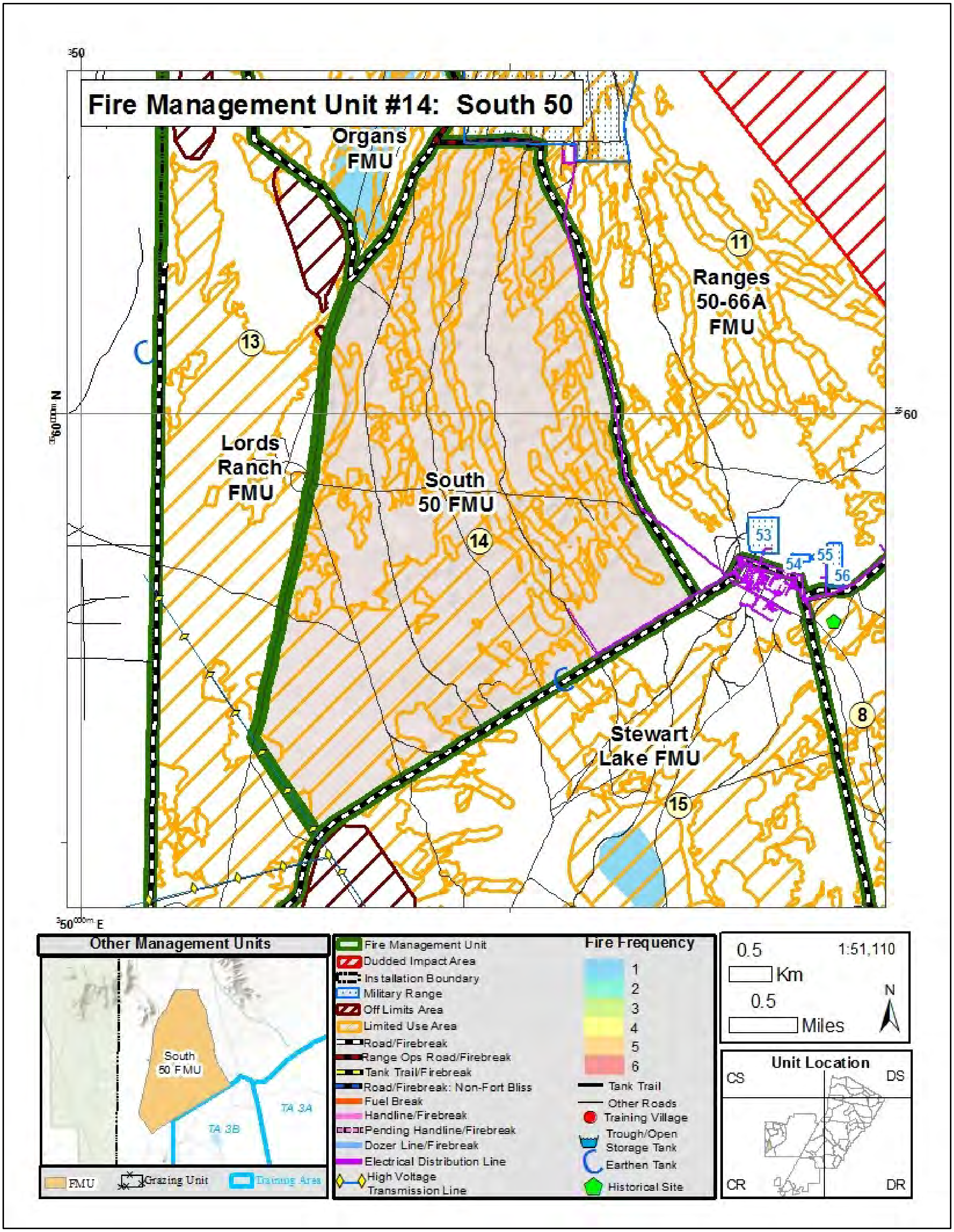
There are no SDZ areas within FMU 14.

Pre Fire Season Fuels Management Actions

Firebreak roads around the perimeter of FMU 14 should be maintained by DPW O&M and kept vegetation-free.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 14. Firefighters and equipment will stay on roads and monitor wildfires advance. Extinguish wildfires if they burn up to roads.


Fire Management Unit #14: South 50
Organs FMU
Ranges 50-66A FMU
Lords Ranch FMU
South 50 FMU
Stewart Lake FMU
11
13
14
15
8
53
54
55
56
Other Management Units
South 50 FMU
TA 3A
TA 3B
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:51,110
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

778

FMU 15 STEWART LAKE 11,811 Acres

Physical Characteristics

FMU 15 is located within Doña Ana Range and TA 3B. FMU 15 is bounded on the north by the firebreak road (aka Anzio Road) beginning at the west boundary of the Fort Bliss Military Reservation and heading northeast to the firebreak road that separates Doña Ana Base Camp from Ranges 53-56 then continues east to War Road. The east boundary of FMU 15 is the War Road (NM 213) from Doña Ana Base Camp heading south to the boundary of Fort Bliss near the town of Chaparral. The south boundary of FMU 15 is marked by a fence and two-track road and is the southern boundary of Fort Bliss and heads west from NM 213 to the Franklin Mountains and then the boundary is unmarked to the southwest corner of Fort Bliss in New Mexico. The west boundary is a firebreak road along the western Fort Bliss Military Reservation boundary from the southwest corner to the Anzio Road and gate.

FMU 15 is diverse in terms of topography. The western half of the FMU is dominated by the north end of the Franklin Mountains. The east half grades from mountains to bajadas as they slope downwards from the Franklin Mountains to the basin floor. The lowest portion of the FMU is a large playa lake called Stewart Lake. Vegetation on the mountains is a mixture of desert grasses with agave, prickly pear, catclaw, yucca, sotol and ocotillo. Vegetation on the bajadas is mesquite, creosote, tarbush, prickly pear and grasses intermixed. The low-lying areas surrounding Stewart Lake have abundant mesquite, creosote and desert grasses.

Fire history records show one wildfire within this FMU since 1990. That wildfire burned the area around Stewart Lake.

Infrastructure/Assets to be Protected

FMU 15 contains the Doña Ana Base Camp. This Camp is well-protected from wildfire due to the clearing of most vegetation within the Camp’s footprint. There are a scattering of other structures within FMU 15. There is a structure atop the Franklin Mountains in FMU 15 that is accessed by a spur road from the Anzio Road. A high voltage power line passes through FMU 15 in the southwest portion and crosses the extreme north end of the Franklin Mountains.

There are four off limits areas (OLAs) located in the western half of FMU 15.

Risk to Firefighters

Normal environmental factors of heat, dust, wind and low humidity are here. Power lines can be hazards if wooden poles are burning.

There are no SDZ areas in FMU 15.

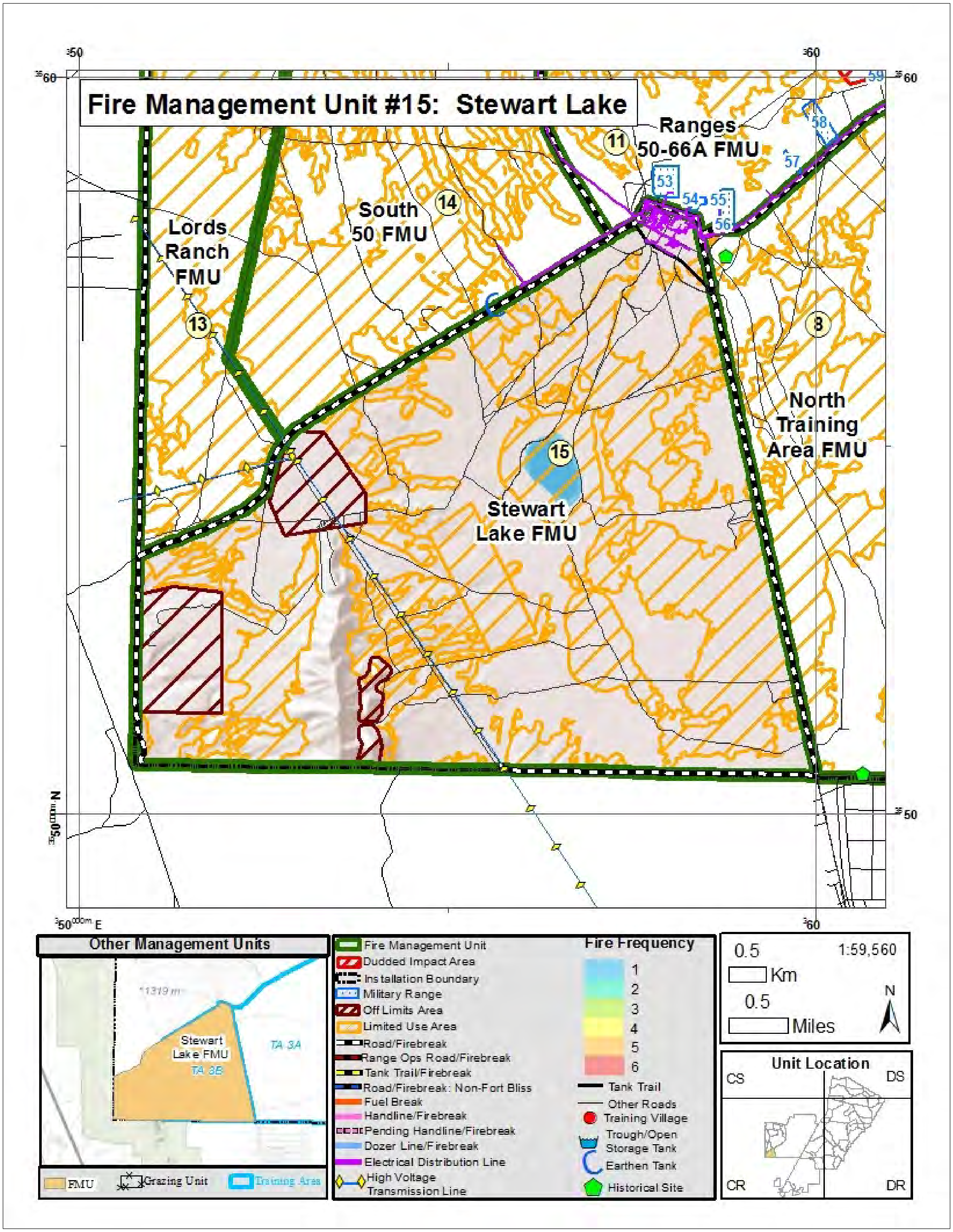
Pre Fire Season Fuels Management Actions

Firebreak roads around the perimeter of FMU 15 should be maintained by DPW O&M to keep them vegetation-free. The south boundary of the Military Reservation has a primitive road that goes from NM

213 to the base of the Franklin Mountains. This road should be improved for brush engine access and kept vegetation-free. The same is true for the road that travels south from the Anzio Road along the western boundary of Fort Bliss. This road is rough and needs work so that brush engines can access it.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 15. Keep wildfires contained within Fort Bliss perimeters. Use point protection with engines around any structures if wildfires are threatening including power poles. Fuels are insufficient most years to allow wildfire spread within FMU 15 except in the area around Stewart Lake. In years following above normal annual precipitation, wildfires may spread across Fort Bliss boundaries. Firefighters and equipment will stay on roads and monitor wildfire progress. Extinguish wildfires as they burn up to roads.


Fire Management Unit #15: Stewart Lake
Ranges 50-66A FMU
Lords Ranch FMU
South 50 FMU
North Training Area FMU
Stewart Lake FMU
11
14
13
8
15
53
54
55
56
57
58
59
50
60
50000m. E
3550000m. N
Other Management Units
*1319 m
Stewart Lake FMU
TA 3B
TA 3A
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
Km
0.5
Miles
1:59,560
N
Unit Location
CS
DS
CR
DR

824

FMU 16 NW McGREGOR 20,615 Acres

Physical Characteristics

Most of TA 10 is within FMU 16. FMU 16 is bounded on the north by the McGregor Range Military Reservation boundary from US 54 east to the Lincoln National Forest boundary. The east boundary of FMU 16 is unmarked along the north-south boundary between Fort Bliss and the Lincoln National Forest. The south boundary is an unmarked line from the southwest corner of the Lincoln National Forest heading southwest to a firebreak road, then northwest along the firebreak road to an intersection with a county road, then west on the county-maintained road past Sand tank and Escondida Tank to its intersection with US 54. The west boundary is the Fort Bliss boundary northward along the east side of US Highway 54 to the northwest corner of Fort Bliss just north of Dunes tank.

Topography is representative of the Tularosa Basin desert floor and is flat to gently rolling in FMU 16. Vegetation in FMU 16 is characteristic of Chihuahuan desert scrub and includes creosote, mesquite and tarbush intermixed with desert grasses in the east half of FMU 16. Sand sage and grasses that have adapted to life in sandy soils are found in the west half of FMU 16. In years following high precipitation, wildfires can burn in sand sage and grass. There are areas of mesquite, much of it now in the form of coppice dunes that surround the sand sage fuel type. These areas do not support wildfire spread. Fire history records show 1 wildfire in FMU 16 since 1990.

Infrastructure/Assets to be Protected

There are no training assets or military infrastructure within FMU 16. There are improvements related to livestock grazing and watering in FMU 16.

Risk to Firefighters

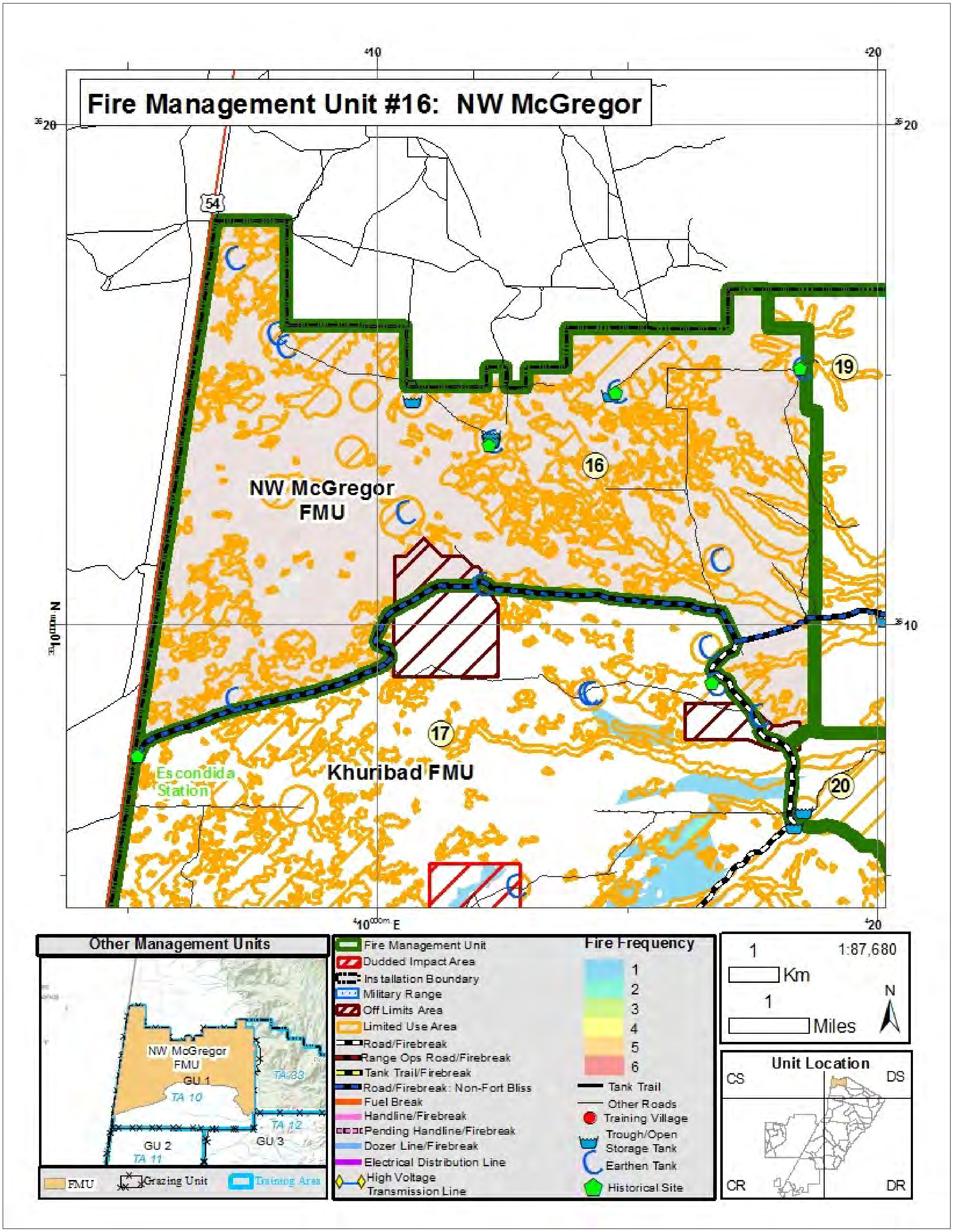
There is a danger of firefighting vehicles becoming stuck if driving off roads within FMU 16 due to deep sand in many places. UXO is not considered a danger within FMU 16 due to its use as a grazing livestock pasture. Environmental factors of high heat, low humidity and strong winds present additional hazards to wildland firefighters in FMU 16. Most of the south half of FMU 16 is within the SDZ for Range 91. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations here.

Pre Fire Season Fuels Management Actions

The firebreak road running south from the county-maintained road in the southeast corner of FMU 16 should be maintained by DPW O&M to be vegetation-free.

Wildfire Management

Use direct attack methods with Type 6 4x4 engines, UTVs or on foot. BLM Grazing Unit 1 is located within FMU 16. The grazing unit boundary is mostly fenced. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 16 and will work closely with BLM firefighters to keep wildfires small.



Fire Management Unit #16: NW McGregor
54
NW McGregor
FMU
16
17
19
20
Khuribad FMU
Escondida
Station
Other Management Units
NW McGregor
FMU
GU 1
TA 10
TA 33
TA 12
GU 2
GU 3
TA 11
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage
Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open
Storage Tank
Earthen Tank
Historical Site
1
1:87,680
Km
1
Miles
N
Unit Location
CS
DS
CR
DR

860

FMU 17 KHURIBAD 32,513 Acres

Physical Characteristics

Parts of TA 10, 11 and 12 are located within FMU 17. FMU 17 is bounded on the north by the county road that runs from US Highway 54 to an intersection with a firebreak road. The east boundary is the firebreak road south from the county road past No Good tank to an intersection of a firebreak road and the Orogrande pipeline road at the mouth of Culp Canyon, then continuing southeast on a two-track road up Culp Canyon past Culp tank to an intersection with a firebreak road. The south boundary is the firebreak road heading southwest near Culp tank to an intersection of a firebreak road along a high-voltage power line, then northwest and west along the fire break/ power line road to US 54. The west boundary is the McGregor Range boundary alongside US Highway 54 from the high-voltage power line north to the county road that runs east and becomes the north boundary of FMU 17.

Topography is typical Tularosa Basin desert floor and is generally flat to gently rolling in the western portion of FMU 17. Vegetation is dominated by shrub lands of creosote, tarbush, cacti and mesquite intermixed with desert grasses. There are large areas of sand sage and mixed desert grasses that have adapted to life in sandy soils. In years following higher than average precipitation, wildfires burn in this fuel type. The eastern portion of FMU 17 is steep, rocky limestone hills. Vegetation is ocotillo, sotol, cacti, cat claw, agave and sparse grasses intermixed. This rocky soil does not support wildfire growth due to a lack of continuous vegetation.

Fort Bliss fire history records show at least 12 wildfires within FMU 17. Wildfires have spread beyond FMU boundaries due to continuous grass fuels in valley bottoms. An area of note is the eastern portion of FMU 17 where the FMU abuts the limestone hills which are the beginning of the Sacramento Mountain foothills. Here sand has piled up against the hills and created dunes, some of which are over 40 feet high and have partially submerged the hills. These dune-dominated areas also have good herbaceous cover of grasses and shrubs in years following high precipitation. These areas will carry wildfires, but they will not spread due to the lack of vegetation on the limestone hills surrounding the dunes.

Infrastructure/Assets to be Protected

The village of Khuribad is in FMU 17. It is not at risk for damage from wildfire due to its construction of mostly metal materials and the lack of fuels surrounding it. The high voltage power line that parallels the southern border of this FMU is built of wooden poles and is at risk of damage from severe wildfires. Tumbleweeds along fence lines can be a fire hazard and can cause fence damage if burned and can help spread fire into surrounding rangelands.

Risk to Firefighters

There is a danger of firefighting vehicles becoming stuck if driving off roads within FMU 17 due to deep sand in many places. UXO is not considered a danger within this FMU due to its use as a grazing livestock pasture. Risks associated with working around power lines should be considered. Do not burn out fuels under power lines as smoke can cause arcing between lines and ground.

The entire FMU 17 is within the SDZ for Range 91 with the exception of the extreme western side of FMU 17 near Highway 54. Permission to enter SDZ areas must be obtained from Range Operations prior to engaging in wildfire operations here.

Pre Fire Season Fuels Management Actions

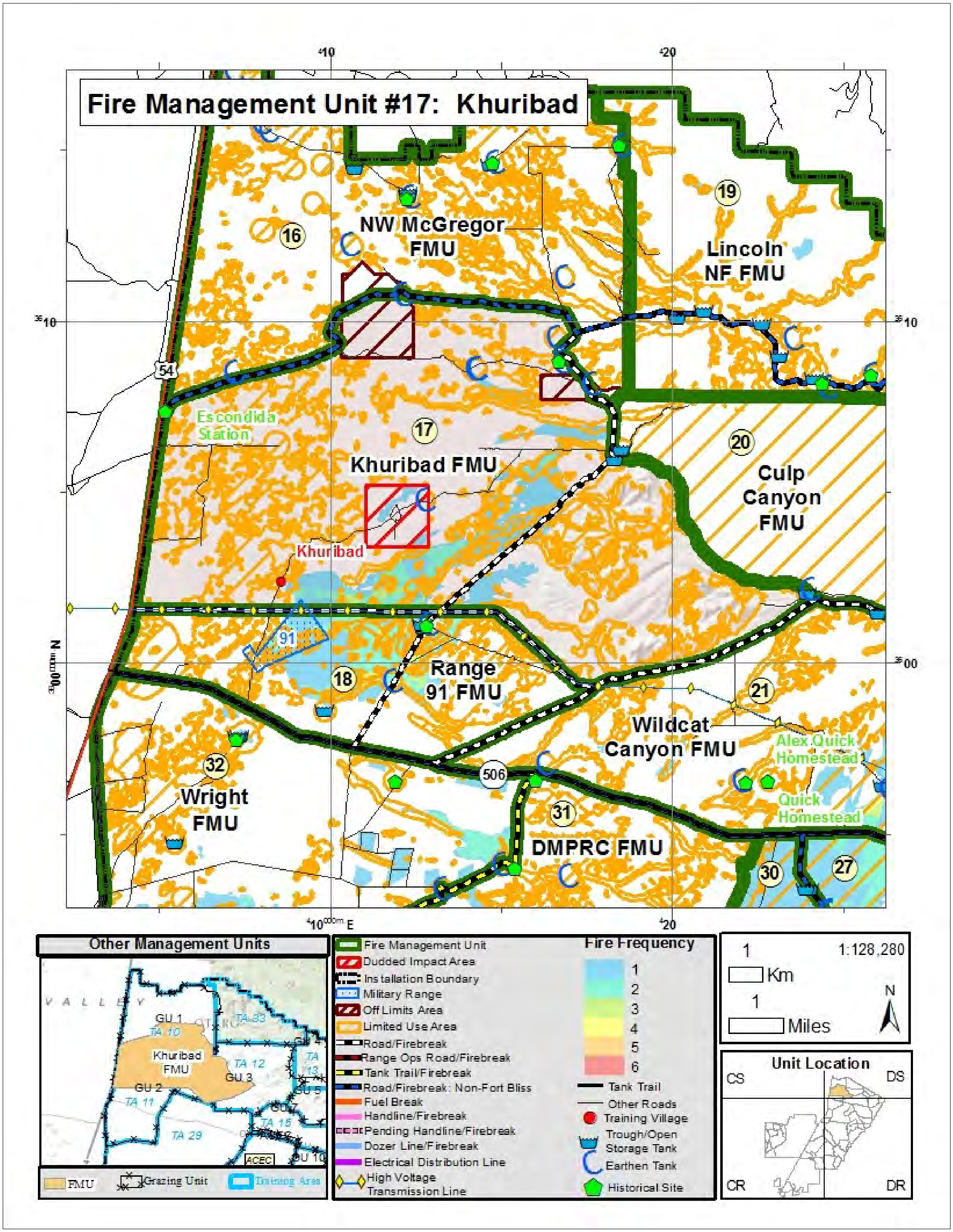
Roads around the perimeter of FMU 17 should be maintained by Fort Bliss DPW O&M to keep them vegetation-free.

Wildfire Management

Use direct attack methods with Type 6 4x4 engines, UTVs and ground forces on wildfires within FMU 17. UTVs and high-clearance 4 wheel drive engines may maneuver off roads as needed. Firefighters armed with fire swatters and shovels can be very effective here as long as winds are not high, generally less than 20 mph. The high voltage power line is of particular concern here. Burnout operations under power lines are not a safe practice. Soak wooden poles with a mix of water and foam and exit the area if wildfire is approaching. If wildfire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or county roads and blackline along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Units 1, 2 and 3 have parts of pastures located within FMU 17. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 17 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

918



Fire Management Unit #17: Khuribad
NW McGregor FMU
Lincoln NF FMU
Khuribad FMU
Escondida Station
Khuribad
Culp Canyon FMU
Range 91 FMU
Wildcat Canyon FMU
Alex Quick Homestead
Quick Homestead
Wright FMU
DMPRC FMU
16
17
18
19
20
21
27
30
31
32
91
54
506
Other Management Units
VALLEY
GU 1
TA 10
TA 33
Khuribad FMU
TA 12
GU 3
GU 2
TA 11
TA 13
TA 29
TA 15
ACEC
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1
1:128,280
Km
1
Miles
N
Unit Location
CS
DS
CR
DR

FMU 18 RANGE 91 10,148 Acres

Physical Characteristics

Parts of TA 11, 12 and 29 are located in FMU 18. FMU 18 is bounded on the north by a high-voltage power line and firebreak road from the west boundary of Fort Bliss heading east then southeast to an intersection of firebreak roads. The east is bounded by a firebreak road (aka Culp Canyon Road) that runs from its junction with the power line southwest to NM 506. The south boundary is NM 506 from the Culp Canyon firebreak road to US 54. The west boundary is the Fort Bliss boundary east of the railroad tracks and US Highway 54 from NM 506 north to a point where the high-voltage power line crosses US 54.

Topography is typical Tularosa Basin desert floor and is flat to gently rolling. Vegetation in FMU 18 is dominated by shrub lands of creosote, tar bush and mesquite intermixed with desert grasses. There are areas of sand sage and mixed grasslands that have adapted to life in sandy soils. In years following higher than average precipitation, wildfires burn in this fuel type. The eastern third of this FMU transitions into limestone hills which are the beginning of the Sacramento Mountain foothills. Much of this area is exposed bedrock. Vegetation here is dominated by creosote, ocotillo, sotol and cat claw interspersed with grasses, cacti and mesquite. Fire history shows that wildfires do not carry through this soil/fuel type.

Fort Bliss fire history records show at least 7 wildfires within FMU 18. Wildfires have spread beyond FMU boundaries to the north due to continuous grass fuels in basin bottomlands.

Infrastructure/Assets to be Protected

Range 91 (aka SHORAD) is located within FMU 18. Range 91 is a multi-purpose range for firing handheld Stinger and Avenger missiles among others. The Range has minor infrastructure associated with it that is not at risk for damage from wildfire due to construction materials and the lack of fuels surrounding it. The high-voltage power line that parallels the northern border of this FMU is built of wooden poles and is at risk of damage from severe wildfires.

Risk to Firefighters

There is a danger of firefighting vehicles becoming stuck if driving off roads within FMU 18 due to deep sand in places. UXO is not considered a danger within FMU 18 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of light, flashy fuels found here is that they burn readily and wildfires are wind-driven.

The SDZ for Range 91 covers much of FMU 18. The areas near and adjacent to US Highway 54 and NM 506 are outside the SDZ. Obtain permission from Range Operations to enter SDZ areas prior to engaging in wildfire operations here.

Pre Fire Season Fuels Management Actions

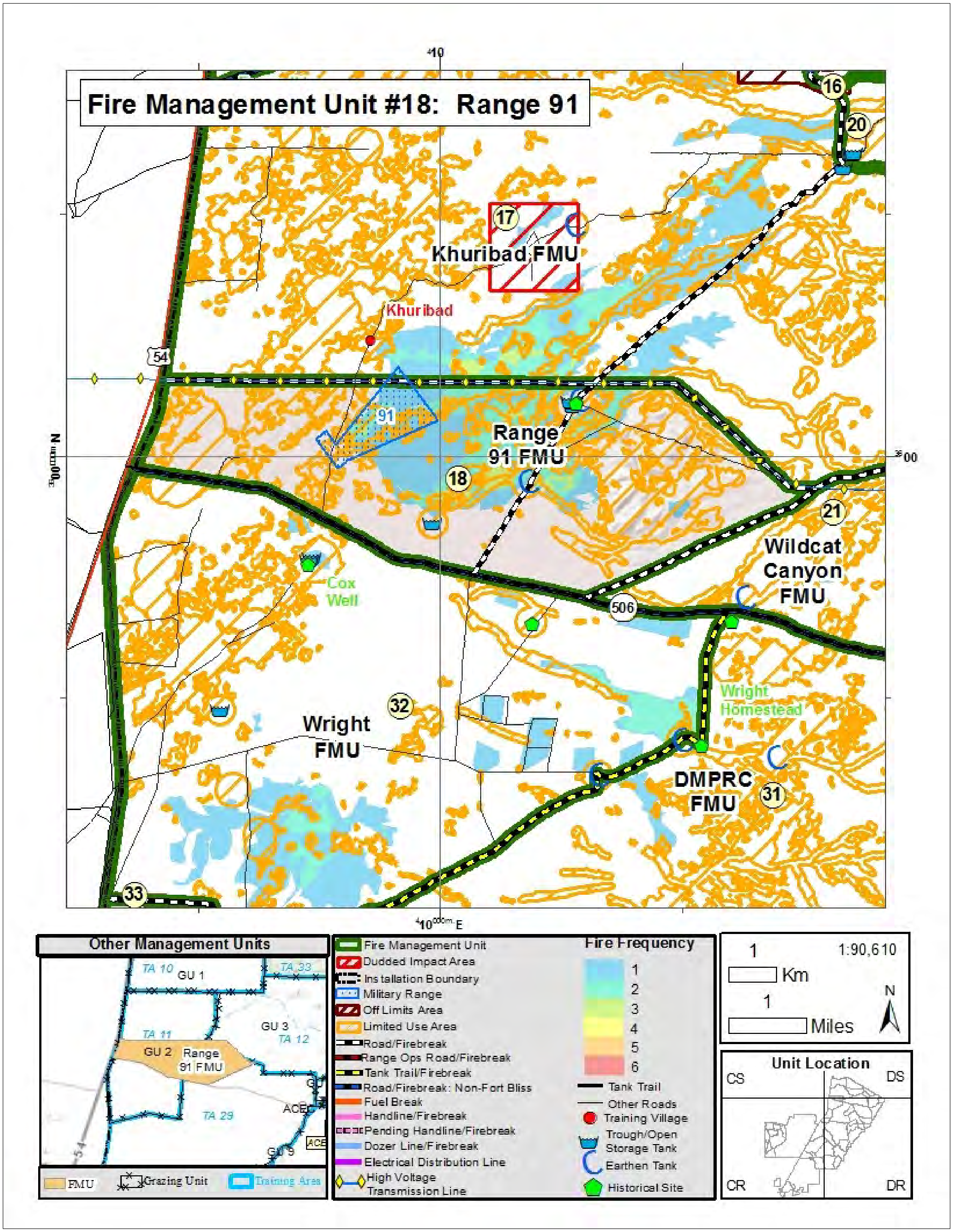
Firebreak roads along the power line and to Culp Canyon should be maintained by DPW O&M to keep them vegetation-free. Tumbleweeds along fence lines can be a fire hazard and can cause fence damage if burned and can help spread fire into surrounding rangelands. Due to the vast distances and miles of fence here, it is not economically feasible to treat this fire hazard.

Wildfire Management

Direct attack methods work well in FMU 18 as fire intensities are usually not high in this fuel type. Engines should stay on roads due to deep sand in places. UTVs and high-clearance 4 wheel drive engines may maneuver off roads as needed. Firefighters armed with fire swatters and shovels can be very effective here as long as winds are not high, generally less than 20 mph. Burn out along roads if deemed advantageous by the Incident Commander. The high voltage power line is of particular concern here. Burnout operations beneath power lines are not a safe practice. Wet down wooden poles with a water/foam mix and exit the area if a wildfire is approaching.

BLM Grazing Units 2 and 3 have parts of pastures located within FMU 18. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within this FMU and will work closely with BLM engines and personnel to keep wildfires as small as possible.

981



Fire Management Unit #18: Range 91
Khuribad FMU
Khuribad
Range 91 FMU
Cox Well
Wildcat Canyon FMU
Wright Homestead
Wright FMU
DMPRC FMU
Other Management Units
GU 1
GU 2
GU 3
TA 10
TA 11
TA 12
TA 29
TA 33
Range 91 FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:90,610
Km
Miles
N
Unit Location
CS
DS
CR
DR

FMU 19 LINCOLN NF 18,259 Acres

Physical Characteristics

FMU 19 includes all of TA 33. FMU 19 is the area of the Lincoln National Forest (NF) that is withdrawn for military use. FMU 19 is bounded on the north by the boundary between the withdrawn portion of the Lincoln NF within McGregor Range and the Lincoln NF. This boundary is unmarked and runs southeast in a stair step fashion following section lines past private and state lands to the north to a point at the southwest corner of the village of Timberon. The eastern boundary of FMU 19 begins at a fence corner just west of the village of Timberon and follows a dilapidated fence line to a section corner just south of Culp Peak. The south boundary is an east-west fence line that runs west from Culp Peak to a section corner down on the Tularosa Basin floor that is the southwest corner of the withdrawn portion of the Lincoln NF. The west boundary of FMU 19 is a fence that begins at the southwest corner of the withdrawn portion of the Lincoln NF and runs north for a couple of miles but then is unmarked to the north boundary of the Fort Bliss Military Reservation.

Topography is varied. FMU 19 runs from the Tularosa Basin floor in the west to the top of the Sacramento Escarpment in the north and east. Much of the terrain is extremely steep, limestone ridges cut by deep, rocky canyons. Bare rock is common in many places. Large, rocky, canyon bottoms and south-facing slopes are barriers to fire spread. Vegetation in FMU 19 is diverse. The low country in the west side of FMU 19 is desert shrub lands of creosote and mesquite intermixed with desert grasses. There are areas of sand sage and mixed grasslands. In years following higher than average precipitation, wildfires burn in this fuel type. The rest of FMU 19 transitions into rugged limestone hills which are a part of the Sacramento Mountain foothills. Much of this area is exposed bedrock with scant vegetation. Vegetation is dominated by creosote, tarbush, ocotillo, mountain mahogany, grasses, cacti, agave and mesquite. Fire history records reveal that wildfires do not burn continuously through this type of terrain due to the soils, topography and the patchy nature of the fuels. The upper reaches of FMU 19 end atop the Sacramento escarpment and are typical southwestern forest fuels of ponderosa pine, juniper, piñon pine, oak, mountain mahogany and abundant grasses in open areas. Wildfires that ignite in this high country can spread readily under dry and/or windy conditions.

Fort Bliss fire history records show two large wildfires within FMU 19 since 1990.

Infrastructure/Assets to be Protected

There are no permanent training assets located in FMU 19. There are improvements associated with wildlife and livestock production including fences, pens and water catchments within FMU 19.

Risk to Firefighters

UXO is not considered a danger within FMU 19 due to its use as a grazing pasture. There are significant other dangers associated with fighting wildfires in FMU 19. Steep slopes, rolling rocks and flashy fuels can be present in places. Up slope and up canyon winds can be funneled through saddles and across ridge tops causing blow-ups or crown fire conditions and making them dangerous places to combat wildfires. Forest fuels anywhere atop the Sacramento escarpment can ignite readily and can become large wildfires quite rapidly under dry, windy conditions. Spotting can occur up to ½ mile ahead of a flaming fire front here.

Pre Fire Season Fuels Management Actions

Roads are scarce within FMU 19. Fort Bliss fire personnel should become familiar with road access up Grapevine Canyon, from Timberon and from the Lincoln National Forest into FMU 19.

The US Forest Service's Lincoln National Forest has responsibility for fuels, grazing, vegetation and fire management on all lands within FMU 19. Fuel treatments are US Forest Service responsibility. Naturally-occurring (lightning) wildfires are managed by fire personnel from the US Forest Service. Military-caused wildfires are the responsibility of Fort Bliss Fire and Emergency Services. Fort Bliss fire personnel should pursue the creation of a Memoranda of Agreement or a Mutual Aid Agreement with the USFS-Lincoln National Forest fire management staff to share resources to help manage all wildfires in and around FMU 19.

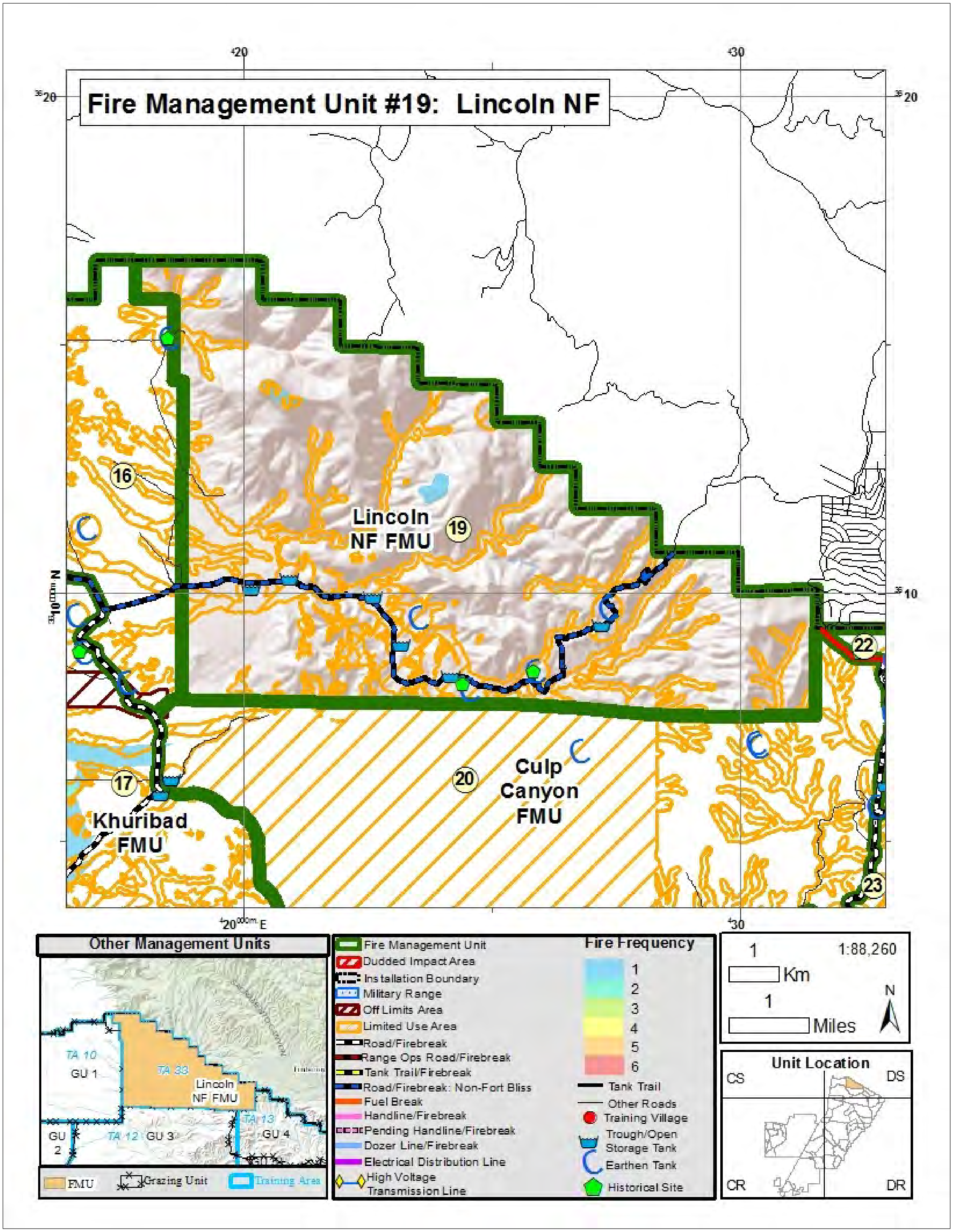
Adjacent to FMU 19 in the area directly west of Timberon is a large area of state-owned land. The state of New Mexico has wildfire protection responsibilities for all state and private lands. Fort Bliss should pursue a mutual aid agreement with the New Mexico State Forestry Division to share firefighting resources in the Timberon area.

Wildfire Management

Use tactics of direct attack on all wildfires atop the Sacramento escarpment if fire conditions warrant. Consider using aerial firefighting assets if wildfire continues to spread after initial attack forces are engaged.

Wildfires below the Sacramento escarpment may be monitored by firefighting personnel due to safety issues of poor access and rugged terrain. Nearly all wildfires started below the Sacramento escarpment will extinguish themselves due to a lack of fuel continuity in the rocky terrain.

USFS firefighting resources will respond to all wildfires located within FMU 19. Fort Bliss firefighting personnel will work closely with USFS engines and firefighters to keep wildfires as small as possible. USFS firefighters will take the lead in ordering additional manpower, supplies and equipment if initial attack efforts are unsuccessful. Timberon VFD will respond to all wildfires located near the village of Timberon.



Fire Management Unit #19: Lincoln NF
Lincoln NF FMU
19
16
17
20
22
23
Culp Canyon FMU
Khuribad FMU
Other Management Units
TA 10
GU 1
TA 33
Lincoln NF FMU
TA 12
GU 3
TA 13
GU 4
GU 2
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1 Km
1 Miles
1:88,260
N
Unit Location
CS
DS
CR
DR

1045

FMU 20 CULP CANYON 17,160 Acres

Physical Characteristics

FMU 20 includes the western part of TA 13 and most of the area of TA 12. FMU 20 includes the area of the Culp Canyon Wilderness Study Area (WSA). FMU 20 is bounded on the north by the southern boundary of the withdrawn portion of the Lincoln National Forest beginning at its southwest corner which is fenced and runs west-east for eight miles then turns north near Culp Peak and follows an old fence line to the McGregor Range boundary. The east side is an unmarked boundary that begins at the fence corner where withdrawn USFS, Army fee-owned land and private land meet, just west of the village of Timberon and runs southeast and follows the escarpment edge and the edge of the BLM/Ft Bliss Timberon thinning project to the firebreak road that follows the Otero Mesa pipeline running south from Rim Tank. The east boundary continues south along the firebreak road and the Otero Mesa pipeline to an intersection of an east-west firebreak road that runs west to Culp Canyon. The south boundary is the firebreak road that runs into Culp Canyon to the west and then follows Culp Canyon past Culp Rim tank to Culp tank and a set of corrals where a two-track road leaves the firebreak road heading northwest following Culp Canyon to an intersection at the mouth of the canyon with a firebreak road on the Orogrande pipeline. The west boundary is the firebreak road that runs north from Culp Canyon and then turns west. At that point where the road turns west the FMU boundary becomes an unmarked line heading northeast from that firebreak road to the southwest fence corner of the withdrawn land of the Lincoln National Forest.

Topography is varied from gently rolling desert hills to rugged mountain slopes. FMU 20 includes limestone hills at the edge of the Tularosa Basin in the west to the top of the Sacramento Escarpment in the north and east. Much of the terrain is steep, limestone ridges cut by deep, rocky canyons. Bare rock is common in many places. Large, rocky, canyon bottoms and sheer rock cliffs are barriers to fire spread. Vegetation in FMU 20 is diverse. The low country on the west side of FMU 20 is desert shrub lands of creosote and mesquite intermixed with desert grasses. There is a unique natural phenomenon within FMU 20 of large, ascending sand dunes that have been blown from the west into the mouth of Culp Canyon and have begun to bury the limestone foothills there. Upon the dunes reside a mixture of vegetation including sand sage and mixed desert grasses. In years following higher than average precipitation, wildfires burn in this fuel type. The rest of FMU 20 contains rugged limestone hills. This soil type is extremely rocky with scant vegetation in places. Vegetation is dominated by creosote, mixed desert grasses, ocotillo, sotol, yucca, cacti, agave and mountain mahogany. Fire history records reveal that wildfires do not burn continuously through this country due to the patchy nature of the fuels. The upper reaches of FMU 20 end atop the Sacramento escarpment and are typical southwestern forest fuels of juniper, piñon pine, oak, mountain mahogany and abundant grasses in open areas. There is a small stand of ponderosa pine in FMU 20. Wildfires that ignite in this high country can spread readily under dry, windy conditions.

Fort Bliss fire history records show one wildfire within FMU 20 since 1990. This wildfire was started by military training activities down on the desert floor in FMU 17 and burned into FMU 20 and died as it hit discontinuous fuels at the edge of the limestone hills.

Infrastructure/Assets to be Protected

There are no permanent training assets located in FMU 19. There are improvements associated with wildlife and livestock production including fences, pens and water catchments within FMU 20.

Risk to Firefighters

UXO is not considered a danger within FMU 20 due to its use as a grazing livestock pasture. There are significant dangers associated with fighting wildfires in FMU 20. Steep slopes, narrow roads, rolling rocks and flashy fuels are hazards to be considered in FMU 20. Up slope and up canyon winds can be funneled through saddles and across ridge tops causing wildfire blow-ups or crown fire conditions and making these places dangerous to combat wildfires. Fuels atop the Sacramento escarpment can ignite and spread quickly during dry times. There are homes and structures adjacent to FMU 20 in the village of Timberon. Hazards associated with propane tanks, power lines, one-way ingress/egress for firefighting vehicles and combustible hazardous materials are safety considerations for firefighters here.

Pre Fire Season Fuels Management Actions

There are a few rough, two-track four-wheel drive roads in FMU 20. Perimeter firebreak roads should be maintained by Fort Bliss DPW O&M to be vegetation-free and passable by Type 6 4x4 engines. Fort Bliss fire personnel should become familiar with road access from Timberon and Fort Bliss into FMU 20.

The Las Cruces District Office-BLM has responsibility for naturally-occurring wildfires on the lands within FMU 20. Military-caused wildfires are the responsibility of Fort Bliss. Fort Bliss fire personnel and BLM fire management personnel work together to share resources and manage all wildfires in FMU 20.

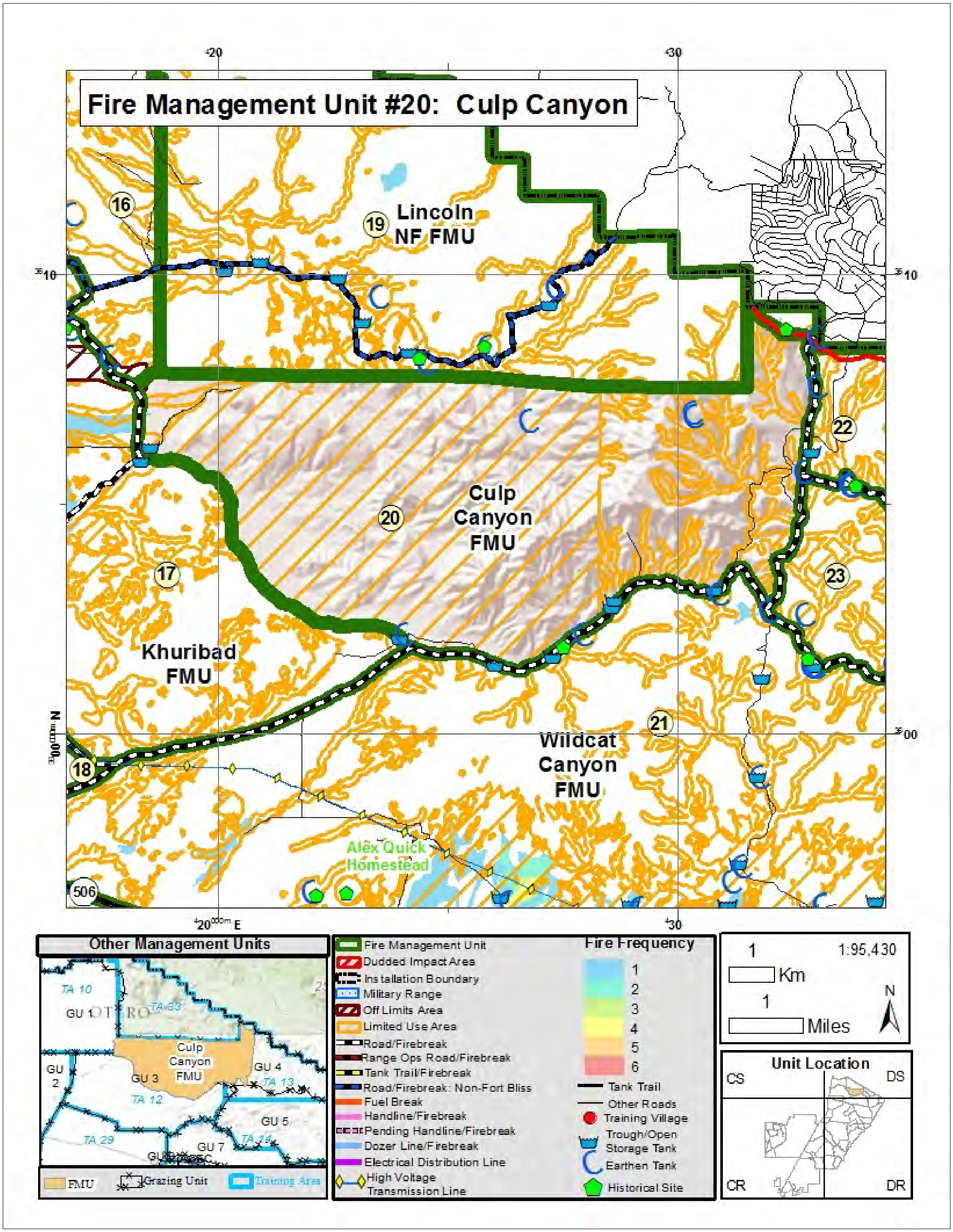
The fuel break along the McGregor Range boundary between Fort Bliss and the Village of Timberon was started in 2004 by BLM on Fort Bliss lands and work continues on this project to the present day. More work is planned for the future. Maintenance thinning and prescribed burning will continue to occur on previously treated lands. Fort Bliss has provided about one half of the funding to support and maintain this work from the collection of grazing fees on army fee-owned lands and should continue to do so in the future.

Wildfire Management

The primary firefighting tactic is to directly attack all fires atop the Sacramento escarpment as fire conditions warrant and keep them small. Burn out along the fuel break between Timberon and Fort Bliss if deemed necessary by the Incident Commander. This decision should only be done to protect structures that are in imminent danger from approaching wildfire. Much of FMU 20 is located within a BLM Wilderness Study Area and as such off-road travel is prohibited even for firefighting vehicles. Firefighters may blackline along firebreak roads ahead of an advancing wildfire when deemed advantageous by the Incident Commander.

Parts of BLM Grazing Units 3 and 4 are within FMU 20. BLM and Fort Bliss firefighting resources will respond to all wildfires located within FMU 20. USFS firefighters will respond to wildfire reports anywhere atop the Sacramento escarpment. Timberon VFD will respond to all wildfires located near the village boundaries.

Wildfires in the western two-thirds of FMU 20 may be monitored by firefighters due to safety issues of poor access and rugged terrain. Consider using aerial firefighting assets if wildfires continue to spread. Most wildfires started in the western two-thirds of FMU 20 will extinguish themselves due to a lack of continuous fuel in the rocky terrain.



Fire Management Unit #20: Culp Canyon
Lincoln NF FMU
Culp Canyon FMU
Khuribad FMU
Wildcat Canyon FMU
Alex Quick Homestead
16
17
18
19
20
21
22
23
506
Other Management Units
TA 10
TA 33
TA 12
TA 29
TA 13
TA 14
GU 1
GU 2
GU 3
GU 4
GU 5
GU 7
Culp Canyon FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:95,430
Km
Miles
N
Unit Location
CS
DS
CR
DR

1125

FMU 21 WILDCAT CANYON 34,691 Acres

Physical Characteristics

FMU 21 includes large portions of TAs 12, 14 and 15 and includes small portions of the northern end of TA 29 and the southwest corner of TA 13. FMU 21 is bounded on the north by a firebreak road that begins on the Otero Mesa pipeline at a junction of firebreak roads and runs east from the ridge between Culp Canyon and El Paso Canyon past Munson tank and intersects with the firebreak road at El Paso Canyon and the firebreak road to West McAfee Canyon. The east boundary is the firebreak road running south from that junction following El Paso Canyon to NM 506. The southern boundary of FMU 21 is a portion of NM 506 between El Paso Canyon road and Culp Canyon road to the west. The west boundary is the Culp Canyon road from NM 506 past Culp tank, past Culp Rim tank to its intersection with the Otero Mesa pipeline.

Topography is flat to gently rolling hills in the southern 1/2 of the FMU and includes the northern-most portions of the Otero Mesa grasslands. The western end of FMU 21 is representative of the Tularosa Basin desert floor. Vegetation in the southern portion of FMU 21 is dominated by creosote intermixed with abundant desert grasses. The northern 1/2 of FMU 21 is steep, rugged, limestone foothills leading up to the Sacramento Mountains. Much of this area is exposed bedrock. Vegetation here is dominated by creosote, ocotillo, cat claw, cacti, agave, desert grasses and mesquite. North-facing slopes in this FMU have scattered mountain mahogany, juniper and piñon pine.

Fort Bliss fire history records show at least 14 wildfires have burned within this FMU since 1990. Most of the wildfires in FMU 21 started near NM 506 and spread to the north and east where they were extinguished as they burned into south-facing limestone hills where fuels were not continuous.

Infrastructure/Assets to be Protected

A high voltage power line that roughly parallels NM 506 is within FMU 21 and is built of wooden poles and is at risk of damage from fast-moving wildfires.

There is a historical wooden structure in the northern portion of FMU 21 at Munson Tank that would need protection from approaching wildfire. There are improvements associated with wildlife and livestock production including fences, pens and water catchments within FMU 21.

Risk to Firefighters

There is a danger of firefighting vehicles becoming stuck if driving off roads within the western most portions of FMU 21 due to deep sand. UXO is not considered a danger within FMU 21 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. Wildfires can move quickly and change directions suddenly in dry, flashy fuels that are characteristic of the Otero Mesa grasslands.

The western portion of FMU 21 including the Culp Canyon road is within the SDZ for Range 91. Obtain permission from Range Operations to enter SDZ areas prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

<u>FMU treatments:</u> Roads around the perimeter of FMU 21 should be maintained by DPW O&M to keep them vegetation-free. Tumbleweeds along fences can be a fire hazard, can cause fence damage if burned and can help spread wildfire into surrounding rangelands. Due to the vast distances and miles of fence here, it is not practical to treat this fire hazard.

<u>Cultural Assets treatments:</u> The historic structure at Munson Tank should be inspected by firefighters for fuel build-up around the site. When fuels are excessive, use hand tools or weed whips or weedeaters to keep weeds and grasses down to around 6 inches in height and out from the structures for about 30 feet.

Wildfire Management

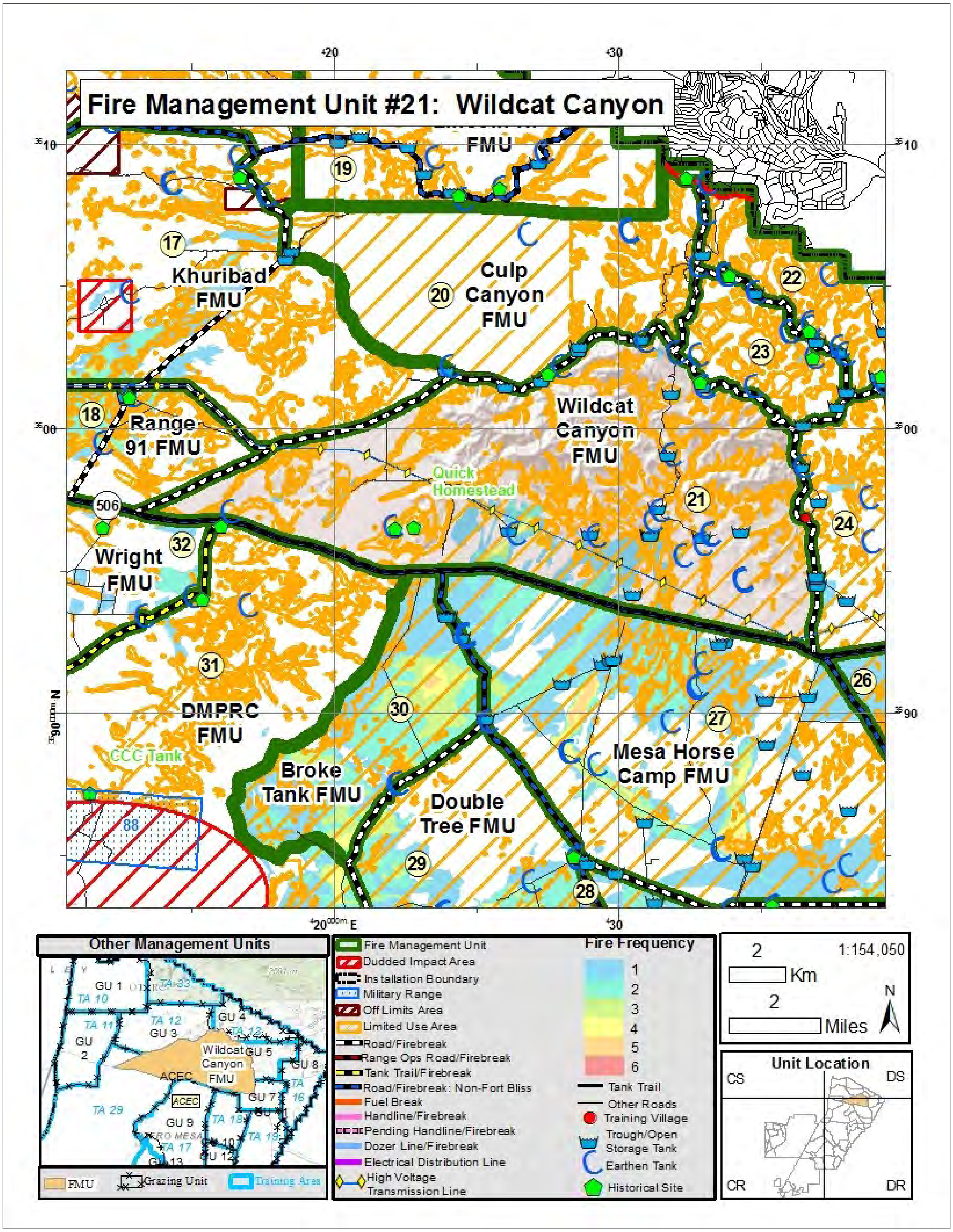
Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Direct attack methods work well in FMU 21 when fire intensities and winds permit. Use wildland engines in tandem and drive off-road to anchor, flank and pinch fire head. Firefighters armed with swatters and shovels can be effective here as long as winds are less than 15 mph.

One of the four units of the Black Grama Area of Critical Environmental Concern (ACEC) is located on the north side of NM 506, is fenced to keep livestock out and is entirely within FMU 21. Off-road vehicle use is not permitted inside ACEC boundaries. Engage wildfire within ACEC boundaries using direct attack methods on foot if fire intensity is light. If fire intensity is high, fall back to roads and engage with engines or burn out along roads ahead of the wildfire.

The high voltage power line is of particular concern here. Burnout operations under power lines are not a safe practice. Soak poles with foam and water then exit the area if wildfires are threatening power lines. Dense smoke can cause electricity to arc between wires and to the ground.

BLM Grazing Units 3, 4, 5 and 7 have parts of pastures located within FMU 21. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within this FMU and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1187



Fire Management Unit #21: Wildcat Canyon
FMU
19
17
Khuribad FMU
20
Culp Canyon FMU
22
23
18
Range 91 FMU
Wildcat Canyon FMU
Quick Homestead
506
21
24
32
Wright FMU
31
DMPRC FMU
30
26
27
CCC Tank
Broke Tank FMU
Mesa Horse Camp FMU
Double Tree FMU
88
29
28
Other Management Units
GU 1
TA 10
TA 33
TA 11
TA 12
GU 3
GU 4
TA 13
GU 2
Wildcat Canyon FMU
GU 5
GU 8
ACEC
TA 16
GU 7
TA 29
GU 9
TA 18
TA 17
TA 19
GU 13
GU 12
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
2 Km
2 Miles
1:154,050
N
Unit Location
CS
DS
CR
DR

FMU 22 TIMBERON 7,218 Acres

Physical Characteristics

FMU 22 is located within TA 13. FMU 22 is bounded on the north and the east by the boundary between the Fort Bliss Military Reservation and the private lands within the village of Timberon and begins at the fence corner that is the dividing line between US Forest Service protected lands, BLM/Fort Bliss fee-owned lands and private lands and is south of the western edge of Norwood Drive in the village of Timberon. This boundary follows section lines in a stair-step fashion as you travel from the northwest to the southeast to East McAfee Canyon. The southern boundary of FMU 22 is a firebreak road that runs west and follows the bottom of East McAfee Canyon from the Fort Bliss Military Reservation boundary over a saddle and into West McAfee Canyon, past Corn tank and Lee tank to a junction of another firebreak road that runs northwest and drops into the north fork of El Paso Canyon and runs past Hamilton tank and Powell Homestead tank to its junction with the firebreak road that follows the pipeline to Otero Mesa. The west boundary is the firebreak road running north up the Otero Mesa pipeline to the edge of the BLM/Ft Bliss fuelbreak, then northwest around the edge of the fuelbreak following the Sacramento escarpment edge to a junction with the Fort Bliss Military Reservation boundary, just west of the village of Timberon.

Topography is rugged, limestone foothills cut by deep, winding canyons leading up to the Sacramento Mountains. Vegetation here is dominated by mountain mahogany, juniper, oak, piñon pine, bear grass, agave, grama and other mountain grasses.

Fort Bliss fire history records show 5 wildfires have burned in this FMU since 1990.

Infrastructure/Assets to be Protected

There are no permanent training assets to be found in FMU 22. There is infrastructure associated with wildlife and livestock production including fences, pens and water storage devices that are at risk from damage by wildfires.

Don Lee's Ranch (Lee Place) is an historic site located just north of West McAfee Canyon road that would need protection from approaching wildfire.

Risk to Firefighters

UXO is not considered a danger within FMU 22 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. Up slope and up canyon winds can be funneled through saddles and across ridges tops causing blow-ups or crown fires and are dangerous places for battling wildfires. Forest fuels near the Fort Bliss boundary can ignite readily and can become crown fires under dry, windy conditions. Spotting can occur up to ½ mile ahead of a flaming fire front here. There are several wooden residences and associated outbuildings that abut the Fort Bliss boundary along the north edge of FMU 22 and most have propane tanks and power lines in proximity. Many of the residences are set into the timber and have poor ingress/egress for fire engines.

There are no SDZ areas within FMU 22.

Pre Fire Season Fuels Management Actions

<u>FMU treatments:</u> There are a few rough, two-track four-wheel drive roads in FMU 22. All perimeter firebreak roads should be maintained by Fort Bliss DPW O&M to be passable by Type 6 4x4 engines. Fort Bliss fire personnel should become familiar with the Fort Bliss boundary all along the northern edge of FMU 22. Fire fighters need to know the road access points from Timberon and from the Sacramento River Road into East McAfee Canyon.

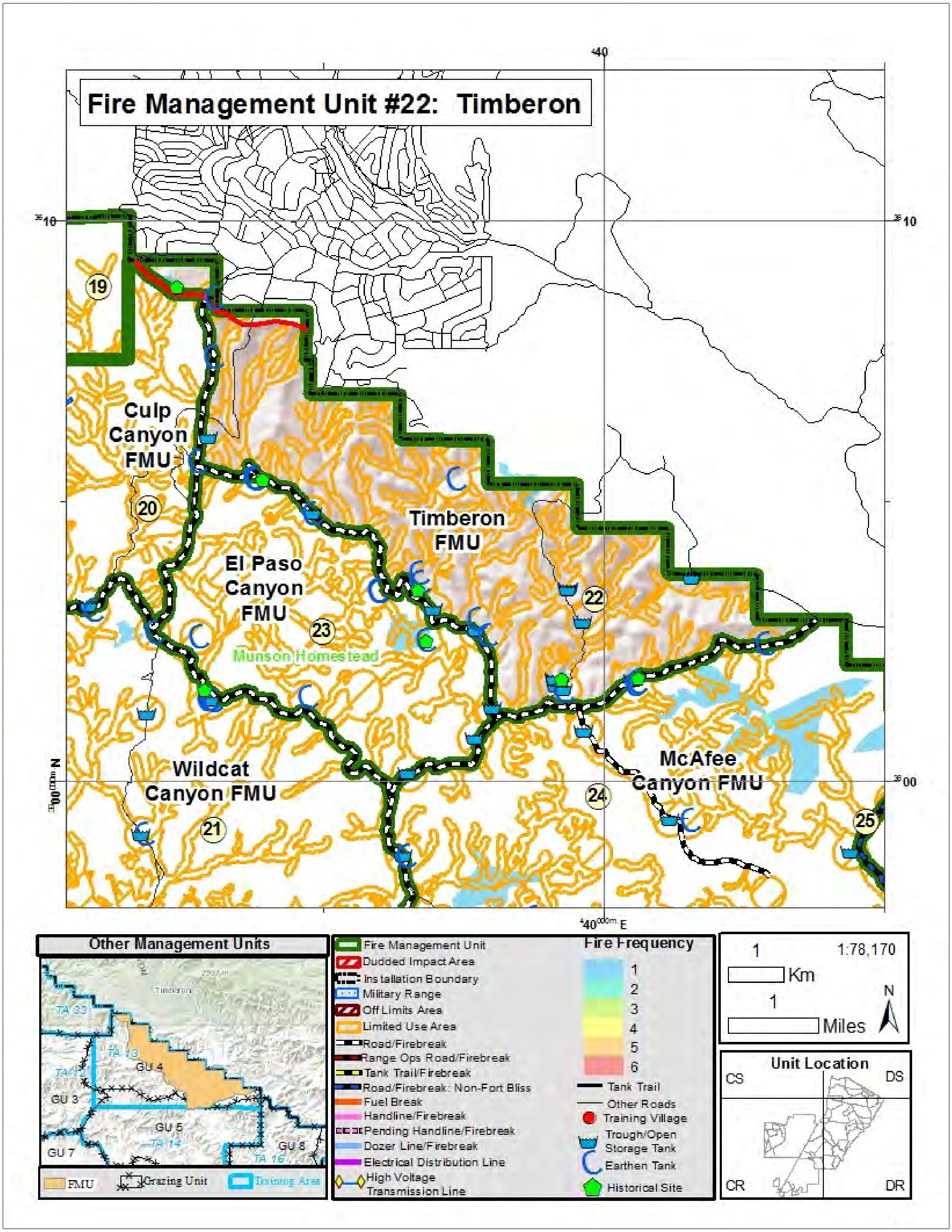
<u>Cultural Assets treatments:</u> Firefighters should inspect the Lee Place for excessive fuel accumulations near the historic structures. When fuels are excessive, use handtools or weed whips or weedeaters to keep weeds and grasses down to around 6 inches in height and out from the structures for about 30 feet.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Tactics to battle wildfires in FMU 22 should include the use of aerial assets if fire engine response times are slow or wildfire is growing despite firefighting efforts. The BLM/Ft Bliss fuelbreak is a good place to lay down retardant to keep wildfire from advancing into private lands and structures which are adjacent to the Fort Bliss boundary. Any back burns considered here should be done only to protect structures in imminent danger from wildfire.

BLM Grazing Units 4 and a small portion of Unit 5 have parts of pastures located within FMU 22. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 22 and should work closely with BLM engines and personnel to keep wildfires as small as possible.

The proximity of FMU 22 to the village of Timberon means that any wildfire starts here will receive a lot of attention. US Forest Service fire engines and personnel will respond to smoke reports here. The Timberon VFD will also respond to all wildfires near their village boundaries.



Fire Management Unit #22: Timberon
Culp Canyon FMU
El Paso Canyon FMU
Timberon FMU
Wildcat Canyon FMU
McAfee Canyon FMU
Munson Homestead
19
20
21
22
23
24
25
Other Management Units
TA 33
TA 13
TA 12
GU 4
GU 3
GU 5
TA 14
GU 7
GU 8
TA 16
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:78,170
Km
Miles
N
Unit Location
CS
DS
CR
DR

1249

FMU 23 EL PASO CANYON 4,769 Acres

Physical Characteristics

FMU 23 is located mostly within TA 13. A small part of FMU 23 is within the northern part of TA 14. This FMU is bounded on the north by a firebreak road that begins at the junction of the Otero Mesa pipeline firebreak road and the firebreak road that runs east down the north fork of El Paso Canyon and then runs southeast past Powell Homestead tank then past Hamilton tank to its junction with the firebreak road that runs east-west into West McAfee Canyon. The east boundary is the firebreak road running down West McAfee Canyon to its junction with El Paso Canyon. The south boundary of FMU 23 is the firebreak road running up the bottom of El Paso Canyon past Munson tank to its junction with the Otero Mesa pipeline firebreak road. The west boundary is the Otero Mesa pipeline firebreak road north to a junction with the north fork of El Paso Canyon firebreak road.

Topography is rugged, limestone foothills cut by deep, winding canyons typical of the Sacramento Mountains foothills. Vegetation here is dominated by mountain mahogany, juniper, oak, piñon pine, bear grass, blue grama, sideoats grama and other mountain grasses. Most of the trees are located on north-facing slopes in isolated stands. South-facing slopes are more open but contain continuous grass fuels.

Fort Bliss fire history records show 3 wildfires have burned in this FMU since 1990.

Infrastructure/Assets to be Protected

There are no permanent training assets in FMU 23. There are improvements associated with livestock and wildlife in the forms of water catchments, holding pens and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 23 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. Up slope and up canyon winds can be funneled through saddles and across ridge tops causing blow-up wildfire conditions. The nature of light, flashy fuels is that they burn readily and are wind-driven. Be cautious of sudden, erratic wind shifts here.

There are no SDZ areas within FMU 23.

Pre Fire Season Fuels Management Actions

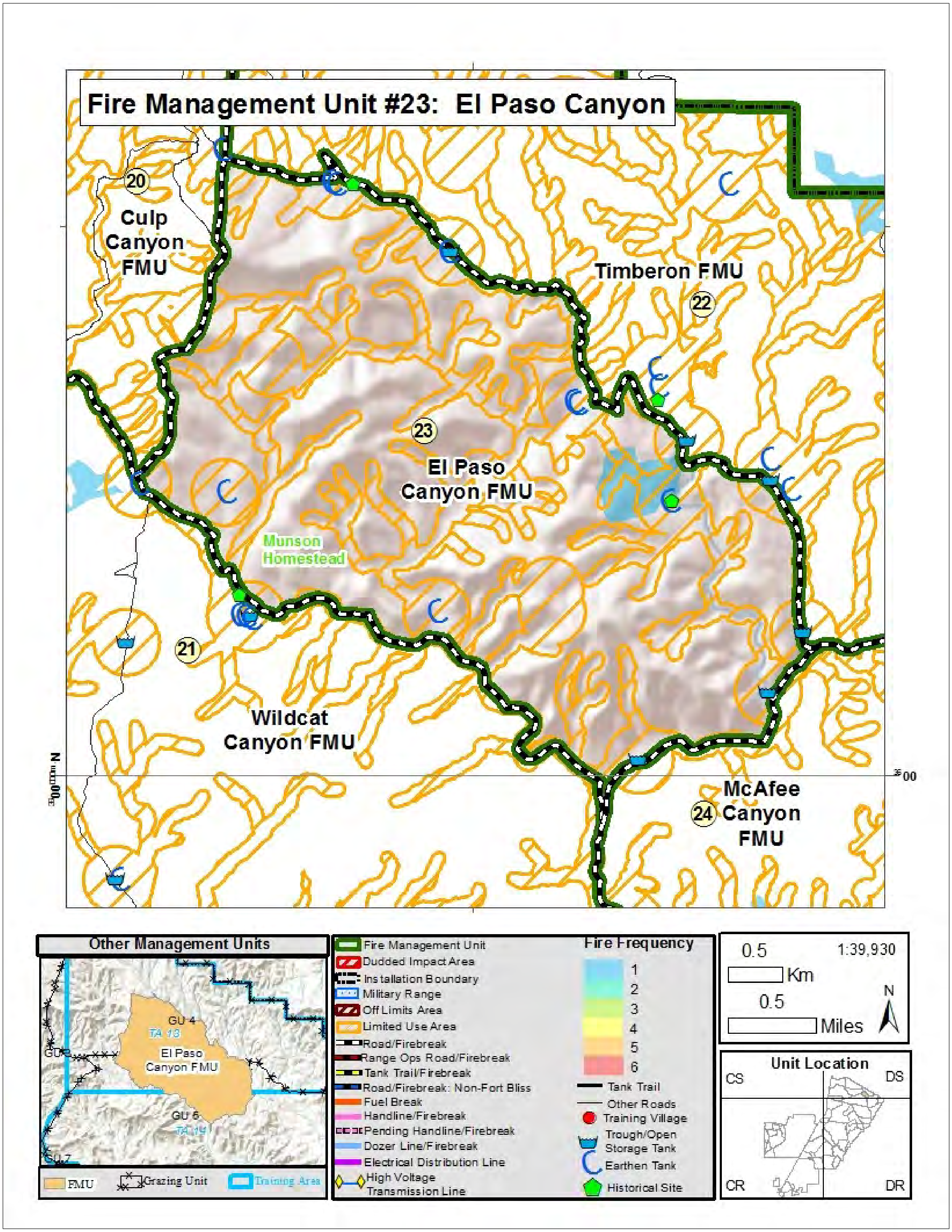
There are a few rough, two-track four-wheel drive roads in FMU 23. All perimeter firebreak roads should be maintained by Fort Bliss DPW O&M to be passable by Type 6 4x4 engines. Firefighters need to learn the road access points from Timberon and from the Sacramento River road into East McAfee Canyon to access FMU 22.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Exercise caution if burning out from firebreak roads in FMU 23 due to the shifting nature of winds within canyon bottoms and the high potential for spot fires outside the FMU boundaries.

BLM Grazing Units 4 and 5 have parts of pastures located within FMU 23. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 23 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1302



Fire Management Unit #23: El Paso Canyon
20
Culp Canyon FMU
Timberon FMU
22
23
El Paso Canyon FMU
Munson Homestead
21
Wildcat Canyon FMU
McAfee Canyon FMU
24
Other Management Units
GU 4
TA 13
El Paso Canyon FMU
GU 6
TA 14
GU 7
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:39,930
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 24 McAFEE CANYON 18,668 Acres

Physical Characteristics

FMU 24 is located within parts of TA 13, 14, 15 and 16. FMU 24 is bounded on the north by a firebreak road and begins at the intersection of El Paso Canyon and West McAfee Canyon then heads east over a saddle into East McAfee Canyon, past Corn tank to its intersection with the Fort Bliss Military Reservation boundary. The east boundary is the Fort Bliss Military Reservation boundary heading southeast along section lines that stair-step to its intersection with the Sacramento River road then south along the Sacramento River road to its junction with NM 506. The south boundary is NM 506 from the Sacramento River road to the firebreak road at the mouth of El Paso Canyon. The west boundary is the firebreak road from NM 506 north up El Paso Canyon to the junction of El Paso Canyon and West McAfee Canyon.

Topography is rugged, limestone foothills in the northern portions grading to smaller hills southward and ending on the flats of Otero Mesa in the southern portions of FMU 24. Vegetation in the northern half of FMU 24 is mountain mahogany, juniper, and oak and piñon pine in isolated stands on north-facing slopes. South-facing slopes are more open but contain continuous grass fuels. Vegetation here includes bear grass, sotol, agave, yucca, blue grama, sideoats grama and other mountain grasses. Southern portions of FMU 24 are mostly south-facing bajadas vegetated with creosote, prickly pear, agave, mesquite, yucca and desert grasses.

Fort Bliss fire history records show 5 wildfires have burned in this FMU since 1990.

Infrastructure/Assets to be Protected

The village of Tarin Kalpak is in FMU 24. There are improvements associated with livestock and wildlife in the forms of water catchments, holding pens and pasture fences that could be impacted by wildfires. There is a high-voltage power line roughly parallel to NM 506 in the southern portion of FMU 24.

Risk to Firefighters

UXO is not considered a danger within FMU 24 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. Up slope and up canyon winds can be funneled through saddles and across ridge tops causing blow-up wildfire conditions. The nature of light, flashy fuels found here is that they burn readily and wildfires are primarily wind-driven events. Be cautious of sudden and erratic wind shifts. High-voltage power lines can arc in heavy smoke and burned power poles can cause wires to come down.

There are no SDZ areas within FMU 24.

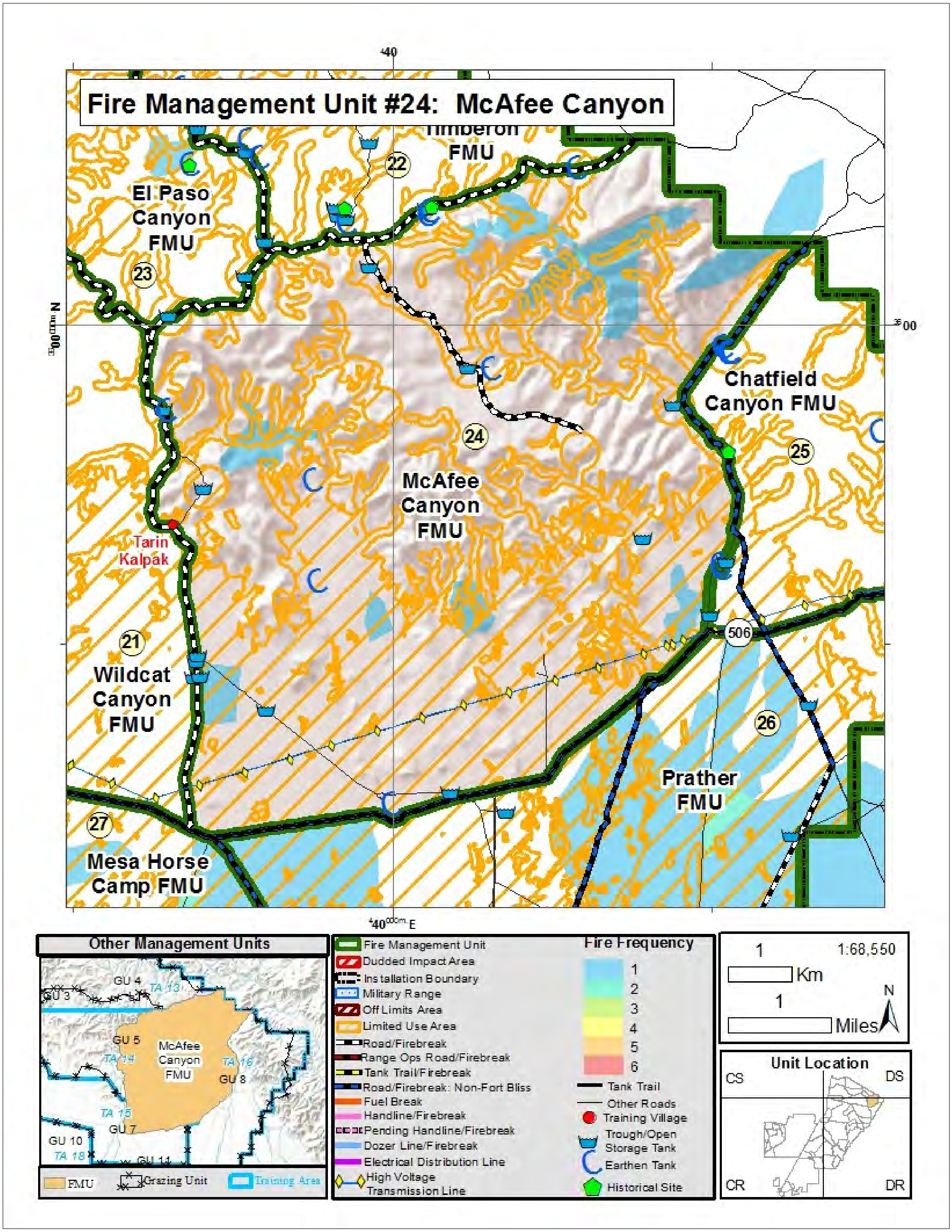
Pre Fire Season Fuels Management Actions

There are a few rough, two-track four-wheel drive roads in FMU 24. All perimeter firebreak roads should be maintained by Fort Bliss DPW O&M to be vegetation-free and passable by Type 6 4x4 engines.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Be extra cautious when fighting wildfires in power line right-of-ways. Wet down wooden power poles with a water/foam mixture and exit the area if wildfire is approaching. Do not burn out directly beneath power lines.

BLM Grazing Units 4, 5, 7 and 8 have parts of pastures located within FMU 24. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 24 and will work closely with BLM engines and personnel to keep wildfires as small as possible.


Fire Management Unit #24: McAfee Canyon
Timberon FMU
El Paso Canyon FMU
Chatfield Canyon FMU
McAfee Canyon FMU
Tarin Kalpak
Wildcat Canyon FMU
Prather FMU
Mesa Horse Camp FMU
21
22
23
24
25
26
27
506
Other Management Units
GU 3
GU 4
TA 13
GU 5
TA 14
McAfee Canyon FMU
TA 16
GU 8
TA 15
GU 7
GU 10
TA 18
GU 11
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:68,550
1 Km
1 Miles
N
Unit Location
CS
DS
CR
DR

FMU 25 CHATFIELD CANYON 5,733 Acres

Physical Characteristics

FMU 25 is located within the northeastern quadrant of TA 16. FMU 25 is bounded on the north and east by the Fort Bliss Military Reservation boundary and heads southeast beginning at the Sacramento River Road then south and then southwest along section lines in a stair-step fashion along the Fort Bliss boundary and is mostly unmarked but follows fences in places to its intersection with NM 506. The south boundary is NM 506 from the Fort Bliss boundary west to its intersection with the Sacramento River road. The west boundary is the Sacramento River road from NM 506 north to the Fort Bliss Military Reservation boundary.

Topography is rugged limestone foothills cut by deep, rocky, sinuous canyons typical of the Sacramento Mountain foothills. Vegetation in FMU 25 is mountain mahogany, juniper, oak and piñon pine intermixed with grasses on north-facing slopes in isolated stands or pockets. South-facing slopes are open but contain continuous grass fuels. Vegetation here includes bear grass, sotol, agave, cacti, yucca and several species of grasses.

Fort Bliss fire history records show 2 wildfires have burned in FMU 25 since 1990. Both of these wildfires were small in size.

Infrastructure/Assets to be Protected

There are no military training assets located in FMU 25. There are improvements associated with livestock and wildlife in the forms of water catchments, holding pens and pasture fences that could be impacted by wildfires. There is a high-voltage power line running roughly parallel to NM 506 across the southern portion of FMU 25.

Risk to Firefighters

UXO is not considered a danger within FMU 25 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. Up slope and up canyon winds can be funneled through saddles and across ridges causing blow-up wildfire conditions. The nature of light, flashy fuels found here is that they burn readily and are wind-driven and slope driven. Be cautious of sudden, erratic wind shifts here. High-voltage power lines can arc in heavy smoke and burned power poles can cause live wires to come down. Be extra cautious in power line right-of-ways.

There are no SDZ areas within FMU 25.

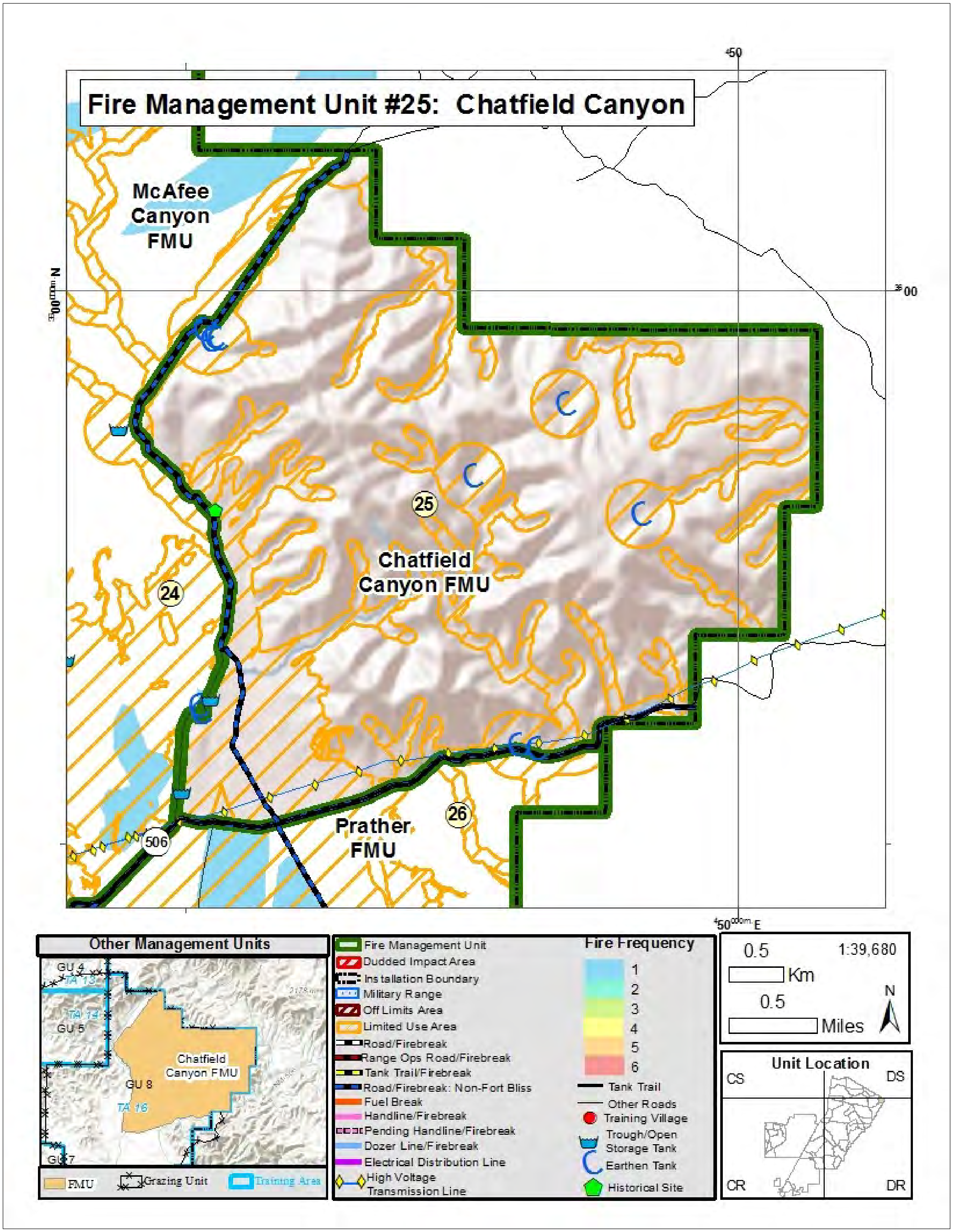
Pre Fire Season Fuels Management Actions

There are two county-maintained roads, NM 506 and the Sacramento River road that follow most of the perimeter of FMU 25. There are no other roads in FMU 25.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Wooden power poles along the high-voltage power line may need to be wet down with a water and foam mixture if wildfire is threatening the power line right-of-way. Do not burn out directly beneath power lines.

BLM Grazing Unit 8 has parts of its pasture located within FMU 25. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 25 and will work closely with BLM engines and personnel to keep wildfires as small as possible.


Fire Management Unit #25: Chatfield Canyon
McAfee Canyon FMU
Chatfield Canyon FMU
Prather FMU
25
24
26
506
Other Management Units
GU 4
GU 5
GU 8
TA 13
TA 14
TA 16
Chatfield Canyon FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
Km
0.5
Miles
1:39,680
N
Unit Location
CS
DS
CR
DR
1392

FMU 26 PRATHER 15,553 Acres

Physical Characteristics

FMU 26 is located within parts of TA 15, 16 and 19. FMU 26 is bounded on the north by NM 506 from the junction of NM 506 and Otero County road F052 then running east along NM 506 to the eastern boundary of the Fort Bliss Military Reservation. The eastern and southern boundary is the Fort Bliss Military Reservation boundary running southwest along section lines in a stair-step fashion from NM 506 past F057 to its junction with Otero County road F037. Most of this boundary is fenced except for a portion in the northeast corner of FMU 26. The west boundary is Otero County road F037 from its junction with the east boundary of Fort Bliss running north to its junction with Otero County road F052, then northwest along Otero County road F052 to its junction with NM 506.

Topography is varied within FMU 26. The northeast corner is the rugged limestone Chatfield Hills. The majority of FMU 26 is the flat desert floor of Otero Mesa and the floodplain of the Sacramento River. Vegetation is typical of Otero Mesa grasslands and is dominated by creosote, yucca, cacti and mesquite with good grassland cover of black grama and tobosa grass over most of the FMU.

Fort Bliss fire history records show 6 wildfires have burned in FMU 26 since 1990. All of the wildfires have been on the grasslands of Otero Mesa and some have become large and crossed the boundary of Fort Bliss to the east.

Infrastructure/Assets to be Protected

There are no military training assets located in FMU 25. There are improvements associated with livestock and wildlife in the forms of water catchments and storage, holding pens and pasture fences that could be impacted by wildfires. The BLM maintains a maintenance shop, a RAWS weather reporting station, storage and warehouse facilities at Prather Camp and is located in the center of FMU 26.

Risk to Firefighters

UXO is not considered a danger within FMU 26 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. The nature of light, flashy fuels found here is that they burn readily and wildfires are wind-driven. Be cautious of sudden, erratic wind shifts here.

There are no SDZ areas within FMU 26.

Pre Fire Season Fuels Management Actions

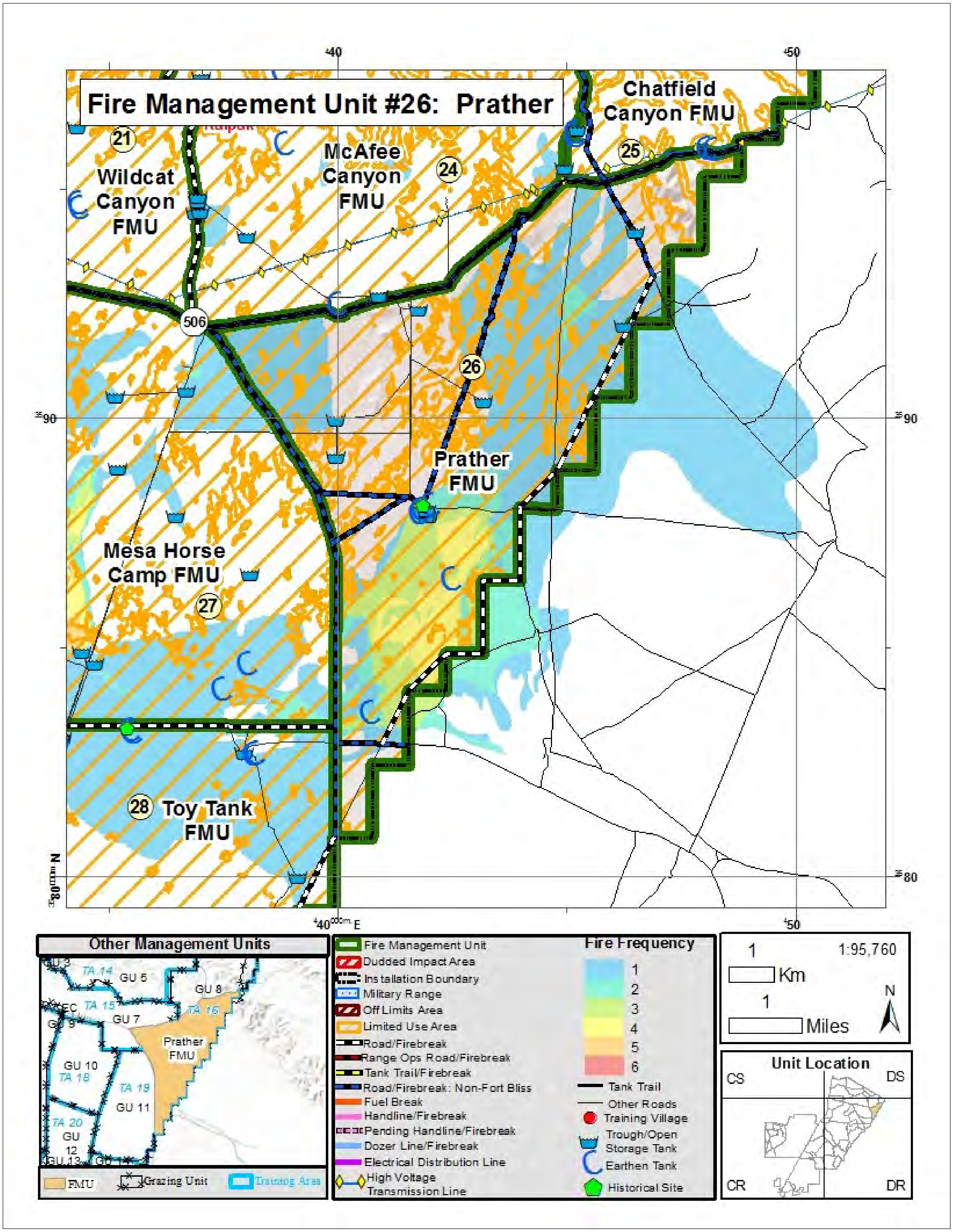
There are three county-maintained roads, NM 506 and Otero County roads F052 and F037 that follow the northern and western perimeters of FMU 26. There is a firebreak road that roughly follows the eastern boundary of the Fort Bliss Military Reservation and is the responsibility of Fort Bliss DPW O&M to maintain. Inspection of firebreak road should be done annually. Firefighters should be aware that tumbleweeds pile up along fences in FMU 26 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or county roads and black line or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Units 7, 8 and 11 have parts of their pastures located within FMU 26. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 26 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1438



Fire Management Unit #26: Prather
Chatfield Canyon FMU
McAfee Canyon FMU
Wildcat Canyon FMU
Prather FMU
Mesa Horse Camp FMU
Toy Tank FMU
21
24
25
26
27
28
506
Other Management Units
GU 5
GU 8
GU 7
GU 10
GU 11
TA 14
TA 15
TA 16
TA 18
TA 19
TA 20
Prather FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:95,760
Km
Miles
N
Unit Location
CS
DS
CR
DR

FMU 27 MESA HORSE CAMP 31,367 Acres

Physical Characteristics

FMU 27 is located within parts of TA 15, 17, 18 and 19. FMU 27 is bounded on the north by NM 506 from the top of the Otero Mesa escarpment at the turnoff of the firebreak road to Double tanks and Horse Camp and running east alongside NM 506 to its junction with Otero County road F052. The east boundary is Otero County road F052 running south from NM 506 to its junction with a firebreak road that runs west towards Horse Camp just north of the intersection of F052 and F037. The south boundary is the east-west firebreak road that runs west from Otero County road F052 past Payne tanks and past Bear tank to its end at Horse Camp. The west boundary is the firebreak road running north from Horse Camp, past Double tanks, past Road tanks to its junction with NM 506.

Topography in FMU 27 is the flat to gently rolling plains of Otero Mesa. Vegetation is typical of Otero Mesa grasslands dominated by creosote, snakeweed, cacti and yucca with good grassland cover of black grama, blue grama and tobosa grass.

Fort Bliss fire history records show at least 15 wildfires have burned in FMU 27 since 1990. Many have become large, wind-driven wildfires usually spreading towards the east under prevailing southwest winds.

Infrastructure/Assets to be Protected

There are no military training assets located in FMU 27. There are improvements associated with livestock and wildlife in the forms of water catchments and storage tanks, holding pens, corrals and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 27 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat and erratic winds are safety considerations here. The nature of light, flashy fuels found here is that they burn readily and wildfires are wind-driven. Be cautious of sudden, erratic wind shifts.

There are no SDZ areas within FMU 27.

Pre Fire Season Fuels Management Actions

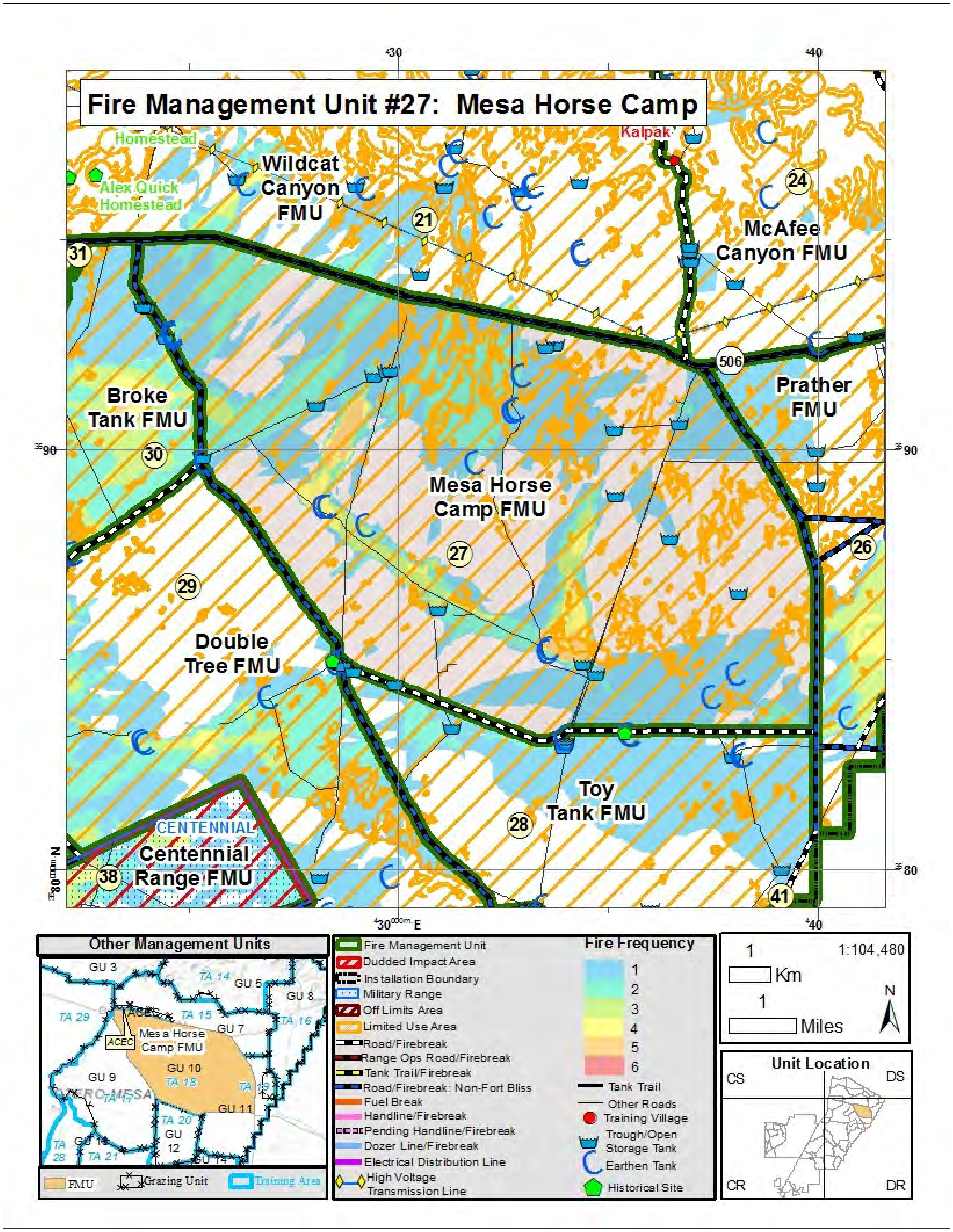
NM 506 and Otero County road F052 are maintained by Otero County. The firebreak road from NM 506 that leads to Horse Camp just after topping the Otero Mesa at the end of the paved section is maintained by the US Air Force. The firebreak road that is the southern boundary of FMU 27 is the responsibility of Fort Bliss DPW O&M to maintain. Inspections of this firebreak road should be done annually. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 27 and can add to wildfire intensity. Due to the miles of fence line here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or other defensible roads and blackline or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Units 7, 9 and 11 have parts of their pastures located within FMU 27. All of Grazing Unit 10 is located within FMU 27.The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 27 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1484



Fire Management Unit #27: Mesa Horse Camp
Wildcat Canyon FMU
McAfee Canyon FMU
Broke Tank FMU
Prather FMU
Mesa Horse Camp FMU
Double Tree FMU
Toy Tank FMU
Centennial Range FMU
CENTENNIAL
Alex Quick Homestead
Homestead
Kalpak
Other Management Units
Mesa Horse Camp FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:104,480
Km
Miles
Unit Location
CS
DS
CR
DR

FMU 28 TOY TANK 11,227 Acres

Physical Characteristics

FMU 28 is located within parts of TA 19 and 20. FMU 28 is bounded on the north by the firebreak road that runs from Mesa Horse Camp eastward past Bear tank past Payne tanks to its intersection with Otero County road F052. The east boundary is Otero County road F052 to its junction with Otero County road F037 and then south on F037 to its junction with a firebreak road that runs southwest. The east boundary continues south from that point along the Fort Bliss Military Reservation boundary then turns west and intersects the same firebreak road running southwest. The south boundary is that firebreak road running southwest from Otero County F037 and then west to Cockleburr tank. The west boundary is a firebreak road from Cockleburr tank northwest to Mesa Horse Camp.

Topography in FMU 28 is the flat to gently rolling plains of Otero Mesa. Vegetation is typical of Otero Mesa and is dominated by creosote, snakeweed, cacti and yucca with good grassland cover of black grama, blue grama and tobosa grasses among others.

Fort Bliss fire history records show at least 7 wildfires have burned in FMU 28 since 1990. Many have become large, wind-driven wildfires that spread towards the east under prevailing southwest winds.

Infrastructure/Assets to be Protected

There are no military training assets located in FMU 28. There are improvements associated with livestock and wildlife in the forms of water catchments and storage tanks, holding pens, corrals and pasture fences that could be impacted by wildfires.

The Payne Homestead is an historic site and is located along the firebreak road just east of Payne Tanks on the northern boundary of FMU 28. Wildfire could impact this site.

Risk to Firefighters

UXO is not considered a danger within FMU 28 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, erratic winds and steep, rocky slopes are safety considerations here. The nature of light, flashy fuels found here is that they burn readily and wildfires are wind-driven. Be cautious of sudden, erratic wind shifts.

There are no SDZ areas within FMU 28.

Pre Fire Season Fuels Management Actions

FMU treatments: Otero County provides maintenance for County roads F052 and F037. The firebreak road from just west of Cockleburr tank to Mesa Horse Camp is maintained by the US Air Force. The firebreak roads that are the southern and northern boundary roads of FMU 28 are the responsibility of Fort Bliss DPW O&M to maintain. Inspections of these firebreak roads should be done annually. Firefighters should be aware that tumbleweeds may pile up along fence lines in FMU 28 and can add to wildfire intensity. Due to the miles of fence line here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

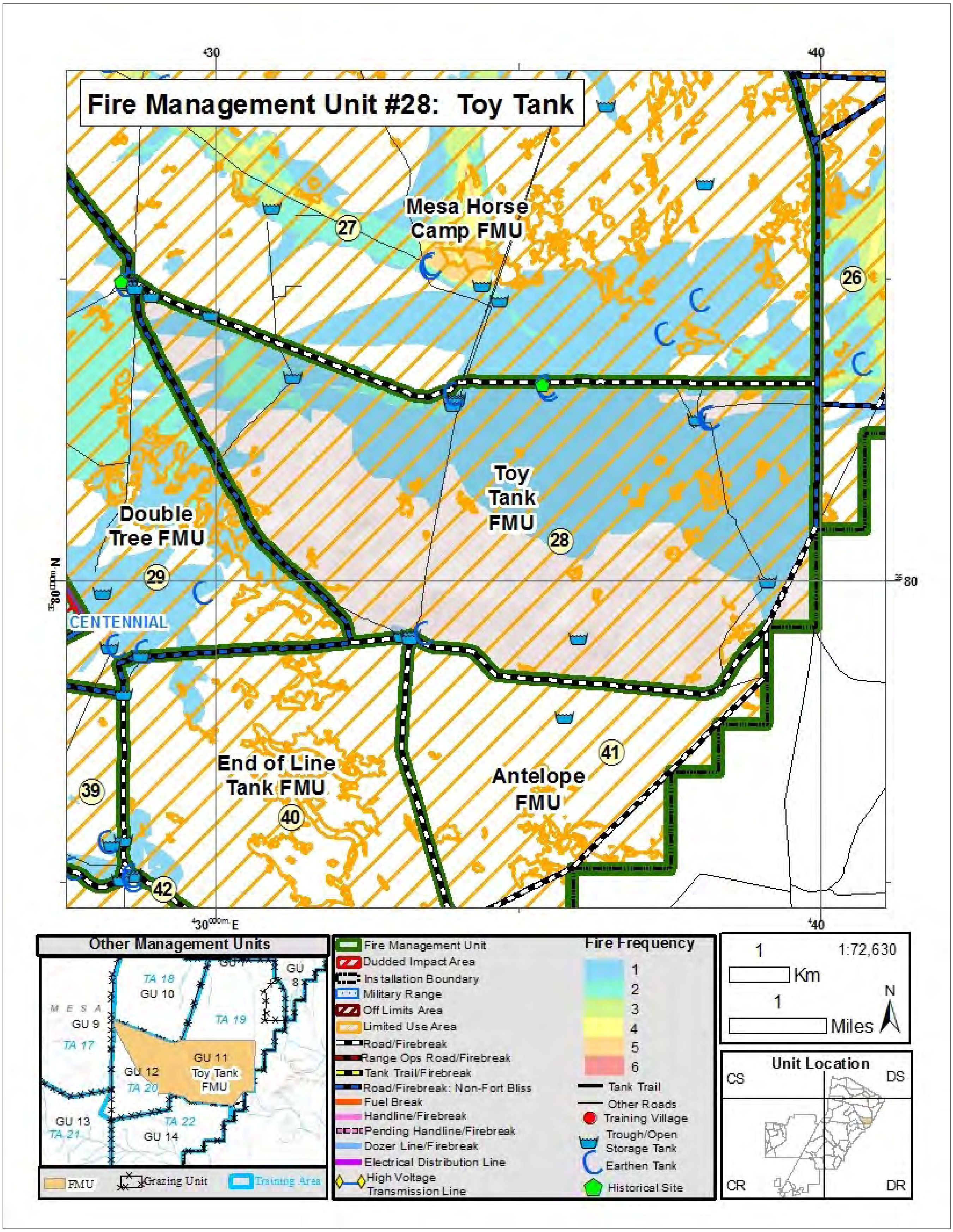
<u>Cultural Assets treatments:</u> Fire personnel should inspect the Payne Homestead site on an annual basis for excessive accumulations of tumbleweeds and other dry brush around wooden structures. Maintain a 30 foot weed, grass and brush free zone around the structure. Pile and burn tumbleweeds in a cleared area or crush down to small sticks and scatter.

Wildfire Management

Use direct attack methods with engines, UTVs or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or county roads and blackline or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander. Provide point protection with wildland fire engines at the Payne Homestead site as necessary.

BLM Grazing Units 11 and 12 have parts of their pastures located within FMU 28. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 28 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1535



Fire Management Unit #28: Toy Tank
Mesa Horse Camp FMU
Toy Tank FMU
28
Double Tree FMU
29
CENTENNIAL
End of Line Tank FMU
40
Antelope FMU
41
27
26
39
42
Other Management Units
GU 10
TA 18
TA 19
GU 9
TA 17
GU 12
TA 20
GU 11 Toy Tank FMU
GU 13
TA 21
TA 22
GU 14
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:72,630
Km
Miles
N
Unit Location
CS
DS
CR
DR

FMU 29 DOUBLE TREE 15,714 Acres

Physical Characteristics

FMU 29 is located within parts of TA 17 and 20 and within a small portion of TA 22. FMU 29 is bounded on the north and east by the road that is the main access road to the Centennial Bombing Range. FMU 29 begins at Double tanks and follows this road southeast past Mesa Horse Camp to the east–west road just west of Cockleburr tank. The south boundary is the access road to Centennial Bombing Range running west past Mare Pasture Rim tank to its intersection with a gate at the fence that surrounds the Centennial Bombing Range. The west boundary is a firebreak and a two-track road from the edge of Centennial Bombing Range at the south access gate running northeast, north and southwest around the perimeter of Centennial Bombing Range and then leaving the Range boundary heading northwest on a firebreak road that follows the western boundary and pasture fence for Grazing Unit 9. The firebreak road then leaves the pasture fence and runs northeast from an intersection and gate, past Broke tank to its intersection with the main access road to Centennial Bombing Range at Double tanks.

Topography in FMU 29 is the rolling mesa of Otero Mesa. Vegetation is typical of Otero Mesa grasslands with low rolling hills dominated by creosote, snakeweed, cacti, sotol, bear grass and yucca with good grassland cover dominated by black grama and tobosa grass over most of the FMU.

Fort Bliss fire history records show at least 12 wildfires have burned in FMU 29 since 1990. Many have become large, wind-driven wildfires usually spreading towards the north and east under prevailing southwest winds.

Infrastructure/Assets to be Protected

There are no military training assets located in FMU 29. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks, holding pens, corrals and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 29 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of light, flashy fuels found here is that they burn readily and wildfires are wind-driven. Be cautious and aware of sudden, erratic wind shifts.

Most of FMU 29 is within the SDZ for Centennial Range. The exception to this is the US Air Force maintained access road from NM 506 south past Mesa Horse Camp to its intersection with a fence and cattle guard at Mare Pasture Rim tank. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

The access road to Centennial Bombing Range is maintained by the US Air Force. Fort Bliss DPW O&M is responsible for maintaining the firebreak road from Centennial Range north along the pasture fence, past

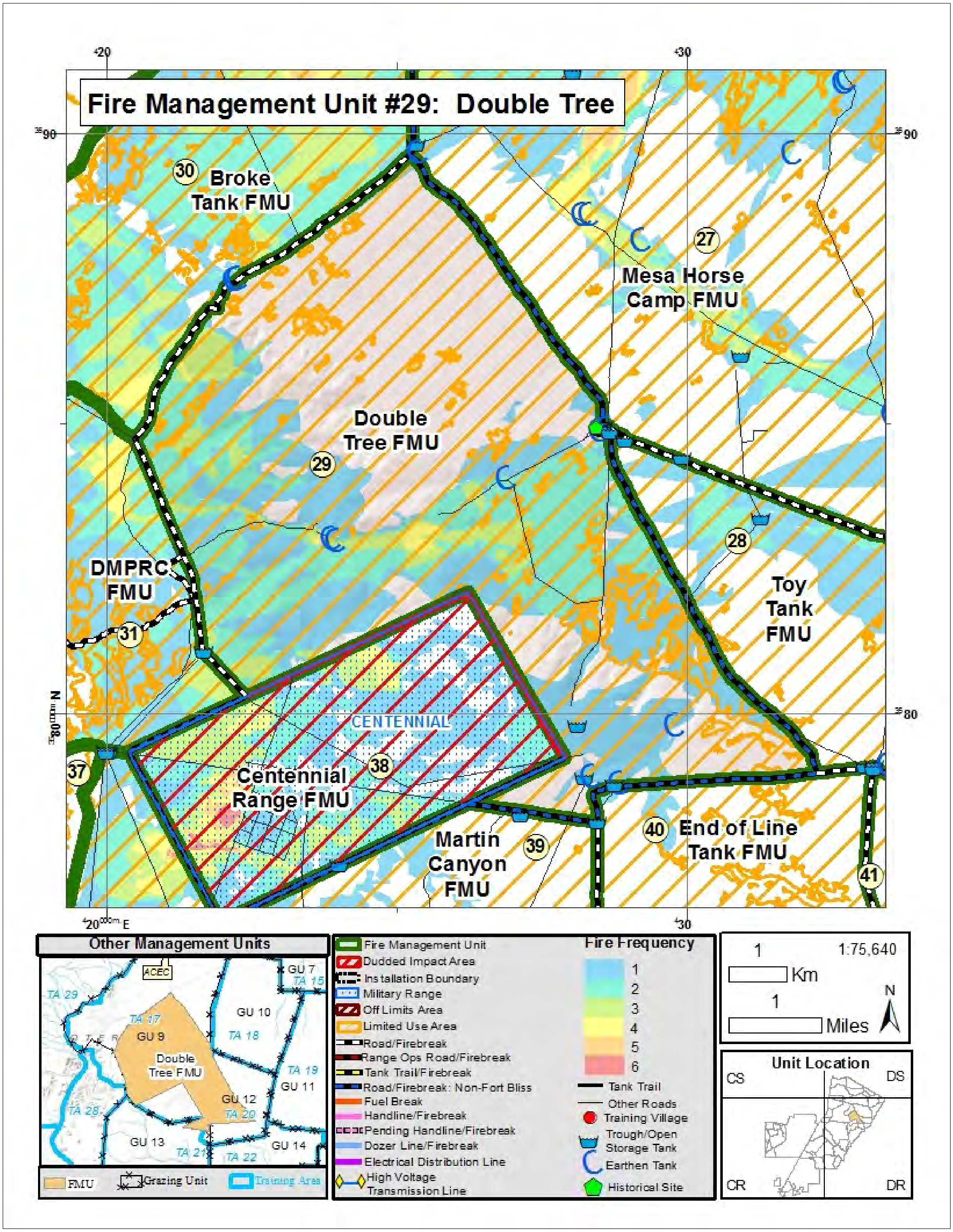
Broke tank to Double tanks. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 29 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or well-maintained roads and blackline or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Units 9 and 12 have parts of their pastures located within FMU 29. A small portion of the north end of Grazing Unit 13 is located within FMU 29. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 29 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1585


Fire Management Unit #29: Double Tree
30 Broke Tank FMU
27 Mesa Horse Camp FMU
29 Double Tree FMU
DMPRC FMU
31
28 Toy Tank FMU
CENTENNIAL
38 Centennial Range FMU
37
39 Martin Canyon FMU
40 End of Line Tank FMU
41
Other Management Units
ACEC
GU 7
TA 15
TA 29
GU 10
TA 17
GU 9
TA 18
Double Tree FMU
TA 19
GU 11
GU 12
TA 28
TA 20
GU 13
TA 21
TA 22
GU 14
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:75,640
1 Km
1 Miles
N
Unit Location
CS
DS
CR
DR

FMU 30 BROKE TANK 10,050 Acres

Physical Characteristics

FMU 30 is located within the western part of TA 17 and a small portion of the northeast corner of TA 29. FMU 30 is bounded on the north by the paved portion of NM 506 from the bottom of the Otero Mesa escarpment to the top of the escarpment. The eastern boundary is the main access road to the Centennial Bombing Range from NM 506 to Double tanks. The south boundary is the firebreak road that runs southwest from Double tanks, past Broke tank to a gate in the pasture fence that is the west boundary for Grazing Unit 9. The west boundary follows the pasture fence northwest along a two track road to the edge of the Otero Mesa escarpment and then roughly follows an unmarked line along the escarpment edge then down the escarpment to the pavement on NM 506 at the base of the Otero Mesa escarpment.

Topography in FMU 30 is primarily the rolling mesa top of Otero Mesa. FMU 30 also includes much of the broken, rough country associated with the cliffs and canyons of the Otero Mesa escarpment. Vegetation atop the mesa is typical grasslands dominated by creosote, snakeweed, cacti and yucca with good grassland cover over much of FMU 30. Vegetation in the canyons and on the face of the escarpment below the top of the mesa is mesquite, ocotillo, apache plume, agave, cacti, sotol and scattered bunchgrasses.

Fort Bliss fire history records show at least 8 wildfires have burned in FMU 30 since 1990. Most wildfires were kept small in this FMU. Wildfires below the escarpment did not burn up to the mesa top and extinguished themselves due to the lack of continuous fuels.

Infrastructure/Assets to be Protected

There are no military training assets located in FMU 30. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks, holding pens, corrals and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 30 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust, erratic winds and steep, rocky slopes are safety considerations here. The nature of light, flashy fuels found here is that they burn readily and wildfires are wind-driven. Be cautious and aware of sudden, erratic wind shifts.

The south half of FMU 30 is within the SDZ for Range 88. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

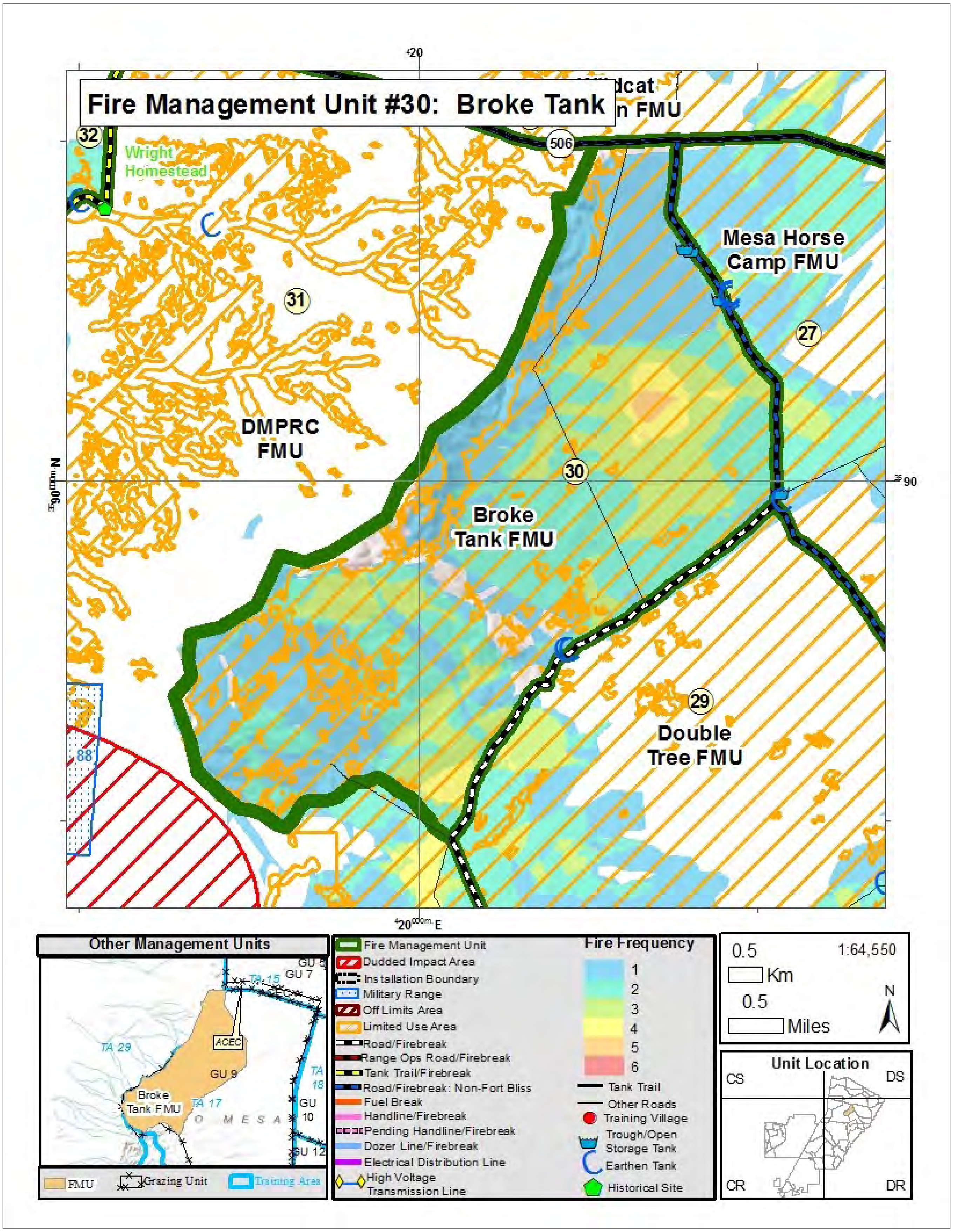
The access road to Centennial Bombing Range is maintained by the US Air Force. Fort Bliss DPW O&M is responsible for maintaining the firebreak road from Double tanks past Broke tank to Centennial Bombing Range. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 30 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot on wildfires atop Otero Mesa. Wildfires down in the west-facing canyons and below the Otero Mesa escarpment should be monitored from the mesa top and allowed to burn out on their own. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires atop Otero mesa. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or well-maintained roads and black line or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Unit 9 has part of its pasture located within FMU 30. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 30 and will work closely with BLM engines and personnel to keep wildfires as small as possible.

1634



Fire Management Unit #30: Broke Tank
Wildcat
n FMU
506
32
Wright Homestead
31
DMPRC FMU
Mesa Horse Camp FMU
27
30
Broke Tank FMU
29
Double Tree FMU
88
420
3590
4200000m. E
Other Management Units
GU 5
GU 7
TA 15
ACEC
TA 29
GU 9
Broke Tank FMU
TA 17
TA 18
GU 10
GU 12
O M E S A
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:64,550
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 31 DMPRC 47,995 Acres

Physical Characteristics

FMU 31 is mostly in the eastern portion of TA 29, and includes small portions of TAs 28, 17, and 21. FMU 31 is bounded on the north by NM 506 beginning at the intersection of a firebreak road from the south and heading east along NM 506 to the base of the Otero Mesa escarpment. The east boundary is an unmarked line along the edge of the Otero Mesa escarpment from NM 506 to its intersection with a firebreak road on the west edge of Otero Mesa, then south along the fire break road along a fence to where the firebreak road intersects the north side of Centennial Bombing Range. The south boundary follows the Centennial Bombing Range boundary to the southwest, then heads west following an unmarked boundary down the escarpment to the Hay Meadow Canyon road, then south along the Hay Meadow Canyon road, then west on the Hay Meadow Tank Trail to an intersection with Route Green Tank Trail. The west boundary heads north along Route Green Tank Trail (Orogrande Range Complex access road) past Ranges 84-88 to an intersection of firebreak roads at Wilde Well then along the fire break road that heads northeast from Wilde Well past Lee tank and Wright tank to NM 506.

FMU 31 sits primarily on the desert floor and extends through creosote piedmonts and bedrock to the Otero Mesa escarpment and on to the top edge of Otero Mesa. Grassland fuels are sparse and disconnected. The majority of the desert shrub lands will not support wildfire spread except during fire seasons following the wettest years. The majority of fires in FMU 31 move east due to prevailing southwest winds in isolated pockets of fuel found mostly in arroyos that drain from the east to the west.

Fort Bliss fire history records show at least 12 wildfires have burned in FMU 31 since 1990.

Infrastructure/Assets to be Protected

Ranges 84, 85, 86, 88, Malakand Village, and the EQR are found within FMU 31. Most of the military assets in FMU 31 do not have enough vegetation nearby to support wildfires that might cause harm.

The Wright Homestead (Wright Place) is an historic cultural site located within FMU 31 that should be protected from wildfire as there can be enough fuel accumulated near these structures that a wildfire could cause damage.

Risks to Firefighters

Within FMU 31 is a large duded impact area that has UXO and receives artillery and air to ground munitions. Entry into impact areas is prohibited.

Nearly all of FMU 31 is within the SDZ for Range 88. NM 506 and the firebreak road from NM 506 to Wilde Well are outside the SDZ. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations.

Pre-Fire Season Fuels Treatments Needed

FMU treatments: The highest priority in FMU 31 is a fuel break to be accomplished by prescribed burning at the mouth of Hay Meadow Canyon, at the east end of Hay Meadow Canyon Tank Trail and along the north/south firebreak road called Hay Meadow Canyon road. Military grid location is DR175794. The first prescribed burn at this location was accomplished in December 2012. This firebreak treatment disrupts the continuous grass cover across the bottom of Hay Meadow Canyon. This helps keep wildfires contained within FMU 31 and does not allow wildfires to move up Hay Meadow Canyon and climb to the Otero Mesa as it has done in the past. Yearly inspections must occur post-growing season to determine if prescribed fire needs to be done prior to the next fire season.

Firebreak road maintenance within FMU 31 is a DPW O&M responsibility. Maintenance should generally be restricted to road surfaces. Road shoulders should be mowed or brush hogged wherever feasible.

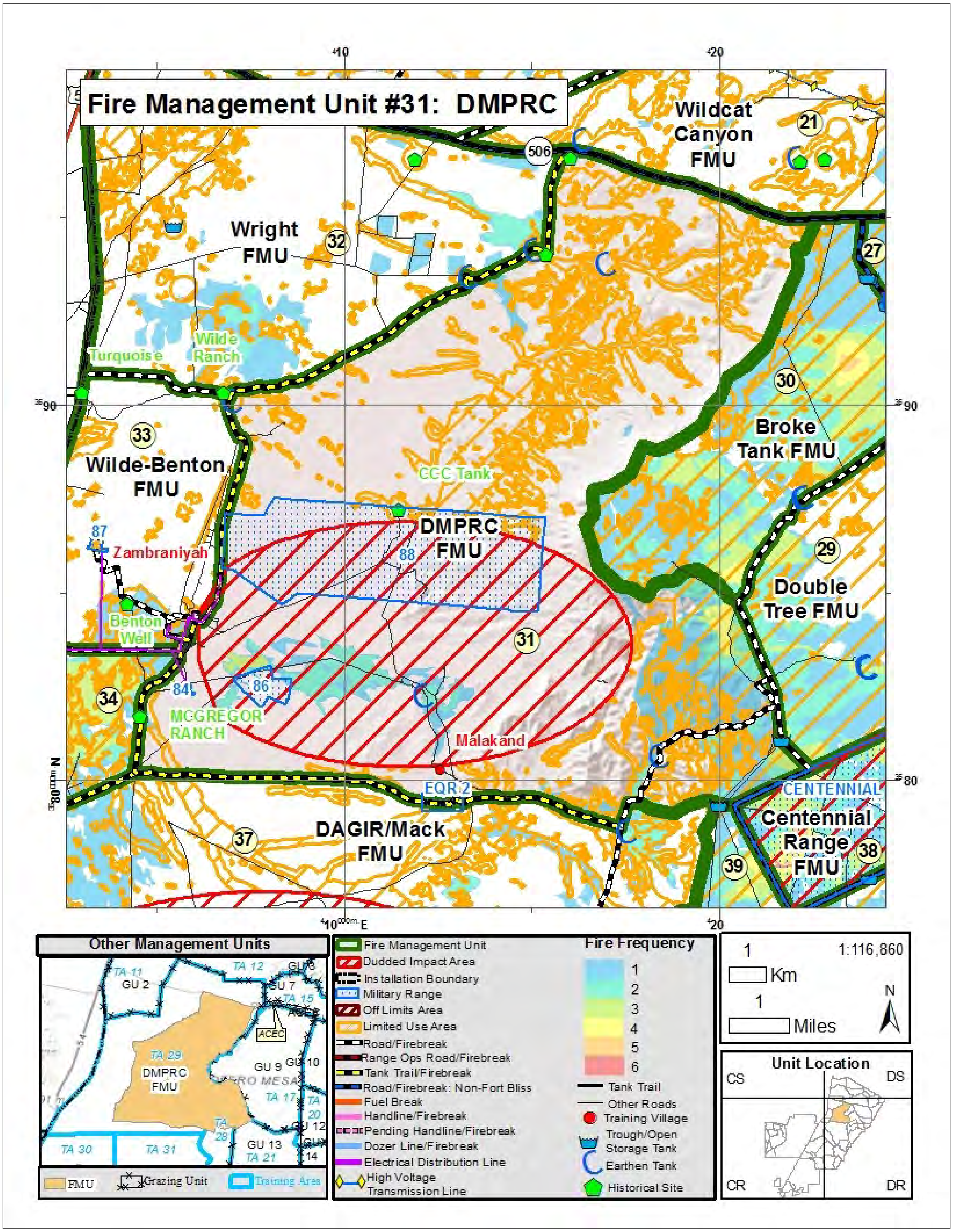
Training Asset Treatments: Vegetated areas around flammable structures need to be kept mowed to keep vegetation short. Mowing (brush hog) of vegetation at 6 to 8 inches in height should be done around targets and other flammable structures wherever possible, twice yearly (once in May or June, and again in late October before present year's vegetative growth dries out) or as needed to prevent tumbleweeds from growing large and breaking off and becoming a fire hazard. Yearly assessments should be done by Fort Bliss fire personnel to assess the amount of fuel loading as fuel loads may vary greatly from year to year and determine the need for mowing or removal of fuels around structures.

Cultural Asset treatments: The Wright Place should be inspected on an annual basis by firefighters to determine the need for removal of accumulated brush and weeds around the historic wooden structure. Remove tumbleweeds and other flammable debris out to 30 feet from the structure. Burn tumbleweeds in a cleared area or crush down and scatter.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 31 except for wildfires adjacent to and threatening structures and infrastructure. A primary goal is to keep wildfire within FMU 31 and prevent wildfires from climbing Hay Meadow Canyon to the Otero Mesa. Fire history shows that other wildfires in FMU 31 extinguished themselves as they ran out of fuel. Flammable fuels are dispersed or concentrated in drainage bottoms. Fuels end in bedrock areas on the eastern portions of FMU 31. Firefighters and equipment should stay on roads and may use fire to burn out fuels along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

One area atop Otero Mesa within FMU 31 is fenced to keep livestock out and is one of the four units of the Black Grama Area of Critical Environmental Concern (ACEC). Off-road vehicle travel is not permitted in ACECs. Wildfires within ACEC boundaries can be engaged using direct attack suppression methods on foot if fire intensities allow. If fire intensities are such that direct attack is not feasible, fall back to firebreak roads and engage with engines from roads or burn out along roads ahead of the wildfire.



Fire Management Unit #31: DMPRC
Wildcat Canyon FMU
Wright FMU
Turquoise
Wilde Ranch
Wilde-Benton FMU
CCC Tank
DMPRC FMU
Zambraniyah
Benton Well
MCGREGOR RANCH
Malakand
EQR 2
Broke Tank FMU
Double Tree FMU
DAGIR/Mack FMU
CENTENNIAL
Centennial Range FMU
Other Management Units
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:116,860
Km
Miles
Unit Location

1702

FMU 32 WRIGHT 19,615 Acres

Physical Characteristics

Part of TA 29 and TA 11 are located in FMU 32. FMU 32 is bounded on the north by NM 506 from its intersection at US 54 heading east to its intersection with a firebreak road from the Wright Place to the south. The south and east boundary of FMU 32 is the fire break road that runs past the Wright Place and Lee tank, past Wilde Well and continues west to the railroad tracks. The west boundary is the Fort Bliss Military Reservation boundary from the fire break road north along a two-track road on the east side of the railroad tracks to its intersection with NM 506.

FMU 32 is flat to gently rolling topography. Vegetation is dominated by mesquite and creosote intermixed with patches of fairly contiguous grasslands in sandy soils. Sandy soil types also contain sand sagebrush mixed among perennial desert grasses and in years following average to above average precipitation wildfires can spread and become large in this fuel type. There are also areas of mesquite coppice dunes in FMU 32. These areas do not support continuous grass growth and are barriers to wildfire spread.

Fort Bliss fire history records show that at least 14 wildfires have burned in FMU 32 since 1990.

Infrastructure/Assets to be Protected

There are no training assets or infrastructure within FMU 32.

Wilde Well is an historical cultural site located within FMU 32. This site is normally not at risk from wildfire damage due to the lack of continuous fuels.

Risk to Firefighters

There is a danger of firefighting vehicles becoming stuck if driving off roads within FMU 32 due to deep sand in many places. Normal environmental factors of dust, high heat, low relative humidity and erratic winds are safety considerations for firefighters in FMU 32.

There are no SDZ areas within FMU 32.

Pre Fire Season Fuels Management Actions

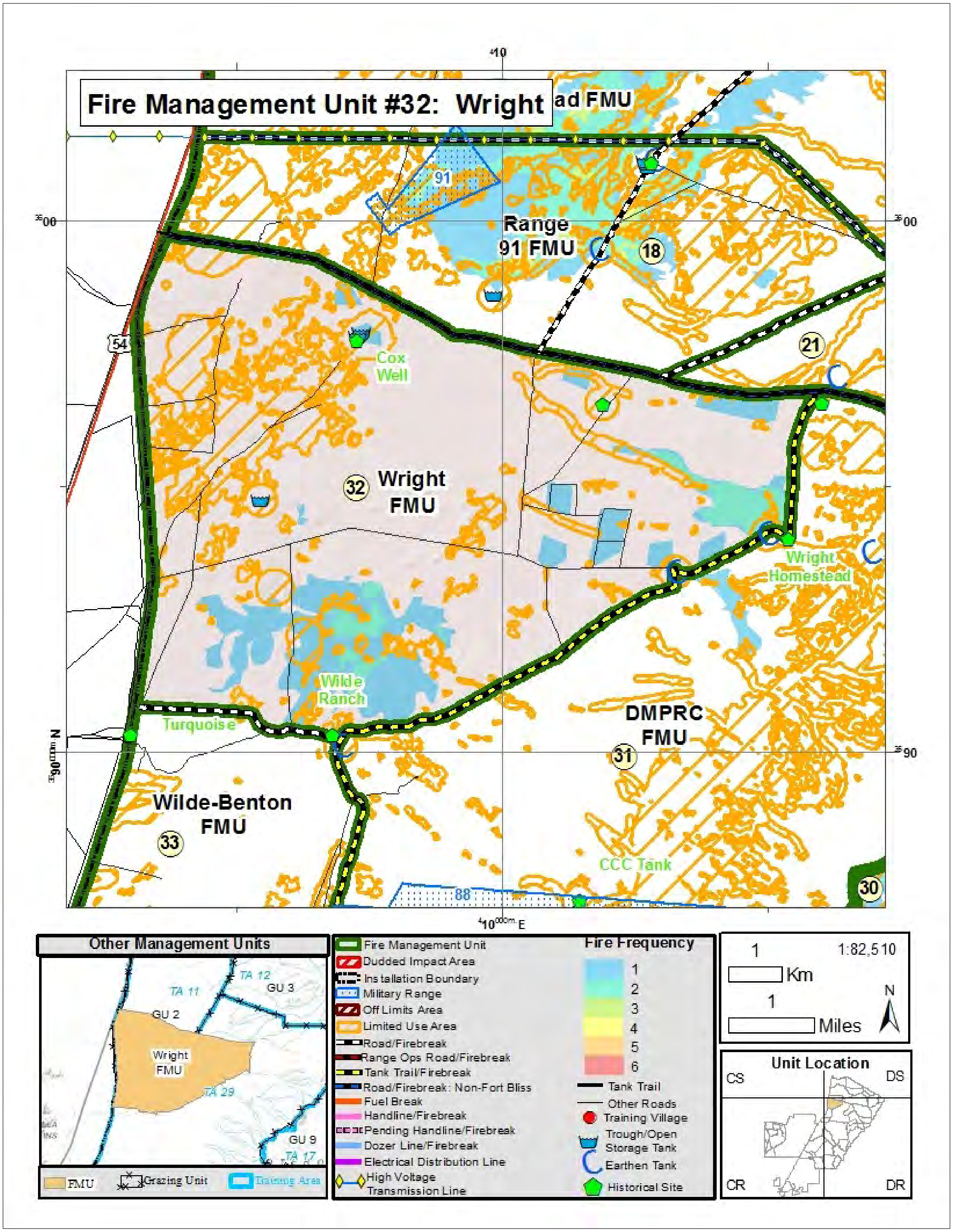
<u>FMU treatments:</u> Fire break roads on the east and south boundaries of FMU 32 should be maintained by Fort Bliss DPW O&M to keep them vegetation-free.

<u>Cultural Assets treatments:</u> Inspections of Wilde Well should occur on an annual basis by fire personnel to assess the amount of dried tumbleweeds and brush against historic wooden structures. If necessary, remove dried brush out to 30 feet from structures, stack in cleared areas and burn or crush down and scatter brush.

Wildfire Management

Let wildfires burn themselves out in FMU 32 except for the portion within Grazing Unit 2. Use direct attack within the Grazing Unit. Fire history shows that wildfires in the rest of FMU 32 extinguish themselves as they run out of fuel in mesquite or creosote areas. Firefighters and equipment should stay on roads and may use fire to burn out fuels along roads ahead of a wildfire, if deemed necessary by the Incident Commander.

The southern portion of BLM Grazing Unit 2 is located within the northern half of FMU 32. The grazing unit boundary is fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 32 and will work closely with BLM to keep wildfires as small as possible within the grazing unit.



Fire Management Unit #32: Wright
Range 91 FMU
Wright FMU
Cox Well
Wright Homestead
Wilde Ranch
Turquoise
DMPRC FMU
Wilde-Benton FMU
CCC Tank
Other Management Units
Fire Frequency
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:82,510
Km
Miles
Unit Location

1745

FMU 33 WILDE-BENTON 8,845 Acres

Physical Characteristics

A part of TA 29 is located within FMU 33. FMU 33 occupies the west side of TA 29 and is bounded on the north by a fire break road from the railroad tracks heading east to Wilde Well and the intersection of a fire break road heading south. The east boundary of FMU 33 is the fire break road that heads south from Wilde Well and runs past Ranges 88-85. The fire break road becomes Route Green Tank Trail at Range 88 and is the access road for the Orogrande Range Complex. The south boundary is a fire break road that runs east-west and is the main access road from US 54 to access Ranges 84-88 of the Orogrande Range Complex. The western boundary of FMU 33 is a two-track road that follows the Fort Bliss Military Reservation boundary from the firebreak road that is the access road to the Orogrande Range Complex north alongside the railroad tracks to its intersection with the fire break road that runs east to Wilde Well.

Topography is generally flat to gently rolling in FMU 33. FMU 33 is characterized by deep, sandy soils. These sandy soils make moisture relatively available to vegetation and produce an abundant perennial mixture of sand sage, four wing saltbush and dropseed grasses, among others. Annual grasses, forbs and weeds also contribute significantly to the fuel bed. Even average precipitation years produce enough fuels in this soil type to promote wildfire growth.

Fort Bliss fire history records show at least 3 wildfires have burned in FMU 33 since 1990.

Infrastructure/Assets to be Protected

The CACTF (Range 87) at the village of Zambraniyah and the Orogrande Range Complex facilities are located in FMU 33. Wilde-Benton Airfield is located in the northeast quadrant of FMU 33.

Benton Well is an historic cultural site located in FMU 33 near the CACTF. The wooden windmill structure is at risk from wildfire.

Risk to Firefighters

There is a danger of firefighting vehicles driving off roads and becoming stuck within FMU 33 due to deep sand in many places. Environmental factors of high heat, low humidity, dust and strong, erratic winds present additional hazards to wildland firefighters in FMU 33.

The southeast quadrant of FMU 33 is within the SDZ for the Orogrande Range Complex. Obtain permission from Range Operations to enter SDZ areas prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

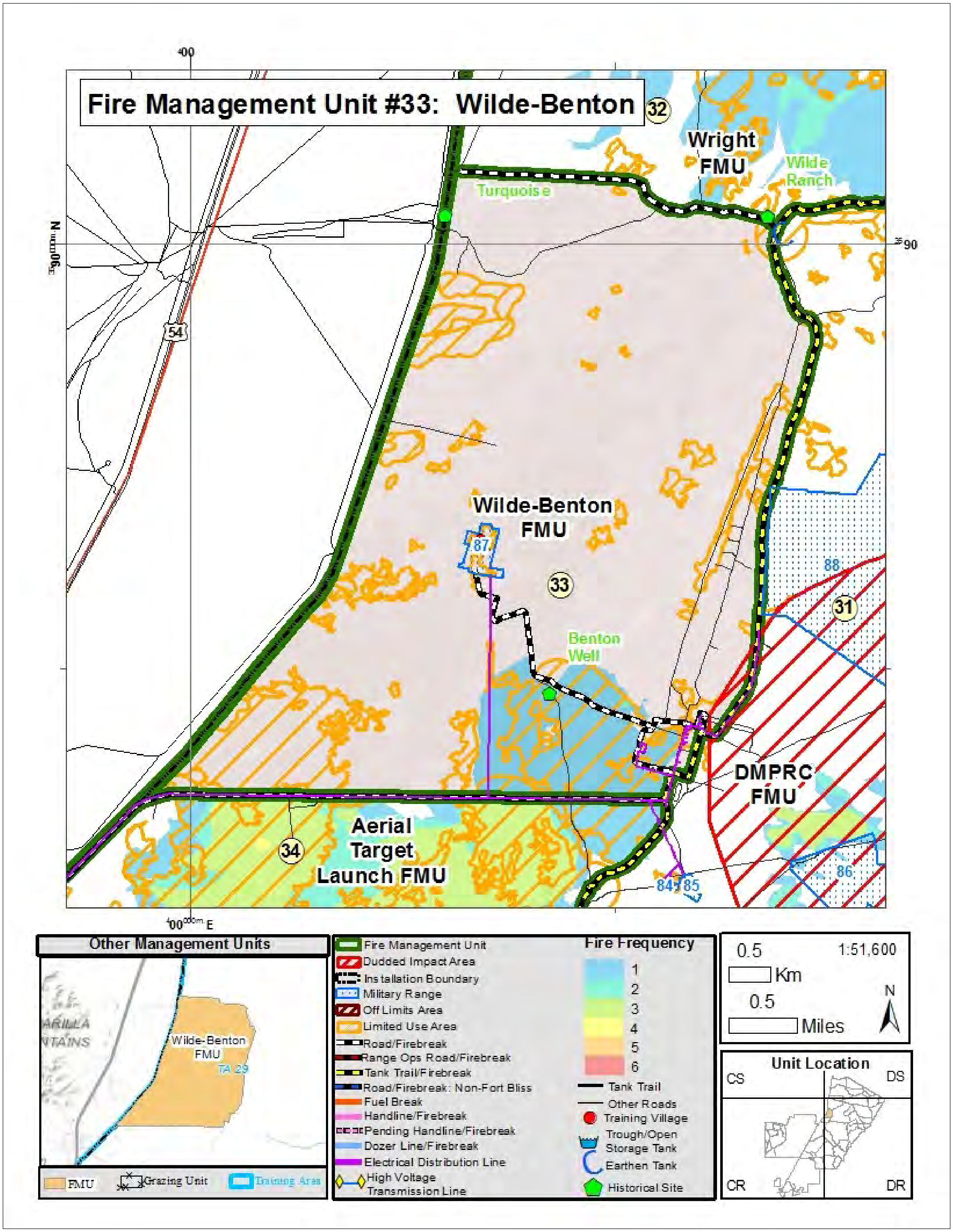
FMU treatments: Fire break roads around the north, east and south perimeters of FMU 33 should be maintained by Fort Bliss DPW O&M to keep them vegetation-free.

Training Asset treatments: Vegetated areas adjacent to flammable structures need to be mowed to keep vegetation short. Vegetation should not be completely removed around structures as the plants roots help stabilize the sandy soils and help prevent sand from piling up against buildings. The CACTF is well placed and protected from wildfire due to its construction materials and the cleared areas around all buildings. The Orogrande Range Complex is also well protected with bare dirt surrounding most of the facilities.

Cultural Assets treatments: Benton well needs to be inspected by firefighters on an annual basis for accumulation of dried vegetation. Maintain the area directly around the windmill base to be brush free by mowing or weed eating annual growth for 30 feet out from the structure.

Wildfire Management

Let wildfires burn themselves out in FMU 33. Suppress wildfires with engines and UTVs if wildfire is threatening structures and/or power lines. Wildfires may be suppressed as they burn up to roads. Firefighters and equipment should stay on roads and use fire to burn out fuels along roads ahead of a wildfire, if deemed advantageous by the Incident Commander.



Fire Management Unit #33: Wilde-Benton
32
Wright FMU
Wilde Ranch
Turquoise
54
Wilde-Benton FMU
87
33
88
31
Benton Well
DMPRC FMU
Aerial Target Launch FMU
34
84
85
86
400
90
Other Management Units
Wilde-Benton FMU
TA 29
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:51,600
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 34 AERIAL TARGET LAUNCH 6,751 Acres

Physical Characteristics

Part of TA 29 is located in FMU 34. FMU 34 is bounded on the north by the paved fire break road that is the main access road to the Orogrande Range Complex from the Fort Bliss Military Reservation boundary heading east to its intersection with Route Green Tank Trail. The east boundary is Route Green Tank Trail from the fire break road near the Orogrande Range Complex heading south to its intersection with the Hay Meadow Tank Trail. The south boundary is Route Green Tank Trail heading southwest from the Hay Meadow Tank Trail past an intersection with another fire break road that is the access road for the IPBC and the DAGIR to its intersection with the Fort Bliss Military Reservation boundary. The west boundary is the western boundary of Fort Bliss from where the Route Green Tank Trail meets the boundary northward along the railroad tracks to where the fire break road turns east towards the Orogrande Range Complex and leaves the Fort Bliss boundary.

FMU 34 is characterized by gently sloping to flat terrain with sandy soil. The southern portions of the FMU have more stable soils and grades into abrupt creosote-covered hills along the southwest boundary. Sandy soils produce a perennial mixture of sand sage, fourwing saltbush and dropseed grasses, among others. Annual grasses, forbs and weeds also contribute significantly to the fuel bed in wetter years. Even average precipitation years produce enough fuel in this soil type to promote wildfire growth. Wildfires have been common in FMU 34 east of the Target Launch Complex.

Fort Bliss fire records show there have been at least 5 wildfires in FMU 34 since 1990. One wildfire escaped FMU boundaries as it jumped the paved road near the Orogrande Range Complex and moved northward.

Infrastructure/Assets to be Protected

The Aerial Target Launch facility and associated buildings are located in FMU 34. PEO STRI has tracking and communication facilities located on hilltops near the Launch Facility. There is a scrap yard of old military vehicles and a warehouse located in the southwest portion of FMU 34. The structures and associated infrastructure are well protected from wildfire by surrounding bare ground and parking lots.

Risk to Firefighters

There is a danger of firefighting vehicles driving off roads and becoming stuck within FMU 34 due to deep sand in many places. Environmental factors of high heat, low humidity, dust and strong, erratic winds present additional hazards to wildland firefighters in FMU 34.

The eastern half of FMU 34 is within the SDZ for live-fire from the Orogrande Range Complex. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations here.

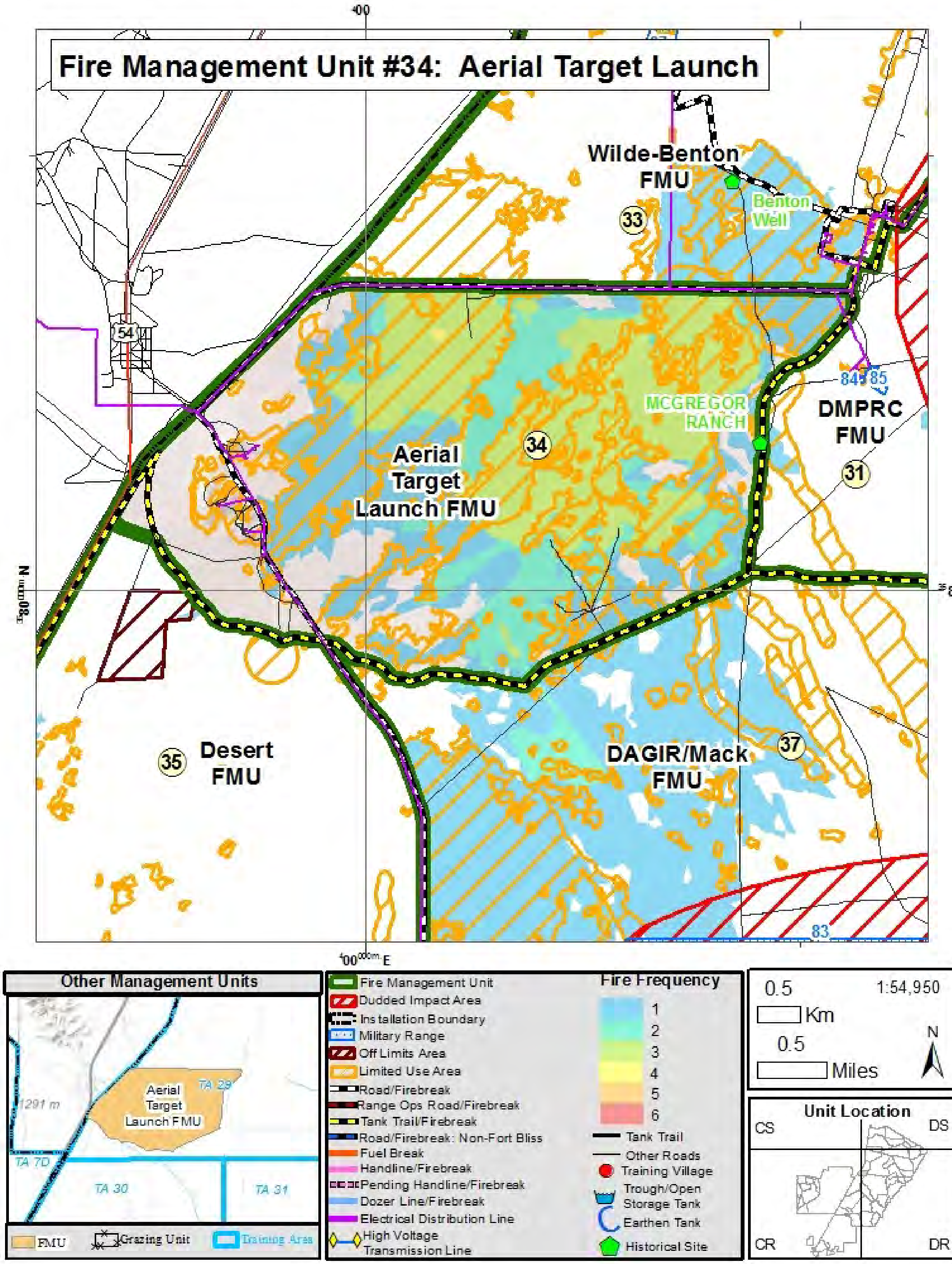
Pre Fire Season Fuels Management Actions

The fire break roads surrounding FMU 34 are well-maintained and the north boundary is paved. Normal maintenance will keep these roads adequate for fire break purposes.

<u>FMU treatments:</u> The Route Green Tank trail portion that is the southern portion of FMU 34 is a firebreak road that needs reinforced using prescribed fire. The blackline operation would occur in FMU 37. When fuel loads are adequate, plan to implement prescribed burning in late winter or early spring before fire season onset.

Wildfire Management

Let wildfires burn themselves out in all areas of FMU 34. Wildfires can be suppressed using engines as they burn up to roads. Firefighters and equipment should stay on roads and may use fire to fight fire by burning out fuels along roads ahead of a wildfire, if deemed advantageous by the Incident Commander.



Fire Management Unit #34: Aerial Target Launch
Wilde-Benton FMU
33
Benton Well
54
MCGREGOR RANCH
DMPRC FMU
31
34
Aerial Target Launch FMU
35
Desert FMU
DAGIR/Mack FMU
37
83
Other Management Units
Aerial Target Launch FMU
TA 29
TA 7D
TA 30
TA 31
1291 m
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:54,950
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

1836

FMU 35 DESERT 24,881 Acres

Physical Characteristics

Parts of TA 29, 30 and 32D are located in FMU 35. FMU 35 is bounded on the north by the Route Green Tank Trail from the point where the Route Green Tank Trail leaves the Fort Bliss Military Reservation boundary just south of the village of Orogrande and heads east to an intersection with a fire break road that is the access road for the DAGIR and the IPBC. FMU 35 is bounded on the east by the firebreak road heading south from the intersection with Route Green Tank Trail to an intersection with a Range fire break road near the DAGIR ROCA, then heading southwest on another fire break road that is the access road for a power line and continues south along the power line into TA 32D to an intersection with a fire break road at Range 40. The south boundary is the fire break road heading west from that intersection of fire break roads at Range 40 to its junction with the Fort Bliss boundary alongside US 54. The west boundary is the Route Green Tank Trail that follows the Fort Bliss Military Reservation boundary adjacent to US 54 from the fire break road north to the point where Route Green Tank Trail leaves US 54 and heads east.

FMU 35 is characterized by deep, sandy soils throughout the north half of the FMU. The southern portions of FMU 35 have more stable soils and mesquite coppice dunes are prevalent. There are limestone hills in the northeast quadrant of FMU 35. Sandy soils produce a perennial mixture of sand sage, four wing saltbush, and tobosa and dropseed grasses, among others. Annual grasses, forbs and weeds also contribute to the fuel bed in wetter years. Even average precipitation years produce enough fuel in this soil type to promote wildfire growth. The mesquite coppice dunes and the limestone hills do not grow enough continuous fuel to support wildfire spread.

Fort Bliss fire history records show there have been 5 fires in FMU 35 since 1990. Two of these fires crossed over roads and burned into other FMUs.

Infrastructure/Assets to be Protected

There are no significant military resources located within FMU 35 that need protecting from wildfire. There is a power line with wooden poles alongside a firebreak road from the DAGIR through the limestone hills south to Range 40.

There are cultural assets located at South Well on the southern boundary of FMU 35 that are worth protecting from wildfire.

Risk to Firefighters

There is a danger of firefighting vehicles driving off roads and becoming stuck within FMU 35 due to deep sand in places. Environmental factors of high heat, low humidity, dust and strong, erratic winds present additional hazards to wildland firefighters in FMU 35.

There are no SDZ areas in FMU 35.

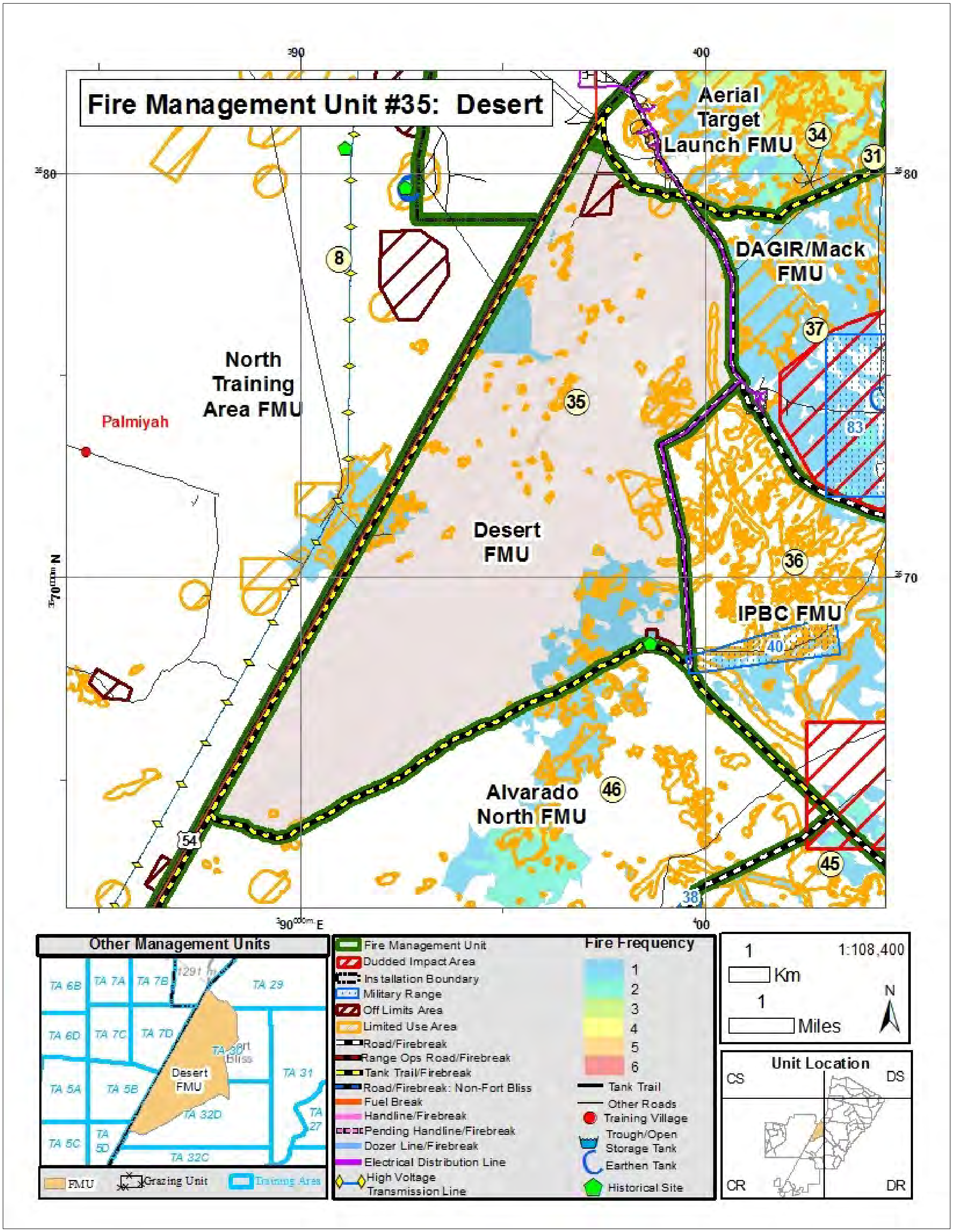
Pre Fire Season Fuels Management Actions

FMU treatments: Firebreak roads around the eastern and southern perimeters of FMU 35 should be maintained by Fort Bliss DPW O&M to keep them vegetation-free. Maintaining the eastern boundary fire break road will allow engine access and will help protect the wooden poles along the power line.

Cultural Asset treatments: The South Well site contains historic, combustible cultural features and should be inspected by firefighters annually for debris and brush accumulations near these features. Remove old tumbleweeds and debris and burn them onsite or crush down and scatter to alleviate possible wildfire damage.

Wildfire Management

Let wildfires burn themselves out in FMU 35. Wildfires can be suppressed with water as they burn up to roads. Fire history shows that most wildfires in FMU 35 extinguish themselves as they run into sparse fuels. Firefighters and equipment should stay on roads and may use fire to burn out fuels along roads ahead of a wildfire, if deemed advantageous by the Incident Commander. Do not burn out or engage wildfires under power lines as smoke can cause arcing between lines and the ground. Protect power poles by wetting them down with a foam and water mixture as necessary, then exit the area if wildfire is approaching. Provide point protection at the South Well site with wildland engines if a wildfire is threatening to burn around the cultural site.

1889 

Fire Management Unit #35: Desert
Aerial Target Launch FMU
34
31
DAGIR/Mack FMU
37
83
8
North Training Area FMU
Palmiyah
35
Desert FMU
36
IPBC FMU
40
Alvarado North FMU
46
54
45
38
390
400
80
70
390000m E
3770000m N
Other Management Units
TA 6B
TA 7A
TA 7B
1291 m
TA 29
TA 6D
TA 7C
TA 7D
TA 30
TA 31
TA 5A
TA 5B
Desert FMU
TA 32D
TA 27
TA 5C
TA 5D
TA 32C
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1 Km
1 Miles
1:108,400
N
Unit Location
CS
DS
CR
DR

FMU 36 IPBC 17,762 Acres

Physical Characteristics

Portions of TA 26, 27, 30, 31 and 32D are located in FMU 36. FMU 36, called IPBC (Infantry Platoon Battle Course) is bounded on the north by a Range road beginning at the DAGIR ROCA and heading southeast around the Range and around the targets in the southern portion of the DAGIR to an intersection with a DPW fire break road. The eastern boundary is a DPW fire break road heading southeast past Road tanks, past Tinney tank to Campbell tank. The south boundary is a firebreak road heading southwest from Campbell tank, then heading west, then northwest past South tank to the Range 40 ROCA. The west boundary of FMU 36 is a firebreak road from Range 40 north along a power line, then heading through limestone hills along the power line northeast to its intersection with fire break roads at the DAGIR ROCA.

The topography within FMU 36 is more mountainous and rugged than the surrounding FMUs. There are numerous areas of exposed bedrock where little vegetation is present. Between the hills are alluvial valleys characterized by numerous rocky washes. Vegetation is mostly shrubs of creosote, tar bush and mesquite intermixed with desert grasses, cacti, agave and sotol on slopes and upland areas. Basins and valleys are mostly grasslands with desert willow, apache plume, little-leaf sumac and other shrubs associated with arroyo riparian areas.

Fire history shows at least 9 wildfires have burned in FMU 36. Most wildfires burned up and down the valley bottoms where fuels were dense enough to support wildfire spread. Most hillsides and upland areas do not have fuel loads sufficient to support wildfire spread.

Infrastructure/Assets to be Protected

Range 40 is located within FMU 36. Range 40 and its associated infrastructure are mostly well protected from wildfire effects due to cleared areas around them, their construction materials and the lack of continuous vegetation.

Risk to Firefighters

Range 40 is a live-fire range within FMU 36. There is danger of UXO throughout FMU 36. Normal environmental conditions of high heat, low relative humidity and erratic, strong winds present hazards to firefighters when battling wildfires in FMU 36.

Most of FMU 36 is within the SDZ for Range 40. The DPW firebreak roads around the south and west perimeters from Campbell tank to Range 40 and along the power line are outside the SDZ. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations.

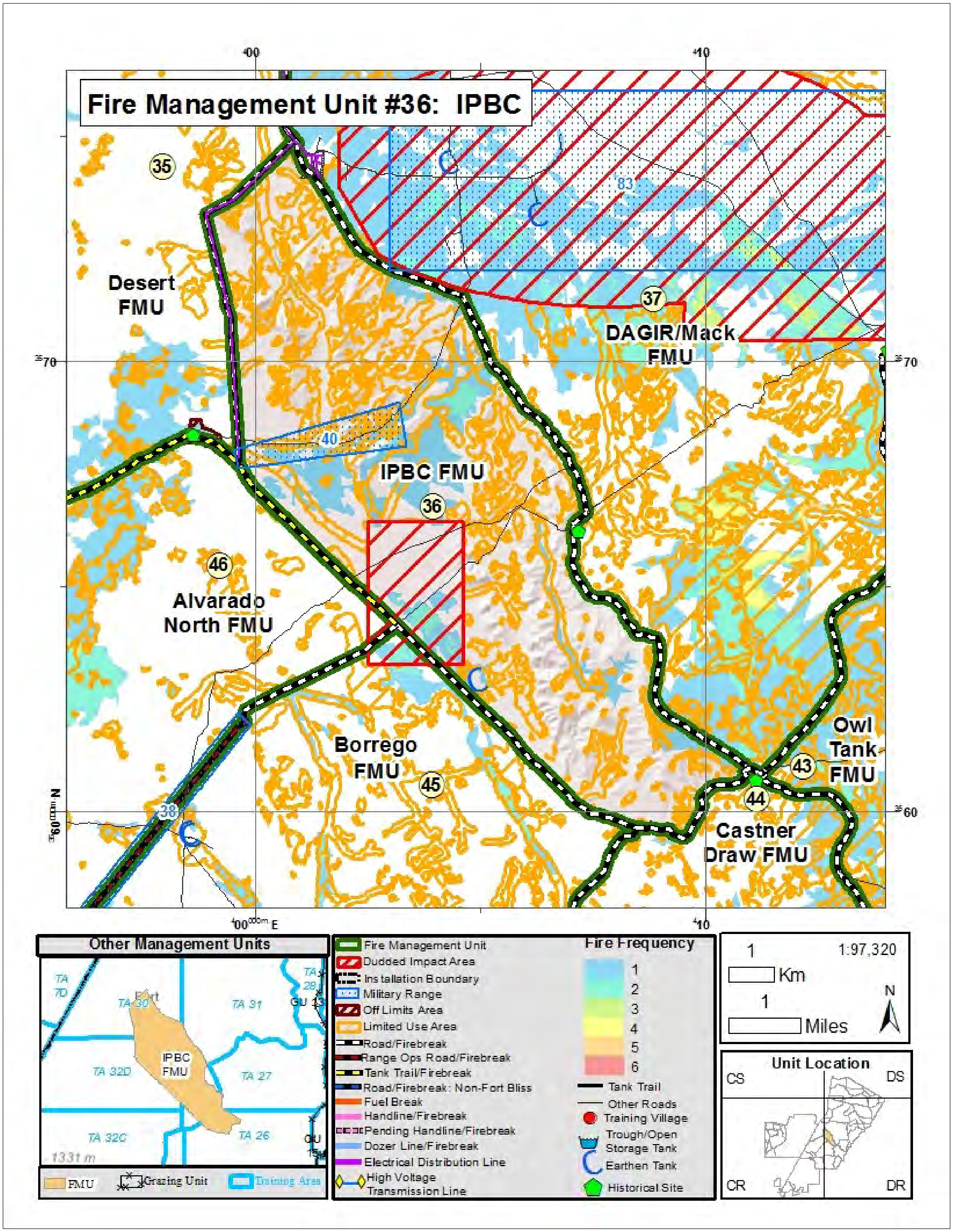
Pre Fire Season Fuels Management Actions

<u>FMU treatments:</u> The Range fire break road at the DAGIR and the DPW fire break roads around the perimeter of FMU 36 should be maintained to keep them vegetation-free.

<u>Training Asset treatment:</u> Dry, dead tumbleweeds can accumulate against structures and infrastructure. Inspections of facilities and structures need to occur periodically to assess fuel build-ups. Maintain vegetation-free areas around all structures, targets and Range developments. Tumbleweeds should be piled and burned in cleared areas or crushed and scattered when appropriate and necessary.

Wildfire Management

Let wildfires burn themselves out in FMU 36. Wildfires can be suppressed using engines as they burn up to roads. Fire history shows that most wildfires in FMU 36 extinguish themselves as they run into sparse fuels. Firefighters and equipment should stay on roads or in cleared areas and may use fire to burn out fuels ahead of a wildfire, if deemed advantageous by the Incident Commander.



Fire Management Unit #36: IPBC
35
Desert FMU
83
37
DAGIR/Mack FMU
40
IPBC FMU
36
46
Alvarado North FMU
Borrego FMU
45
38
Owl Tank FMU
43
44
Castner Draw FMU
Other Management Units
IPBC FMU
TA 30
TA 31
TA 32D
TA 27
TA 32C
TA 26
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:97,320
1 Km
1 Miles
N
Unit Location
CS
DS
CR
DR

1932

FMU 37 DAGIR/MACK 62,250 Acres

Physical Characteristics

Parts of TA 27, 28, 29, 30 and 31 are found within FMU 37. FMU 37, called DAGIR/Mack (DAGIR is short for Digital Air/Ground Integration Range) is bounded on the north by the Hay Meadow Tank Trail beginning at its intersection with the fire break road that is the access road to the DAGIR DACA eastward to the Hay Meadow firebreak road, then north on the firebreak road to the first ridgeline heading east, then eastward on an unmarked line along the spine of the ridge to the top of Otero Mesa at West Rim tanks. The east is bounded by the top of the Otero Mesa escarpment and is unmarked from West Rim tanks south past Martin Canyon to an intersection of two fire break roads at the southwest corner of Grazing Unit 13, then along the firebreak road heading south to another intersection with a firebreak road. The south is bounded by a firebreak road that goes west from that intersection at a gate in the pasture fence of Grazing Unit 15 on Otero Mesa, down the escarpment heading west to another intersection of fire break roads, then heading southwest on a fire break road to a four-way intersection of fire break roads at Campbell Tank. The west boundary of FMU 37 is the firebreak road heading northwest from Campbell Tank, past Tinney tank, past Road tanks to the edge of the impact area of the DAGIR. From there the road is a Range firebreak road heading northwest to the DAGIR. At the DAGIR heading north, the road is a DPW firebreak road to its intersection with the Hay Meadow Tank Trail.

The topography within FMU 37 includes the desert floor of the Tularosa Basin and transitions into uplands then rolling hills and mesas to the steep, rocky rim of the Otero Mesa escarpment. Soils range from sandy to loamy to rocky to exposed bedrock. Vegetation is typical Chihuahuan desert scrub on the desert floor including a sand sage/grass mix in sandy areas, grasslands in valleys, basins and atop Otero mesa and a grass/shrub mix on uplands and steep slopes.

Fort Bliss fire history shows at least 22 wildfires have burned in several locations throughout FMU 37. Wildfires can burn through valley bottoms and basin floors where fuel loads are sufficient for wildfire spread. Hillsides and upland areas, including the Otero Mesa escarpment, do not have fuel loads sufficient to support wildfire spread. One large wildfire, in 1993, burned from the desert basin floor up the bottom of Martin Canyon to the top of Otero Mesa.

Infrastructure/Assets to be Protected

Range 83 and the EQR #2 are located in FMU 37. Range 83 includes facilities at the DAGIR DACA, infrastructure and an array of mechanized targets spread across several thousand acres. Most of the Range and targets and their associated infrastructure are protected from severe wildfire effects due to a web of roads that access targets, cleared areas around targets and a lack of naturally occurring vegetation.

Mack Tanks is an historical site and is located in the southeast quadrant of FMU 37.

Risk to Firefighters

Range 83 is a live-fire range. The entire FMU, except for a small portion in the northwest quadrant is in the SDZ for Range 83 and clearance must be obtained from Range Operations before entering. There is a large, duded impact area associated with Range 83. Entry into impact areas is prohibited. There is danger of UXO throughout FMU 37. Off-road travel in sandy areas can cause firefighting equipment to become stuck.

Pre Fire Season Fuels Management Actions

FMU treatments: Range and DPW designated firebreak roads within FMU 37 should be maintained to keep them vegetation-free. A prescribed burn across the bottom of Martin Canyon just below the escarpment is planned and should prevent wildfires from burning up Martin Canyon and climbing to the top of Otero Mesa. This will be accomplished by blacklining alongside the firebreak road across the bottom of Martin Canyon from Martin Well to bedrock on the north side of Martin Canyon. Yearly inspections should occur post-growing season to determine if fuel loads are sufficient to carry wildfire. If so, a prescribed fire should be done in winter or early spring prior to the onset of the next fire season. Route Green Tank trail should also be inspected and considered for a prescribed burn when fuel loads are adequate. This area is a part of the sand sage grasslands fuel type and wildfires have burned across the tank trail in this area in the past.

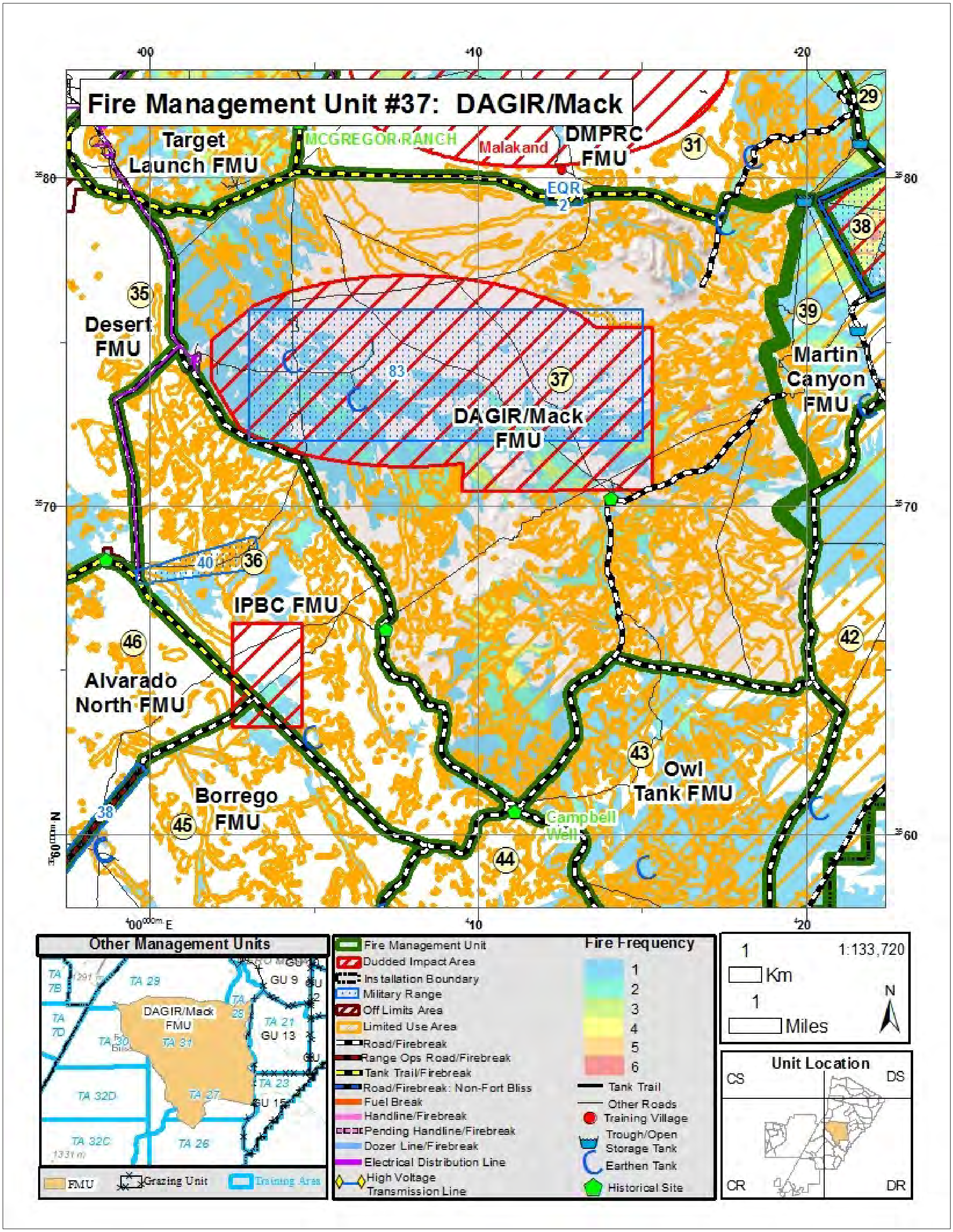
Training asset treatment: Dry, dead tumbleweeds can accumulate against structures, target mechanisms and along fences. Inspection of fences, target mechanisms and structures needs to occur annually to assess fuel build-ups. Mow or brush hog to 6 to 8 inches in height around all structures, targets and Range developments as needed to keep vegetation short. Dried tumbleweeds should be crushed or piled and burned in cleared areas by firefighters when accumulations warrant treating.

Cultural Asset treatments: Mack Tanks have a network of roads around them that should afford them protection from wildfire effects. If a wildfire occurs in the vicinity of Mack tanks, an assessment post-wildfire passage should be done by firefighters and DPW-E archaeologists to determine fire effects and to extinguish any remaining hotspots within the area of cultural significance.

Wildfire Management

Let wildfires burn themselves out in FMU 37. If wildfires are within the target areas and are deemed a threat to DAGIR infrastructure then live-fire must be halted and fire suppression occurs. In all areas within FMU 37, firefighters and equipment should stay on roads or in cleared areas and may use fire to burn out fuels ahead of a wildfire, if deemed advantageous by the Incident Commander. Fire history shows that most wildfires in FMU 37 extinguish themselves as they run into sparse fuels.

One of the Black Grama Areas of Critical Environmental Concern (ACEC) is located within FMU 37. This ACEC is atop Otero Mesa and follows the escarpment edge. The eastern boundary of the ACEC is fenced to keep livestock out. Off-road vehicle use is not permitted within ACEC boundaries. Wildfires within the ACEC boundary may be engaged using direct attack suppression methods on foot if fire intensities allow. If fire intensities are such that direct attack is not feasible, fall back to firebreak roads and engage with engines from roads or burn out along roads ahead of the wildfire.



Fire Management Unit #37: DAGIR/Mack
Target Launch FMU
MCGREGOR RANCH
Malakand
DMPRC FMU
EQR 2
Desert FMU
DAGIR/Mack FMU
Martin Canyon FMU
IPBC FMU
Alvarado North FMU
Borrego FMU
Owl Tank FMU
Campbell Well
Other Management Units
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:133,720
Km
Miles
Unit Location
FMU
Grazing Unit
Training Area

2003

FMU 38 CENTENNIAL RANGE 5,346 Acres

Physical Characteristics

FMU 38 is located within TA 17 and TA 23. FMU 38 is a US Air Force Bombing Range that is rectangular in shape, sits atop Otero Mesa and is surrounded by the US Army's McGregor Range. The Range is completely fenced and is surrounded by fire break roads on the south and west sides and by two-track roads on the east and north perimeters. Topography in FMU 38 is flat to gently rolling hills atop Otero Mesa. Vegetation is typical Otero Mesa grasslands intermixed with creosote, mesquite, snakeweed, yucca and cacti.

Fort Bliss fire history records show at least 15 wildfires have burned in this FMU since 1990. Most wildfires were kept relatively small and within FMU boundaries by firebreak roads and prescribed burns that have been conducted around the perimeter.

Infrastructure/Assets to be Protected

There are numerous USAF assets in the form of structures, radio towers, bunkers, airstrip and military hulks that have been placed here for target practice. Wildfires have burned around these structures many times.

Risk to Firefighters

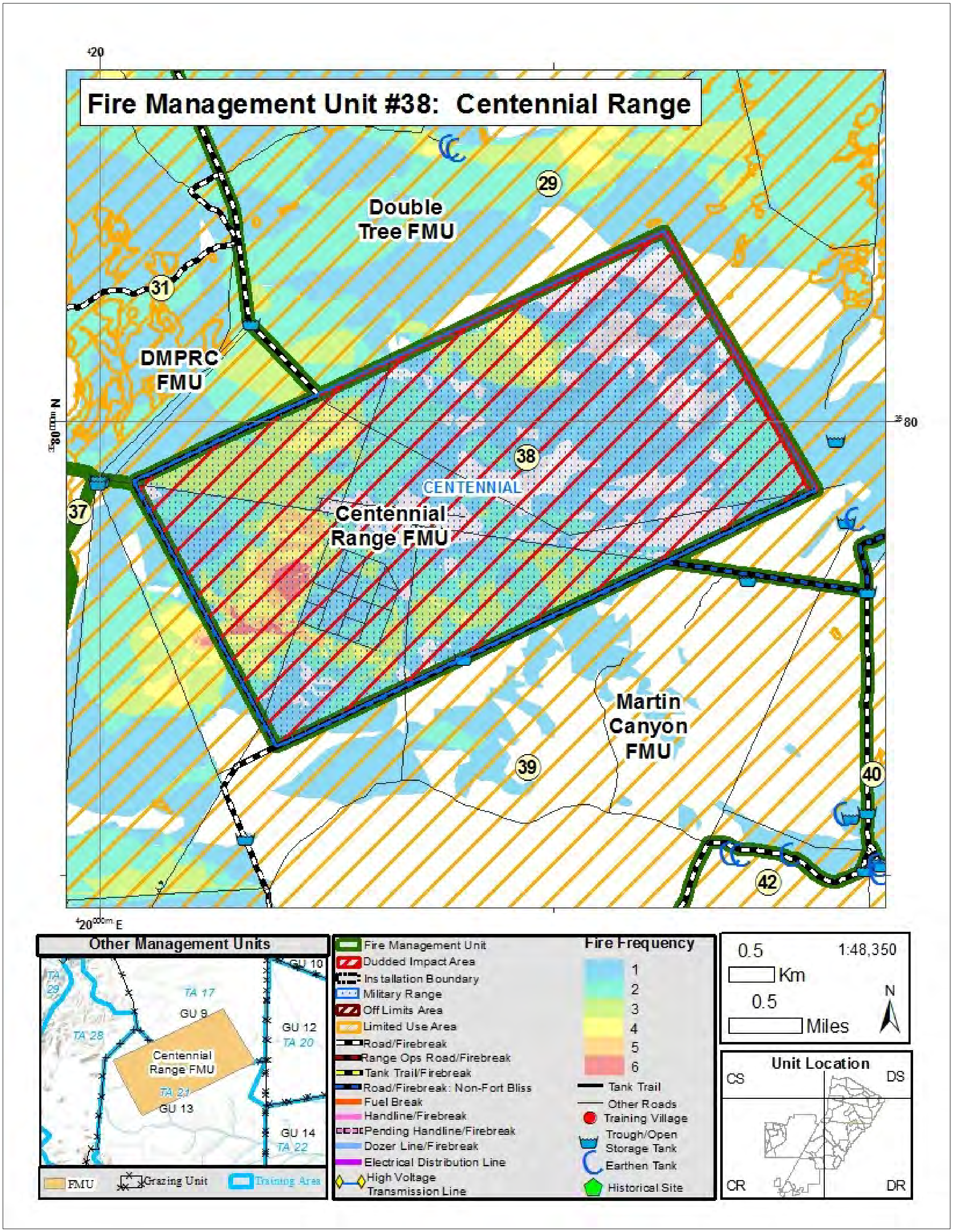
The Centennial Bombing Range is off limits to all personnel unless escorted by USAF Centennial Range personnel. Travel is restricted to roads only within Centennial Range. Fort Bliss firefighters should contact Centennial Range Control at 575 572-5716 for access to Centennial Range.

Pre Fire Season Fuels Management Actions

The access road to Centennial Bombing Range is maintained by the US Air Force. Firefighters from BLM and Holloman AFB conduct inspections each winter to determine if prescribed burning is warranted around the eastern half of the Bombing Range perimeter. Prescribed burns are conducted for the purpose of containing wildfires inside the Centennial Range perimeter. Several perimeter prescribed burns have been conducted in the last several years by BLM, Fort Bliss and Holloman AFB firefighters. Firebreak roads around the western half of the Range are maintained by the US Air Force. Tumbleweeds are a concern within FMU 38. Some years the piles of cured tumbleweeds can accumulate to the point that the perimeter fence and perimeter road are completely covered by tumbleweeds. When this occurs, use of prescribed fire prior to the onset of fire season is the best way to mitigate this wildfire threat.

Wildfire Management

Let wildfires burn within the perimeter of Centennial Bombing Range. All wildfires within Centennial Bombing Range are the responsibility of the US Air Force. The Air Force has mounted security cameras located throughout the Range and they can remotely monitor wildfires within Centennial Range boundaries. The Air Force, Fort Bliss and BLM firefighters should work together to keep wildfires contained within the perimeter boundaries of Centennial Range by staying on roads and engaging wildfire with engines or burning out fuels.



Fire Management Unit #38: Centennial Range
Double Tree FMU
DMPRC FMU
Centennial Range FMU
CENTENNIAL
Martin Canyon FMU
29
31
37
38
39
40
42
Other Management Units
TA 17
GU 9
GU 10
GU 12
TA 20
TA 28
Centennial Range FMU
TA 21
GU 13
GU 14
TA 22
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5 Km
0.5 Miles
1:48,350
N
Unit Location
CS
DS
CR
DR

2038

FMU 39 MARTIN CANYON 11,333 Acres

Physical Characteristics

FMU 39 is located mostly within TA 21. There are small portions of TAs 27, 28 and 20 in FMU 39. FMU 39 is bounded on the north by two-track roads beginning at the two steel-rim tanks known as Rim tanks which are just outside the northwest corner of Centennial Bombing Range on the edge of the Otero Mesa escarpment. Then heading east on a two-track road to the Centennial Range boundary fence, then southeast, then northeast around the western and southern perimeter of Centennial Range to where the Centennial Range access road leaves the perimeter of the Range and heads east to an intersection with a firebreak road at Mare Pasture Rim tank. The eastern boundary of FMU 39 is the firebreak road heading due south along a fence line from Mare Pasture Rim tank to End of Line tank. The south boundary is the firebreak road that runs west from End of Line Tank to Big Tank, then turns southwest following a water pipeline, then west to a water trough for cattle, then southwest to an intersection of roads, then northwest to another intersection, then southwest past Martin Tank to the edge of the Otero Mesa escarpment. The west boundary follows an unmarked boundary north along the rim of the Otero Mesa escarpment past Martin Canyon to the Rim tanks.

Topography in FMU 39 is the gently rolling mesa top of Otero Mesa. Vegetation atop the mesa is typical Otero Mesa grasslands with black grama, blue grama and tobosa grass being the dominant grasses. Shrubs here include creosote, snakeweed, sotol, bear grass, prickly pear, agave and yucca.

Fort Bliss fire history records show at least 14 wildfires have burned in FMU 39 since 1990. Some of these wildfires have become large. One large wildfire burned from the Tularosa Basin floor, up the bottom of Martin Canyon and on to the top of Otero Mesa.

Infrastructure/Assets to be Protected

There are two US Air Force assets related to communication facilities located in FMU 39. One of these facilities is a solar power plant located on the rim of the Otero Mesa escarpment and is used for powering communication equipment on Centennial Range. The other is a radio repeater tower. Both of these facilities are surrounded by bare dirt pads and are the responsibility of the US Air Force. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks, holding pens, corrals, pipelines and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 39 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of wildfires in light, flashy fuels found here is that they burn readily and are completely wind-driven.

The entire FMU is within the SDZ for Centennial Range. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations in FMU 39.

Pre Fire Season Fuels Management Actions

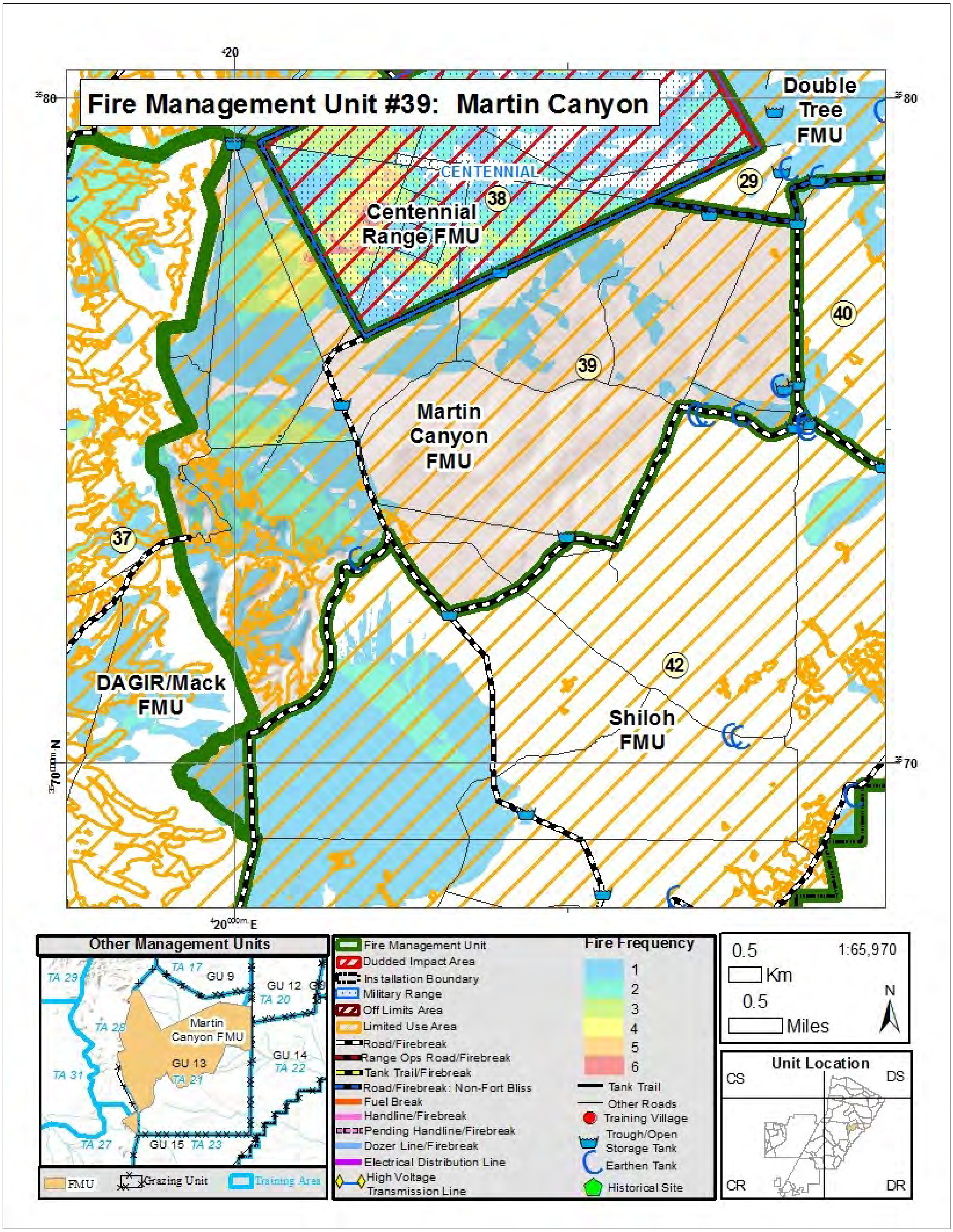
The access road to Centennial Bombing Range is maintained by the US Air Force. Fort Bliss DPW O&M is responsible for maintaining the firebreak roads from Mare Pasture Rim tank south to End of Line tank and around the perimeter of FMU 39 and then north along the firebreak road around the head of Martin Canyon and tying back into the Centennial Bombing Range perimeter at its southwest corner.

Firefighters should be aware that tumbleweeds may pile up along fences in FMU 39 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot on wildfires atop Otero Mesa. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Wildfires in west-facing canyons below the Otero Mesa escarpment should be monitored from the mesa top and allowed to burn out on their own. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or well-maintained roads and blackline or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

Part of BLM Grazing Unit 13 is located within FMU 39. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 39 and will work closely with BLM engines and personnel to keep wildfires as small as reasonably possible.



Fire Management Unit #39: Martin Canyon
Double Tree FMU
CENTENNIAL
Centennial Range FMU
38
29
40
39
Martin Canyon FMU
37
DAGIR/Mack FMU
42
Shiloh FMU
Other Management Units
TA 29
TA 17
GU 9
GU 12
TA 20
TA 28
Martin Canyon FMU
GU 13
TA 21
GU 14
TA 22
TA 31
TA 27
GU 15
TA 23
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:65,970
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

2095

FMU 40 END OF LINE TANK 5,997 Acres

Physical Characteristics

FMU 40 is located within TA 20 and 22. FMU 40 is bounded on the north by the Centennial Range access road starting at an intersection with a firebreak road at Mare Pasture Rim tank and heading east on the access road to where the Centennial Range access road turns north at an intersection with a firebreak road just west of Cockleburr tank, then continuing east along that firebreak road to Cockleburr tank. The eastern boundary is a firebreak road heading south from Cockleburr tank along a fence line to the boundary fence of McGregor Range, then continuing south along the boundary fence to where the boundary fence turns west. The south boundary is a firebreak road that heads west past End of Line tank #4 (steel closed-top water storage tank) to End of Line tank. The west boundary follows the fence line between Grazing Units 14 and 13 north to its intersection with the Centennial Range access road at Mare Pasture Rim tank.

Topography in FMU 40 is the gently rolling mesa top of Otero Mesa. Vegetation atop the mesa is typical Otero Mesa grasslands with black grama, blue grama and tobosa grass dominating much of the FMU. Typical shrubs are creosote, snakeweed, sotol, bear grass, cacti, agave and yucca.

Fort Bliss fire history records show at least 5 wildfires have burned in this FMU since 1990. Some of these wildfires have become large.

Infrastructure/Assets to be Protected

There are no military assets located in FMU 40. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks, holding pens, corrals, pipelines and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 40 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of wildfires in light, flashy fuels found here is that they burn readily and are completely wind-driven.

There are no SDZ areas in FMU 40.

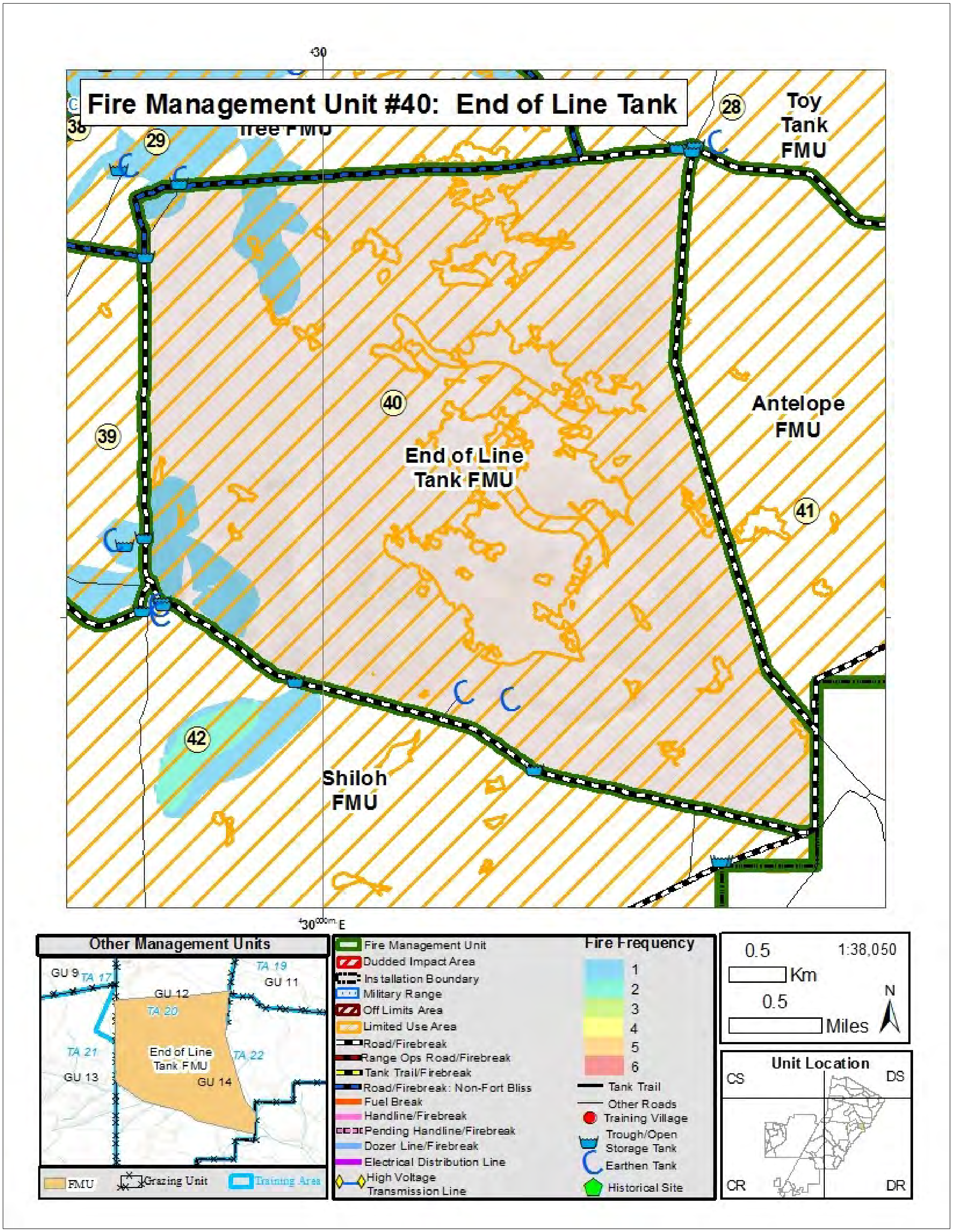
Pre Fire Season Fuels Management Actions

The access road to Centennial Bombing Range is maintained by the US Air Force. Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that are the perimeter of this FMU, from Mare Pasture Rim tank south to the McGregor Range boundary fence then northeast along the firebreak road that cuts across the corners of the McGregor Range boundary to an intersection of firebreak roads, then north along the firebreak road to Cockleburr tank. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 40 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot on wildfires atop Otero Mesa. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or well-maintained roads and black line or burnout along roads ahead of the wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Units 12 and 14 are partly located within FMU 40. There is a small part of Grazing Unit 13 within FMU 40. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 40 and will work closely with BLM engines and personnel to keep wildfires as small as reasonably possible.


Fire Management Unit #40: End of Line Tank
Toy Tank FMU
Antelope FMU
End of Line Tank FMU
Shiloh FMU
40
39
41
42
28
29
30
30000m E
Other Management Units
GU 9
TA 17
TA 19
GU 11
GU 12
TA 20
TA 21
End of Line Tank FMU
TA 22
GU 13
GU 14
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:38,050
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

2143

FMU 41 ANTELOPE 4,349 Acres

Physical Characteristics

FMU 41 is located within TA 22 and within a small portion of the southern end of TA 19. FMU 41 is bounded on the north by a fire break road beginning at Cockleburr tank and heading east along that fire break road, then turning northeast to an intersection with a fire break road at the eastern fence line boundary of Fort Bliss. The eastern boundary is a fire break road heading south along the fence line that is the boundary fence of Fort Bliss to where the boundary fence turns west. The south boundary is the boundary fence between Fort Bliss and BLM, State and private lands to the east and south. The Fort Bliss boundary and fence follows section lines heading south then west in a stair-step fashion to a point where the fence leaves the boundary and follows the fire break road. From here the Fort Bliss boundary is unfenced and unmarked until the fire break road rejoins the boundary and heads south to an intersection with another fire break road along the Fort Bliss boundary within TA 22 and Grazing Unit 14. The west boundary is a fire break road from the Fort Bliss boundary heading northwest and then north to Cockleburr tank.

Topography in FMU 41 is the gently rolling mesa top of Otero Mesa. Vegetation atop the mesa is typical Otero Mesa grasslands with black grama, blue grama and tobosa grass dominating much of the FMU. Typical shrubs are creosote, snakeweed, sotol, bear grass, cacti, agave and yucca.

Fort Bliss fire history records show no wildfires have burned in this FMU since 1990.

Infrastructure/Assets to be Protected

There are no military assets located in FMU 41. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks, holding pens, corrals, pipelines and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 41 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of wildfires in light, flashy fuels found here is that they burn readily and are completely wind-driven.

There are no SDZ areas in FMU 41.

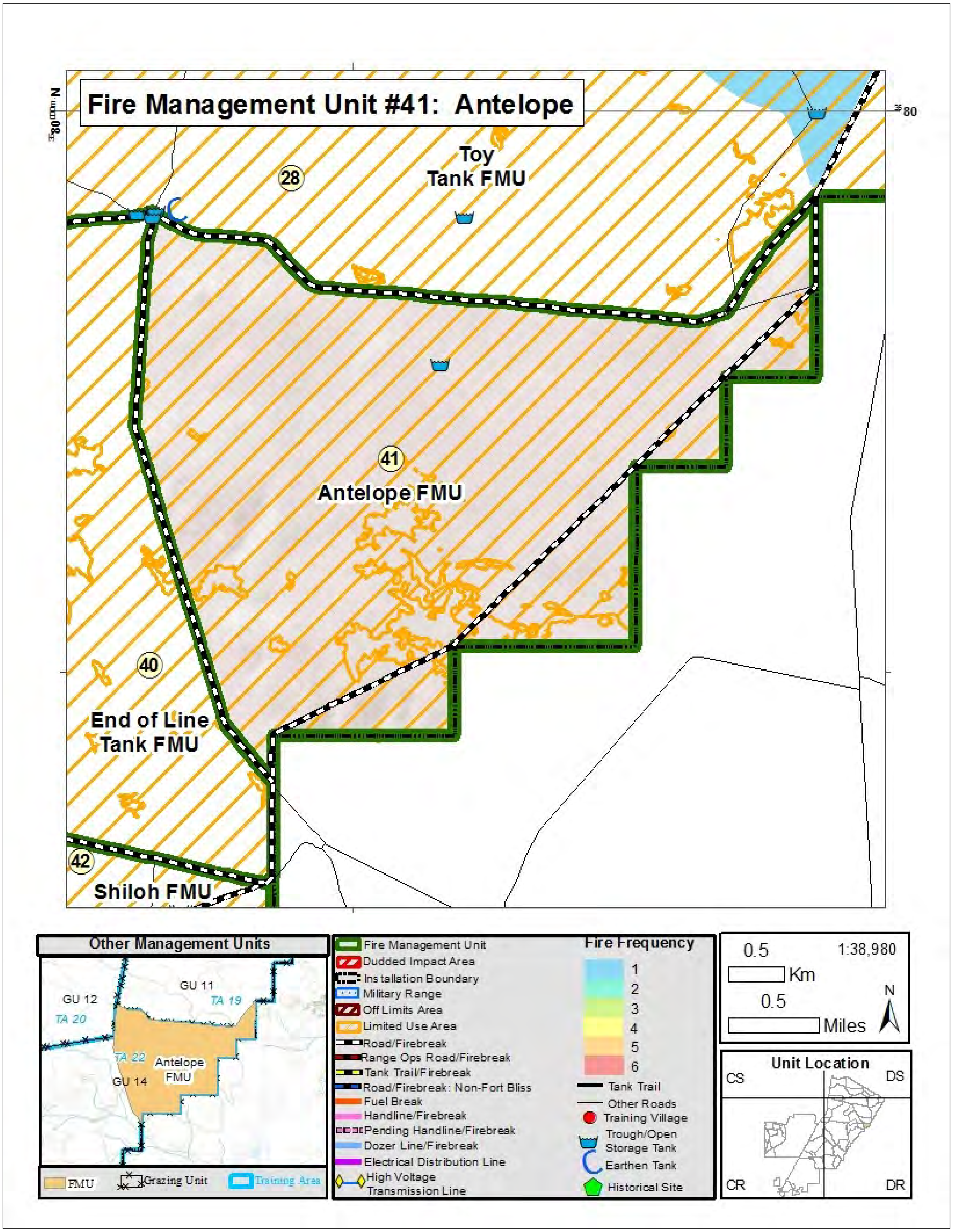
Pre Fire Season Fuels Management Actions

Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that are the perimeter of FMU 41 from Cockleburr tank south to the Fort Bliss boundary fence then northeast along the firebreak road that cuts across the corners of the Fort Bliss boundary to an intersection of firebreak roads, then southwest and west along the firebreak road to Cockleburr tank. Firefighters should be aware that tumbleweeds may pile up along fence lines in FMU 41 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot on wildfires atop Otero Mesa. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to fire break roads and black line or burnout along roads ahead of the wildfire, when deemed advantageous by the Incident Commander.

BLM Grazing Unit 14 is partly located within FMU 41. There is a small portion of the southern end of Grazing Unit 11 located within FMU 41. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 41 and will work closely with BLM engines and personnel to keep wildfires as small as reasonably possible.



Fire Management Unit #41: Antelope
Toy Tank FMU
28
41
Antelope FMU
40
End of Line Tank FMU
42
Shiloh FMU
Other Management Units
GU 11
GU 12
TA 19
TA 20
TA 22
Antelope FMU
GU 14
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
Km
0.5
Miles
1:38,980
N
Unit Location
CS
DS
CR
DR

2190

FMU 42 SHILOH 25,920 Acres

Physical Characteristics

FMU 42 is located within TA 23 and Grazing Unit 15. FMU 42 is bounded on the north by a firebreak road that runs northeast from the edge of the Otero Mesa escarpment, past Martin Tank to a junction of firebreak roads, then southeast to a road junction where a livestock water trough is located, then east and northeast to another water trough, then east and north to Big Tank, then east past End of Line tank, past End of Line tank #4 to the eastern boundary of McGregor Range. The south and east boundary of FMU 42 is fenced and is the boundary between Fort Bliss and BLM lands to the east and south. The Fort Bliss boundary heads south then west in a stair-step fashion following section lines for several miles and ends at an intersection of two firebreak roads at a gate and a fence corner at the southern end of Grazing Unit 15. The west boundary is a firebreak road that runs northwest from the Fort Bliss boundary along the fence that is the southern border of Grazing Unit 15, then the road leaves the fence and travels northeast, roughly paralleling the Otero Mesa escarpment, eventually turning northwest and then north rejoining the fence line, then along the fence north on the escarpment edge to the common corner for Training Areas 21, 27 and 28.

Topography in FMU 39 is the gently rolling mesa top of Otero Mesa. Vegetation atop the mesa is typical Otero Mesa grasslands with black grama, blue grama and tobosa grass dominating much of the FMU. Typical shrubs are creosote, snakeweed, sotol, bear grass, prickly pear, agave and yucca.

Fort Bliss fire history records show at least 8 wildfires have burned in this FMU since 1990. Some of these wildfires have become large. One of these wildfires started in Castner Draw to the west of Otero Mesa and burned up the draw and onto Otero Mesa and across the Fort Bliss eastern boundary on to public and private lands.

Infrastructure/Assets to be Protected

There are no military assets located in FMU 42. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks, holding pens, corrals, pipelines and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is not considered a danger within FMU 42 due to its use as a grazing livestock pasture. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of wildfires in light, flashy fuels found here is that they burn readily and are completely wind-driven.

There are no SDZ areas within FMU 42.

Pre Fire Season Fuels Management Actions

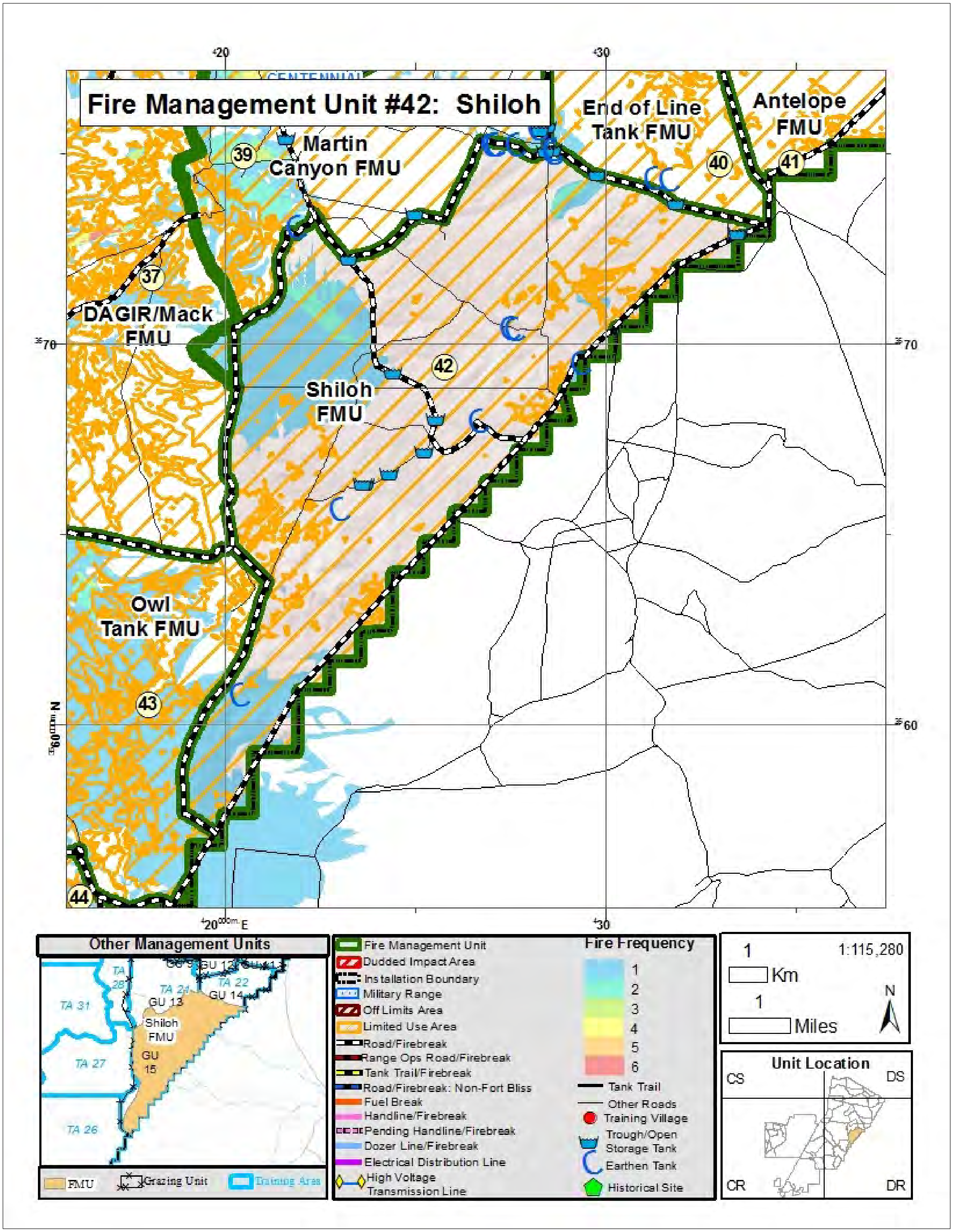
Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that encircle the perimeter of FMU 42. The firebreak road along the Fort Bliss boundary is fenced and actually goes in and out of private lands as it cuts diagonally through the stair-steps of the boundary. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 42 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Use direct attack methods with engines or on foot on wildfires atop Otero Mesa. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. If fire intensities are such that direct attack methods are ineffective or not feasible, fall back to firebreak roads or well-maintained roads and blackline or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander. Wildfires down in the west-facing canyons and below the Otero Mesa escarpment should be monitored from the mesa top and allowed to burn out on their own.

BLM Grazing Unit 15 is located entirely within FMU 42. Grazing Units 13 and 14 are partially located within FMU 42. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 42 and will work closely with BLM engines and personnel to keep wildfires as small as reasonably possible.

2242


Fire Management Unit #42: Shiloh
Martin Canyon FMU
End of Line Tank FMU
Antelope FMU
DAGIR/Mack FMU
Shiloh FMU
Owl Tank FMU
39
40
41
37
42
43
44
20
30
70
60
20000m. E
60000m. N
Other Management Units
TA 31
TA 28
TA 21
TA 22
GU 13
GU 12
GU 14
GU 11
Shiloh FMU
TA 27
GU 15
TA 26
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1
Km
1
Miles
1:115,280
N
Unit Location
CS
DS
CR
DR

FMU 43 OWL TANK 15,006 Acres

Physical Characteristics

FMU 43 is located within TA 23, 26 and 27. FMU 43 is bounded on the north by a firebreak road that begins at an intersection of firebreak roads at Campbell tank on the Tularosa Basin floor and runs northeast, then north, then northeast, then east and eventually ends up on Otero Mesa at a gate and an intersection of firebreak roads. The east boundary of FMU 43 is the firebreak road that runs southeast from that gate within Grazing Unit 15 and TA 23 then turns south to the south boundary and fence of Grazing Unit 15 then turns southeast following a fence line to the boundary of Fort Bliss. The south boundary is the Fort Bliss/BLM boundary and is unmarked and runs southwest in a stair-step fashion following section lines to an intersection of firebreak roads just north of Escondida tank. The west boundary is a firebreak road that runs west and drops into Castner Draw and heads northwest past the Woods-Foster Ranch tanks and homestead, past Holmes Homestead (Hilltop House) through canyons and low hills to its intersection with other firebreak roads at Campbell tank.

Topography in FMU 43 is varied and includes the top of the Otero Mesa, the escarpment and the desert floor of the Tularosa Basin. There are numerous canyons, basins and rocky, low hills and ridges within FMU 43. Vegetation atop the mesa is typical Otero Mesa grasslands with black grama, blue grama and tobosa grass intermixed with creosote, cacti, sotol and bear grass. The escarpment and desert hills and canyons have a diverse mix of shrubs and grasses. Shrubs are mesquite, creosote, sumac, apache plume, cat claw, snakeweed, sotol, bear grass, ocotillo, prickly pear, agave and yucca.

Fort Bliss fire history records show at least 4 wildfires have burned in this FMU since 1990. Some of these wildfires have become large. One of the wildfires started in FMU 43 within Castner Draw and burned eastward up Castner Draw and Owl canyon and onto Otero Mesa and across the Fort Bliss east boundary and onto public lands.

Infrastructure/Assets to be Protected

There are no military assets located in FMU 43. There are improvements associated with livestock operations and wildlife in the forms of water catchments and storage tanks and pasture fences that could be impacted by wildfires.

Risk to Firefighters

UXO is a danger within FMU 43 except atop the Otero Mesa within Grazing Unit 15. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of wildfires in light, flashy fuels found here is that they burn readily and are completely wind-driven.

There are no SDZ areas in FMU 43.

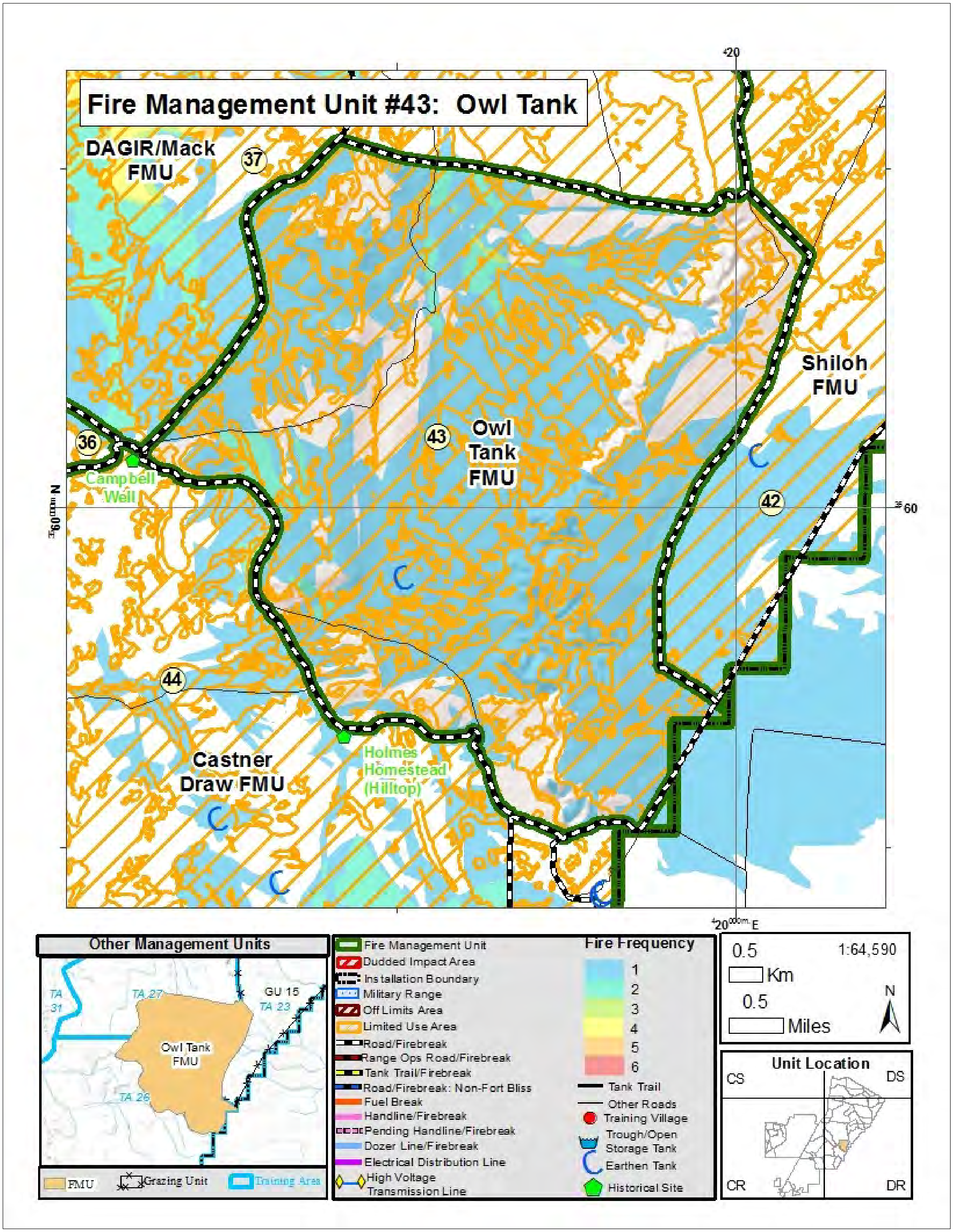
Pre Fire Season Fuels Management Actions

Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that encircle the perimeter of FMU 43. The firebreak road along the Fort Bliss boundary is fenced and actually goes in and out of private lands as it cuts diagonally through the stair-steps of the boundary. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 43 and can add to wildfire intensity. Due to the miles of fence here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Wildfire Management

Atop Otero Mesa, use direct attack methods with engines or on foot on wildfires in Grazing Unit 15. Driving off-road with Type 6 4x4 engines and UTVs is allowed when engaging wildfires. Wildfires elsewhere in FMU 43 should be monitored from roads and allowed to burn out on their own. During years following good precipitation, vegetation may be sufficient to carry wildfires up Castner and/or Owl Canyons to the Otero Mesa. A priority in this FMU is to make use of firebreak roads to the east along the Fort Bliss boundary and blackline or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.

A small portion of BLM Grazing Unit 15 is located within FMU 43. The grazing unit boundaries are fenced to contain livestock. The BLM policy is to extinguish all wildfires within grazing units to preserve grass for livestock use. BLM firefighting resources will respond to all wildfires located within grazing units. Fort Bliss firefighting personnel are responsible for suppressing all military-caused wildfires within FMU 43 and should work closely with BLM engines and personnel to keep wildfires as small as reasonably possible.



Fire Management Unit #43: Owl Tank
DAGIR/Mack FMU
37
36
Campbell Well
43
Owl Tank FMU
Shiloh FMU
42
44
Castner Draw FMU
Holmes Homestead (Hilltop)
420
3560
3560000m N
420000m E
Other Management Units
TA 31
TA 27
GU 15
TA 23
Owl Tank FMU
TA 26
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
Km
0.5
Miles
1:64,590
N
Unit Location
CS
DS
CR
DR

2295

FMU 44 CASTNER DRAW 18,528 Acres

Physical Characteristics

FMU 44 is located within TA 26. FMU 44 is bounded on the north by a firebreak road that begins at an intersection of firebreak roads at Campbell tank on the Tularosa Basin floor and runs southeast past Childs tank, past Foster Ranch tanks through a gap in the hills to Otero Mesa and ending at the Fort Bliss Military Reservation east boundary fence and road. The east boundary of FMU 44 is the Fort Bliss/BLM boundary and runs south then west in a stair-step fashion following section lines to an intersection of firebreak roads then due south along a firebreak road that is fenced and is adjacent to the Fort Bliss boundary. The firebreak road then turns southwest and runs diagonally from the boundary. The east boundary of Fort Bliss continues south along a fence line to a corner where the boundary turns west and is fenced to another corner where two firebreak roads intersect. The south boundary of FMU 44 is a firebreak road that runs northwest from the boundary of Fort Bliss past Ivan Gray tank past the Gray Ranch homestead to Hackberry tank and an intersection of firebreak roads. The west boundary is a firebreak road that heads north from Hackberry tank past Gray tank then turns northeast at an intersection with a firebreak road and then turns east through canyons and low hills to its intersection with other firebreak roads at Campbell tank.

Topography in FMU 44 is varied and includes the Otero Mesa, rolling hills and the desert floor of the Tularosa Basin. There are numerous canyons, basins and rocky, low hills and ridges within FMU 44. Vegetation atop the mesa is typical Otero Mesa grasslands with black grama, blue grama and tobosa grass intermixed with creosote, cacti, agave, sotol and bear grass. The desert floor and the hills and canyons have a diverse mix of shrubs and desert grasses. Shrubs are mesquite, creosote, four wing saltbush, apache plume, snakeweed, sotol, prickly pear, ocotillo, agave and yucca.

Fort Bliss fire history records show at least 6 wildfires have burned in this FMU since 1990. Some of these wildfires have become large and have burned across the Fort Bliss boundary onto private and public lands to the east.

Infrastructure/Assets to be Protected

There are no military assets located in FMU 43.

There are historic wooden structures at Campbell tank and the Holmes Homestead (Hilltop) site within FMU 44. These cultural sites should be protected from wildfire.

Risk to Firefighters

UXO is a danger within FMU 44. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. The nature of wildfires in light, flashy fuels found here is that they burn readily, are wind-driven and are usually short duration events.

There are no SDZ areas within FMU 44.

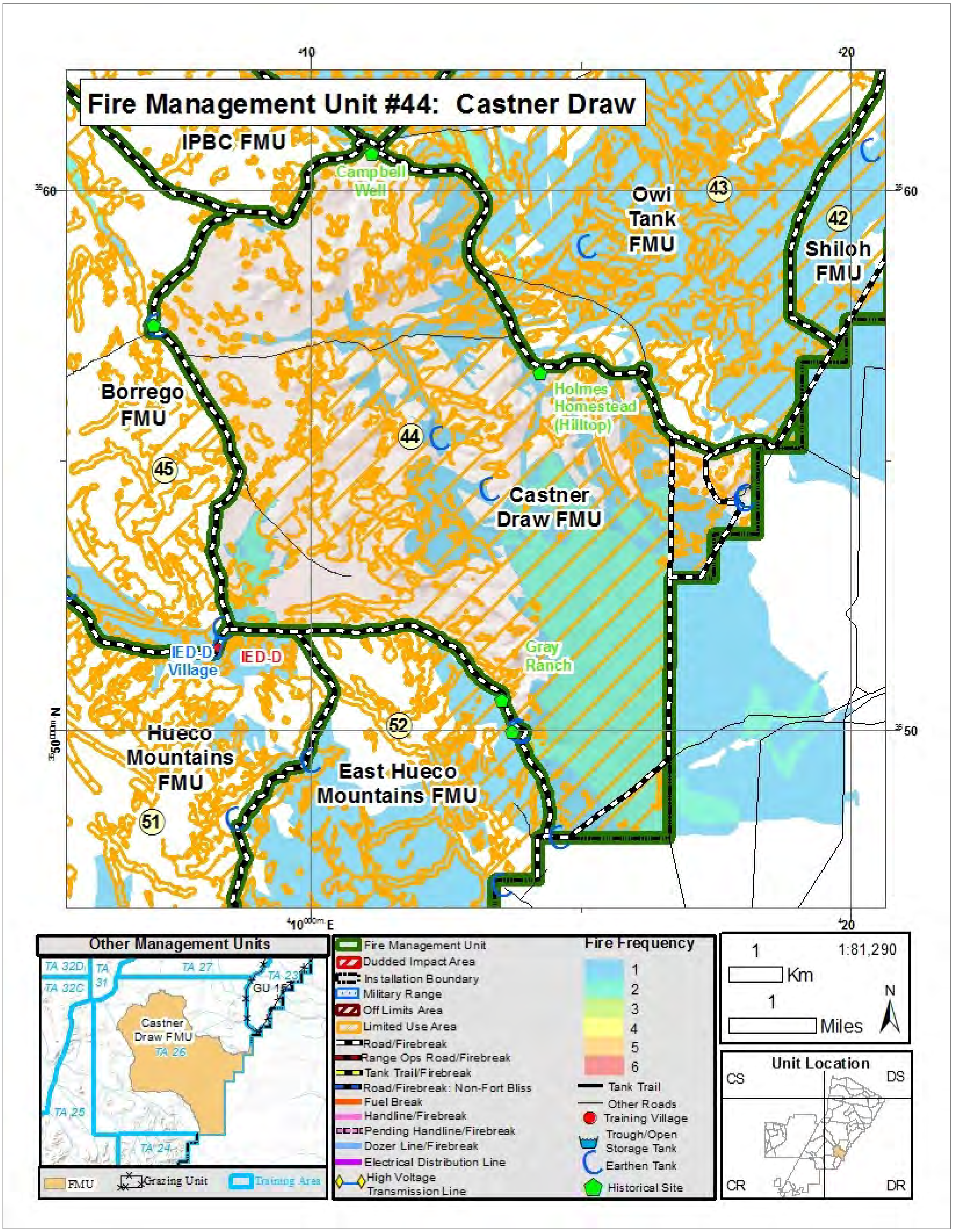
Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that encircle the perimeter of FMU 44. The firebreak road along the Fort Bliss east boundary is fenced and actually goes in and out of private lands as it cuts diagonally through the stair-steps of the boundary. Firefighters should be aware that tumbleweeds may pile up along fences in FMU 44 and can add to wildfire intensity. Due to the miles of fences here it is not practical to treat tumbleweeds but is something for fire personnel to be aware of.

Cultural Assets treatments: Historic structures should be assessed annually by fire professionals to determine if fuel buildup around structures needs to be cut down, mowed or removed. Clear brush and vegetation 30 feet away from structures.

Wildfire Management

Let wildfires burn themselves out in FMU 44. Monitor wildfire progress from firebreak roads. Suppress with water if wildfires burn up to roads using wildland engines and water tenders for support. Protect cultural assets with engines as necessary. During years following good precipitation, vegetation may be sufficient to carry wildfires up drainages to the Otero Mesa. If this occurs, make use of firebreak roads to the east along the Fort Bliss boundary and black line or burnout along roads ahead of a wildfire, when deemed advantageous by the Incident Commander.



Fire Management Unit #44: Castner Draw
IPBC FMU
Campbell Well
Owl Tank FMU
43
42
Shiloh FMU
Borrego FMU
Holmes Homestead (Hilltop)
44
45
Castner Draw FMU
IED-D Village
IED-D
Gray Ranch
52
Hueco Mountains FMU
East Hueco Mountains FMU
51
Other Management Units
TA 32D
TA 31
TA 27
TA 23
GU 15
TA 32C
Castner Draw FMU
TA 26
TA 25
TA 24
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:81,290
Km
Miles
N
Unit Location
CS
DS
CR
DR

2348

FMU 45 BORREGO 32,528 Acres

Physical Characteristics

FMU 45 is located within TA 25, 26, 31, 32C and 32D. The north boundary of FMU 45 is a Range Operations firebreak road that begins at the access road for Range 38 and heads to the northeast and is the centerline of Range 38 (Convoy Live Fire Range), past the end of Range 38 and continues northeast to its junction with a DPW firebreak road. The east boundary is a firebreak road that begins at the intersection of the Range firebreak road in TA 32D and runs southeast past South tank to an intersection with a firebreak road that runs southwest, then along that firebreak road running southwest then south past Gray tank to Hackberry tank. The south boundary is a Range firebreak road that runs west from Hackberry tank past Charley tank and is the centerline of Range 37 (Convoy Live Fire Range) to an intersection with a firebreak road at the Range 37 base firing line. The west boundary is a firebreak road called N and S Launcher Road that heads northwest between TA 32B and TA 32C to its intersection with the Range firebreak road at Range 38.

Topography in FMU 45 is rolling to steep isolated hills with broad canyon bottoms and piedmonts typical of the desert floor of the Tularosa Basin. Vegetation is typical Chihuahuan desert scrub and is a mixture of shrubs and grasses. Shrubs are mesquite, creosote, saltbush, sumac, apache plume, snakeweed, prickly pear, agave and yucca. Grasses are tobosa, dropseeds and black grama.

Fort Bliss fire history records show at least 12 wildfires have burned in this FMU since 1990. Some of these wildfires have become large and are associated with the broad canyon bottomlands where grasses, weeds and shrubs are dense enough to carry wildfires. The hills and uplands or piedmonts do not support wildfire spread due to a lack of continuous fuels.

Infrastructure/Assets to be Protected

Ranges 37 and 38, part of Range 35, Air Defense Firing Ranges Tac 12, Tac 18, Tac 19, Hawk Launching Pads 1-8 and MPTR are located in FMU 45. There are targets, facilities and infrastructure associated with these assets. Most of the military assets in FMU 45 have cleared areas around them and do not have enough vegetation nearby to support wildfires that might cause harm.

Risk to Firefighters

UXO is a danger within FMU 45. There are duded impact areas within FMU 45 which are off limits to all personnel. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. Firefighting operations should be restricted to roads within FMU 45 due to UXO hazards.

The entire FMU falls in the SDZ from ranges 37 and 38 with the exception of the two DPW maintained firebreak roads on the east and west perimeters of FMU 45. Permission to enter SDZ areas in FMU 45 must be obtained from Range Operations prior to engaging in wildfire operations.

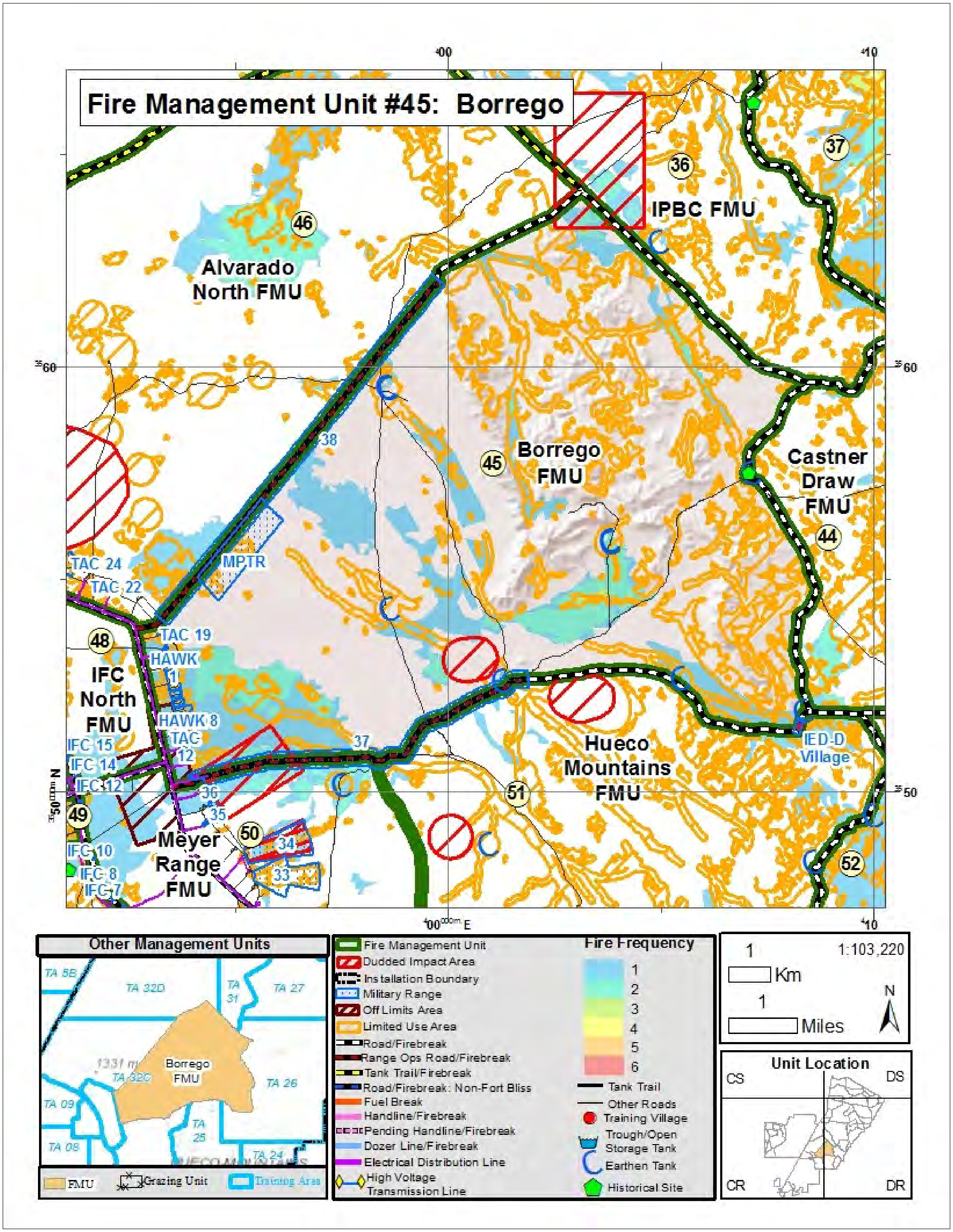
Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that bound the east and west perimeters of FMU 45. Range Operations is responsible for maintaining the Range firebreak roads through Ranges 37 and 38 to their terminus with the DPW firebreak roads. Road maintenance should generally be restricted to road surfaces because blading to bare soil around structures and road shoulders encourages the growth of tumbleweeds and other annuals that will increase both maintenance costs and fire frequency. Road shoulders should generally be mowed or brush hogged wherever feasible.

Training Asset treatment: Vegetated areas around flammable structures should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be mowed or in the case of accumulated dried tumbleweeds, removed, crushed or burned. Mowing of green vegetation to 6-8 inches in height should be done around targets and other flammable structures twice yearly (once in May or June and once in October before present years growth dries out) or as needed.

Wildfire Management

Let wildfires burn themselves out in FMU 45. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires up drainages and across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may need to blackline or burnout along roads ahead of a wildfire. Use fire to fight fire when deemed advantageous by the Incident Commander.



Fire Management Unit #45: Borrego
Alvarado North FMU
46
36
37
IPBC FMU
Borrego FMU
45
Castner Draw FMU
44
38
MPTR
TAC 24
TAC 22
TAC 19
48
HAWK 1
IFC North FMU
HAWK 8
TAC 12
IFC 15
IFC 14
IFC 12
37
36
35
49
50
34
33
Meyer Range FMU
IFC 10
IFC 8
IFC 7
51
Hueco Mountains FMU
IED-D Village
52
Other Management Units
TA 5B
TA 32D
TA 31
TA 27
1331 m
TA 32C
Borrego FMU
TA 26
TA 09
TA 25
TA 08
TA 24
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1
1:103,220
Km
1
Miles
N
Unit Location
CS
DS
CR
DR

2402

FMU 46 ALVARADO NORTH 35,886 Acres

Physical Characteristics

FMU 46 is located within TA 32C and 32D. The north boundary of FMU 46 is a firebreak road beginning at the old railroad stop called Desert and is accessed from the McGregor Base Camp road by going north on Route Green Tank Trail alongside US 54. The firebreak road heads east and then northeast to Range 40 (IPBC), then southeast to an intersection with a Range firebreak road. FMU 46 is bounded on the east by a Range firebreak road (Convoy Live Fire road) that begins at the intersection of a firebreak road within the IPBC in TA 32D and runs southwest through Range 38 to an intersection with the N Launcher Road in TA 32C. The south boundary of FMU 46 is N Launcher Road heading northwest from Range 38 past TAC 22-24 then south to the North IFC road then west along N IFC road to Range 39 to an intersection with a firebreak road that continues west to Alvarado Crossing. The west boundary of FMU 46 is the Route Green Tank Trail that begins at US Highway 54 at Alvarado Crossing and runs northeast along the east side of US 54 to a point where the firebreak road leaves the Route Green Tank Trail at Desert.

Topography in FMU 45 is typical desert floor of the Tularosa Basin with a few scattered hills in the eastern half of the FMU. Deep sand exists in scattered pockets across the desert floor. Vegetation is typical Chihuahuan desert scrub and is a mix of shrubs and grasses. Shrubs are mesquite, creosote, saltbush, snakeweed, cacti, agave and yucca. Grasses are tobosa, sand dropseed, mesa dropseed and black grama.

Fort Bliss fire history records show at least 5 wildfires have burned in this FMU since 1990. Some of these wildfires have become large and are associated with the basin bottomlands and sandy areas where grasses and shrubs are continuous enough to carry wildfires. The hills and uplands do not support wildfire spread due to a lack of continuous fuels.

Infrastructure/Assets to be Protected

Ranges 38 (Convoy Live Fire Range) and 39 (Cane Cholla Range), Tac 22 and Tac 24 (Air Defense Firing Ranges) are located in FMU 46. There are targets, facilities and infrastructure associated with these assets. Most of the military assets in FMU 46 have cleared areas around them and do not have enough vegetation nearby to support wildfires that might cause harm.

Risk to Firefighters

UXO is a danger within FMU 46. Firefighting operations should be restricted to roads within FMU 46. There is a duded impact area associated with Range 39 within FMU 46 and is off limits to all personnel. There are areas of deep sand in FMU 46 that will cause fire engines and equipment to get stuck if driven off roads. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here.

Much of FMU 46 is within SDZs from Ranges 38 and 39 with the exception of the DPW fire break roads which are outside the SDZs. Obtain permission to enter SDZ areas from Range Operations prior to engaging in wildfire operations.

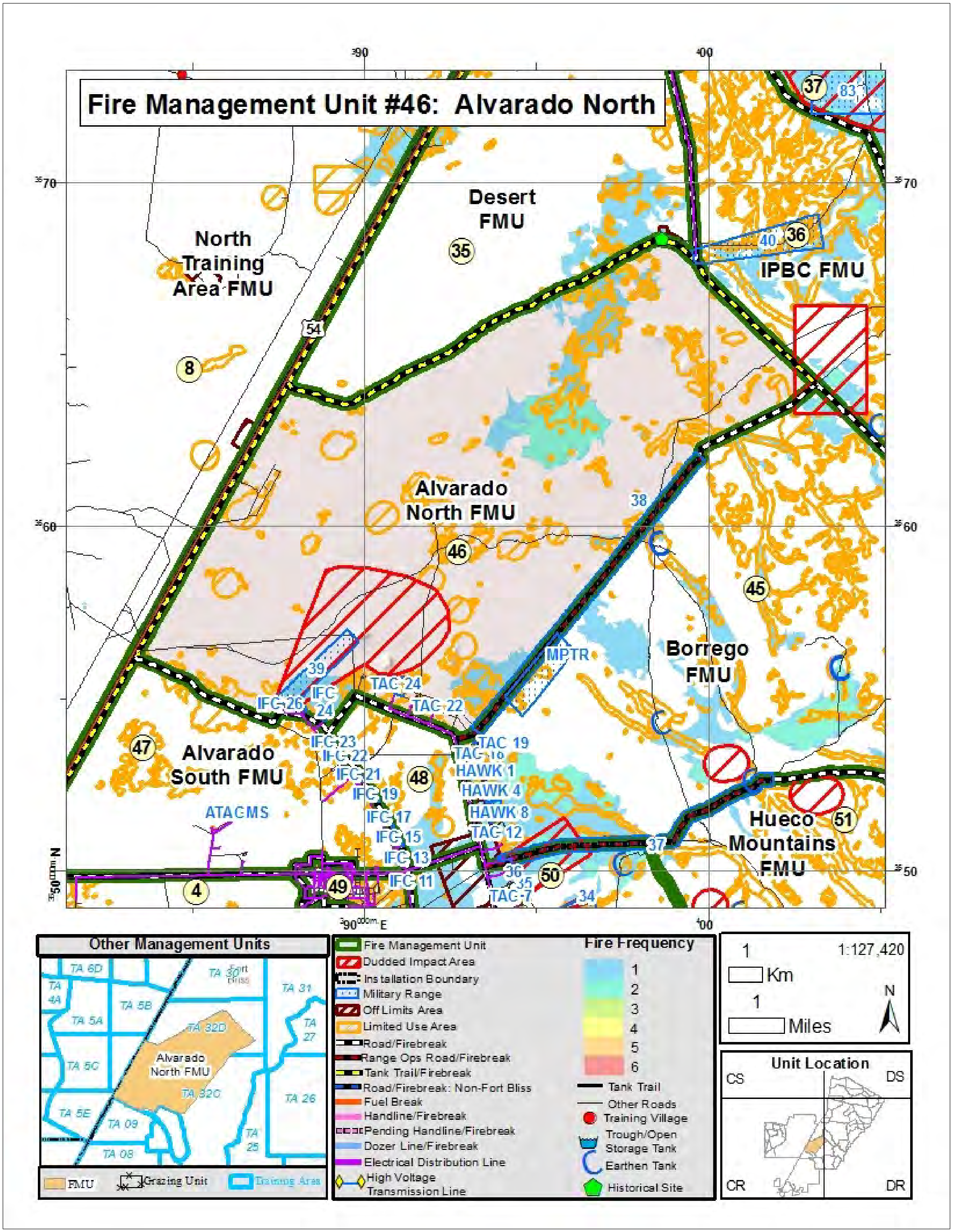
Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that bound the north, south and west perimeters of FMU 46. Range Operations is responsible for maintaining the Range firebreak road through Range 38 which is the east boundary of FMU 46.

Training Asset treatment: Vegetated areas around flammable structures should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be mowed or in the case of accumulated dried tumbleweeds, removed and crushed or burned. Mowing of green vegetation to 6-8 inches in height should be done around targets and other flammable structures twice yearly (once in May or June and once in October before present years growth dries out) or as needed.

Wildfire Management

Let wildfires burn themselves out in FMU 46. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may black line or burnout along roads ahead of a wildfire. Use fire to fight fire when deemed advantageous by the Incident Commander.


Fire Management Unit #46: Alvarado North
Desert FMU
North Training Area FMU
IPBC FMU
Alvarado North FMU
Borrego FMU
Alvarado South FMU
Hueco Mountains FMU
MPTR
ATACMS
Other Management Units
Alvarado North FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:127,420
Km
Miles
Unit Location

2454

FMU 47 ALVARADO SOUTH 11,148 Acres

Physical Characteristics

FMU 47 includes all of TA 9. The eastern 1/6 of FMU 47 is in TA 32C. The north boundary of FMU 47 begins at US Highway 54 at Alvarado Crossing and runs east southeast along a firebreak road past Range 39 (Cane Cholla Range) to an intersection with another fire break road (aka N IFC Road). The east boundary of FMU 47 is the N IFC road heading southeast to its intersection with Patriot Street which is also the main access road through McGregor Base Camp. The south boundary of FMU 47 is Patriot Street heading west from the intersection of N and S IFC roads to the McGregor Base Camp then north on a firebreak road around the fenced boundary of the McGregor Base Camp then west then north past the Helipad then west then south then west and then south around the fenced boundary to its intersection with the McGregor Base Camp main access road then west on the main access road to its intersection with the Route Green Tank Trail adjacent to US 54. The west boundary of FMU 47 is the Route Green Tank Trail beginning at the McGregor Base Camp access road at US 54 and heading north to the Alvarado Crossing at US 54.

Topography in FMU 47 is the relatively flat desert floor of the Tularosa Basin. Vegetation is typical Chihuahuan desert scrub and is a mix of shrubs and grasses. Shrubs are mesquite, creosote, saltbush, snakeweed, cacti and yucca. Grasses are tobosa, sand dropseed, mesa dropseed and black grama. Most of this FMU will not support wildfire spread due to the lack of continuous fine fuels.

Fort Bliss fire history records show one small wildfire has burned in this FMU since 1990.

Infrastructure/Assets to be Protected

An IED Defeat training area and the ATACMS (Multiple Launch Rocket System Range) are located in FMU 47. There are launch pads, towers, facilities and infrastructure associated with these assets. There are power lines with wooden poles leading from McGregor Base Camp to Range 39 and to the ATACMS within FMU 47. The military assets in FMU 47 are cleared to bare ground around them and do not have enough vegetation nearby to support wildfires that might cause harm.

Risk to Firefighters

UXO is a danger within FMU 47. Firefighting operations should be restricted to roads within FMU 47 due to UXO hazards. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. Power line safety should be observed when working under electric lines.

There is an SDZ area near Range 39 in FMU 47. Obtain permission from Range Operations to enter SDZ areas prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that are the perimeters of FMU 47.

Road maintenance should generally be restricted to road surfaces because blading to bare soil around structures and road shoulders encourages the growth of tumbleweeds and other annuals that will increase both maintenance costs and fire frequency. Road shoulders should generally be mowed or brush hogged wherever feasible.

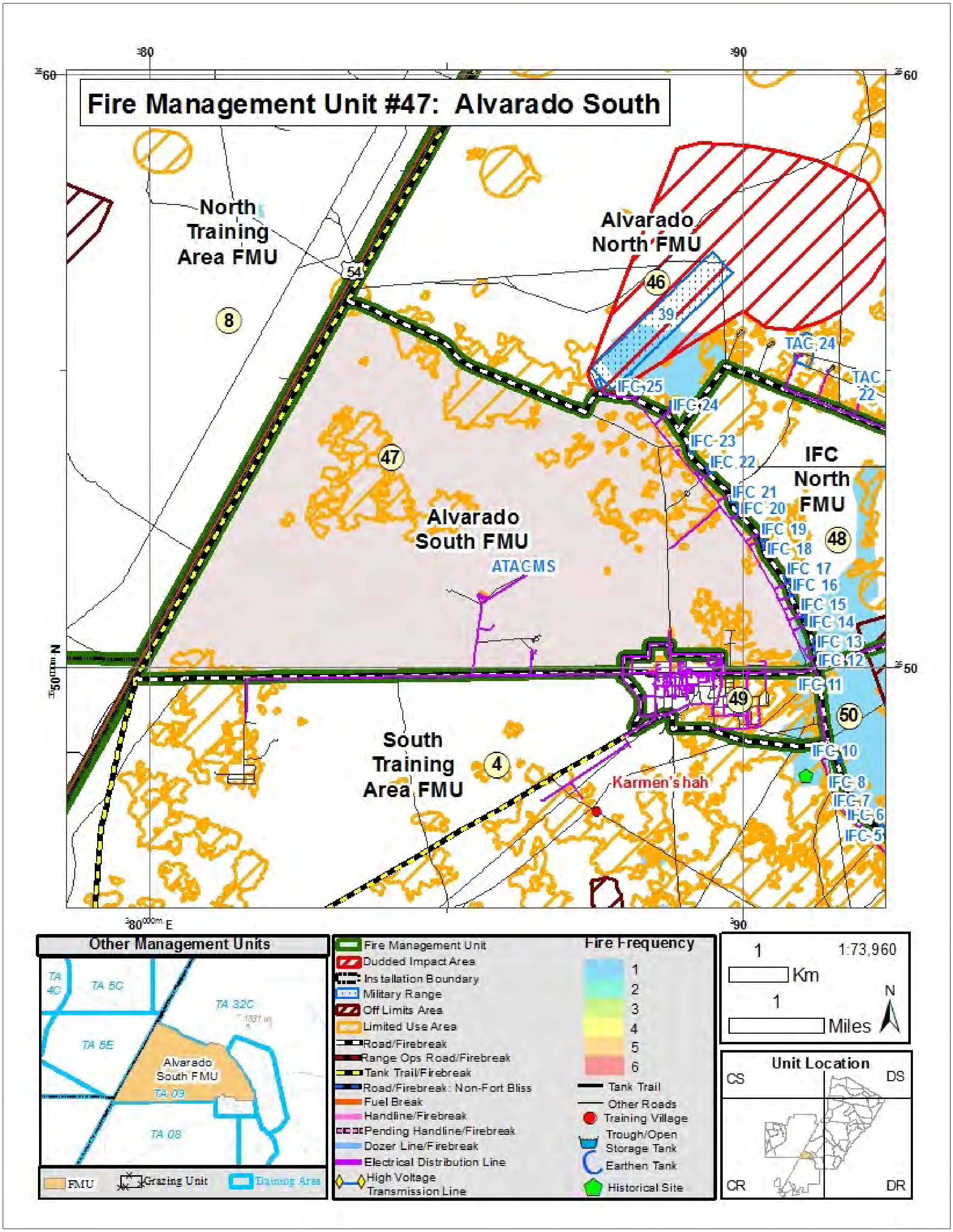
Training Asset treatment: Vegetated areas around flammable structures should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be mowed or in the case of accumulated dried tumbleweeds, removed, crushed or burned. Mowing of green vegetation to 6-8 inches in height should be done around flammable structures twice yearly (once in May or June and once in October before present years growth dries out) or as necessary.

Wildfire Management

Let wildfires burn themselves out within FMU 47. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may blackline or burnout along roads ahead of a wildfire. Use fire to fight fire when deemed advantageous by the Incident Commander.

Power line poles may need pre-treatment with foam solution to keep from burning. Do not burn out under power lines because heavy smoke can cause power lines to arc between wires and the ground.

2506



Fire Management Unit #47: Alvarado South
North Training Area FMU
8
54
Alvarado North FMU
46
39
TAC 24
TAC 22
IFC 25
IFC 24
IFC 23
IFC 22
IFC North FMU
47
IFC 21
IFC 20
Alvarado South FMU
IFC 19
IFC 18
48
ATACMS
IFC 17
IFC 16
IFC 15
IFC 14
IFC 13
IFC 12
IFC 11
49
50
South Training Area FMU
4
IFC 10
Karmen's hah
IFC 8
IFC 7
IFC 6
IFC 5
Other Management Units
TA 4C
TA 5C
TA 32C
TA 5E
Alvarado South FMU
TA 09
TA 08
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1
1:73,960
Km
1
Miles
N
Unit Location
CS
DS
CR
DR

FMU 48 IFC NORTH 3,030 Acres

Physical Characteristics

FMU 48 is inside TA 32B. The north boundary of FMU 48 begins at the intersection of N Launcher Road and N IFC Road south of Range 39 and runs northeast along N Launcher Road then turns southeast and goes past the Air Defense Firing Ranges Tac 24 and Tac 22. The east boundary of FMU 48 is N Launcher Road now heading south past Range 38, Tac 19 and Tac 18, past Hawk pads 1-8 and past Tac 12 to the intersection with McGregor Range Camp access road. The south boundary is the access road from the McGregor Base Camp and runs west to an intersection with the N and S IFC roads. The west boundary is the N IFC road from the McGregor Base Camp Access Road north past 7 IFC (Integrated Fire Control) pads to the intersection of the N Launcher Road that is the north boundary of FMU 48.

Topography in FMU 48 is the flat desert floor of the Tularosa Basin. Vegetation is typical Chihuahuan desert scrub and is a mix of shrubs and grasses. Shrubs are mesquite, creosote, saltbush, snakeweed, prickly pear and yucca. Grasses are tobosa, sand dropseed, mesa dropseed and black grama.

Fort Bliss fire history records show 2 wildfires have burned in this FMU since 1990.

Infrastructure/Assets to be Protected

Twelve IFC launch pads are located in FMU 48. There are concrete pads, towers, facilities, fences, power lines and infrastructure associated with these assets. There are power lines with wooden poles at each of the twelve IFC Ranges within FMU 48. Most of the military assets in FMU 48 do not have enough vegetation nearby to support wildfires that might cause harm.

Risk to Firefighters

UXO is a danger within FMU 48. Firefighting operations should be restricted to roads within FMU 48. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. There are areas of deep sand in FMU 48 that will cause fire engines and equipment to get stuck if driven off roads. Power line safety should be observed when working near electric lines.

The southern portion of FMU 48 is within an SDZ for Ranges 32-35. Obtain permission to enter SDZ area from Range Operations prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

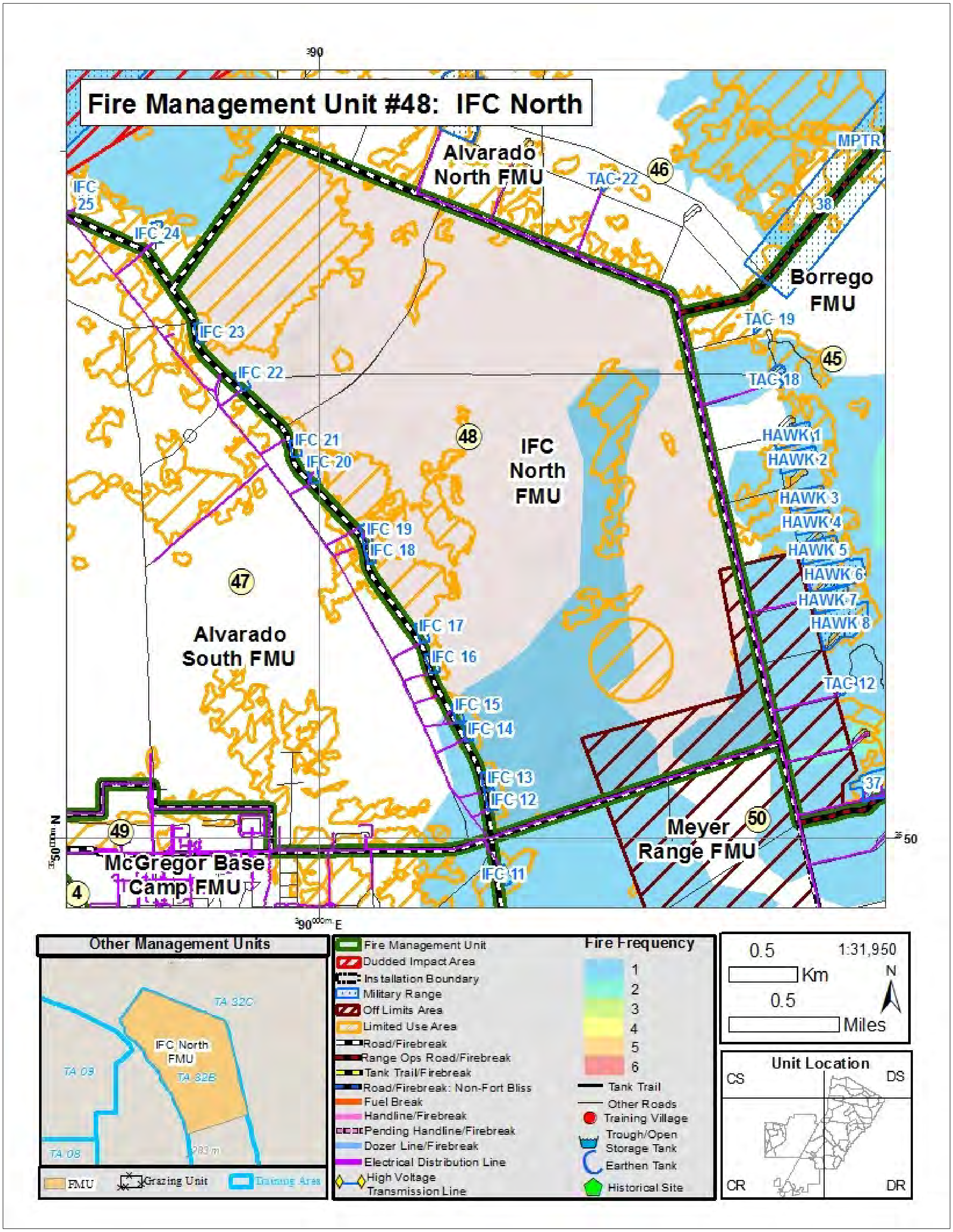
<u>FMU treatments:</u> Fort Bliss DPW O&M is responsible for maintaining the roads that bound the perimeters of FMU 48. Road maintenance should generally be restricted to road surfaces because blading to bare soil around structures and road shoulders encourages the growth of tumbleweeds and other annuals that will increase both maintenance costs and fire frequency. Road shoulders should generally be mowed or brush hogged wherever feasible.

<u>Training Asset treatment:</u> Vegetated areas around structures should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be mowed or in the case of accumulated dried tumbleweeds, removed, crushed or burned. Mowing of green vegetation to 6-8 inches in height should be done around flammable structures twice yearly (once in May or June and once in October before present years growth dries out) or as needed.

Wildfire Management

Let wildfires burn themselves out in FMU 48. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may blackline or burnout along roads ahead of a wildfire. Use fire to fight fire when deemed advantageous by the Incident Commander.

2551


Fire Management Unit #48: IFC North
Alvarado North FMU
IFC North FMU
Alvarado South FMU
Borrego FMU
Meyer Range FMU
McGregor Base Camp FMU
Other Management Units
IFC North FMU
TA 32C
TA 32B
TA 09
TA 08
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.5
1:31,950
Km
0.5
Miles
N
Unit Location
CS
DS
CR
DR

FMU 49 McGREGOR BASE CAMP 954 Acres

Physical Characteristics

FMU 49 is inside TA 32C. The north boundary of FMU 49 begins at the intersection of a firebreak road outside the fenced boundary at the entrance gate to the McGregor Range access road on the west side of the McGregor Base Camp then north, then east and then south around the northern perimeter of McGregor Base Camp to its intersection with Patriot Street (McGregor Range Access Road), then east on Patriot Street to its junction with the N and S IFC roads. The east boundary of FMU 49 is the S IFC road from Patriot Street south past Davis Dome to the Davis Dome Tank crossing. The south boundary is a firebreak road from the Davis Dome tank crossing heading west to Vulcan Road then north on Vulcan Road to the south perimeter fence around McGregor Base Camp then west along the perimeter fence to Route White Tank Trail then heading southwest on Route White Tank Trail to a fire break road that heads north. The west boundary is the fire break road north to the perimeter fence on the west side of McGregor Base Camp then north along the perimeter fence to the main entrance gate at the McGregor Range Access Road.

Topography in FMU 48 is the flat desert floor of the Tularosa Basin. Vegetation is typical Chihuahuan desert scrub and is a mix of shrubs and grasses. Shrubs are mesquite, creosote, saltbush, snakeweed, prickly pear and yucca. Grasses are tobosa, sand dropseed, mesa dropseed and black grama.

Fort Bliss fire history records shows one wildfire burned in FMU 49 in 1996.

Infrastructure/Assets to be Protected

The facilities, housing, offices, warehouses, shops and infrastructure of the McGregor Base Camp are located in FMU 49. Davis Dome Range Operations facilities are located in FMU 49. There are several buildings, concrete pads, towers, facilities, fences, power lines and infrastructure associated with these assets. Most of the military assets in this FMU do not have enough vegetation nearby to support wildfires that might cause harm.

Risk to Firefighters

UXO is not a danger within FMU 49. Any wildfires within FMU 49 could threaten structures and infrastructure within the McGregor Base Camp area.

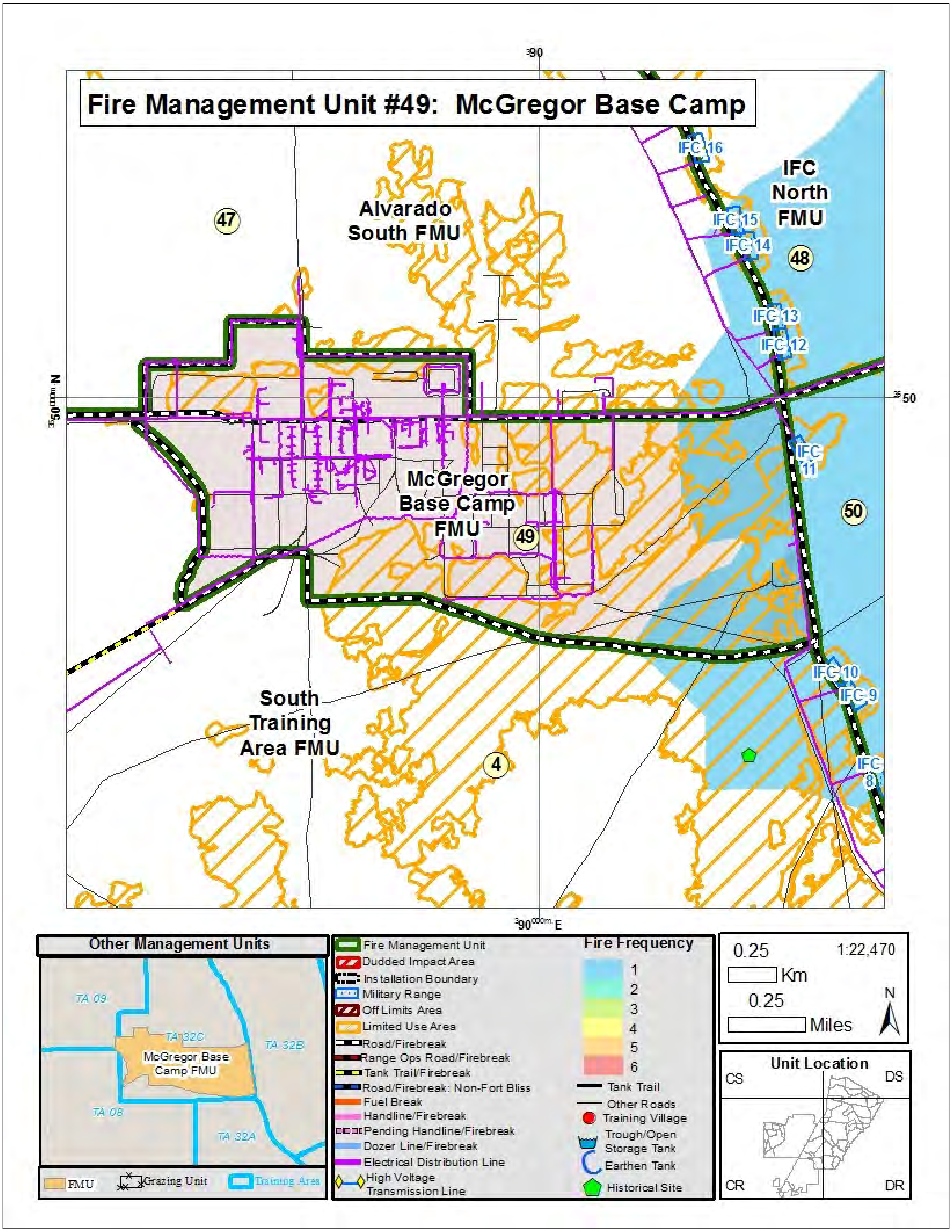
Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that bound the perimeters of FMU 49. Road maintenance should generally be restricted to road surfaces because blading to bare soil around structures and road shoulders encourages the growth of tumbleweeds and other annuals that will increase both maintenance costs and fire frequency. Road shoulders should generally be mowed or brush hogged wherever feasible.

Training Asset treatment: Vegetated areas around flammable structures should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be mowed or in the case of accumulated dried tumbleweeds, removed, crushed or burned. Mowing of green vegetation to 6-8 inches in height should be done around flammable structures twice yearly (once in May or June and once in October before present years growth dries out) or as needed.

Wildfire Management

Use direct attack suppression tactics with engines on all wildfires in FMU 49. Establish anchor point, work towards the head along the hot flanks with wildland engines in tandem, and then work across the head of the wildfire to pinch off wildfire spread. During years following good precipitation, vegetation may be sufficient to carry wildfires across firebreak roads.


Fire Management Unit #49: McGregor Base Camp
Alvarado South FMU
IFC North FMU
McGregor Base Camp FMU
South Training Area FMU
47
48
49
50
4
IFC 16
IFC 15
IFC 14
IFC 13
IFC 12
IFC 11
IFC 10
IFC 9
IFC 8
Other Management Units
TA 09
TA 32C
TA 32B
McGregor Base Camp FMU
TA 08
TA 32A
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
0.25 Km
0.25 Miles
1:22,470
N
Unit Location
CS
DS
CR
DR

2597

FMU 50 MEYER RANGE 17,046 Acres

Physical Characteristics

FMU 50 is located within TA 32B and 32C. The north boundary of FMU 50 begins at the intersection of the N and S IFC road and the main access road for the McGregor Base Camp and runs northeast along the main access road to an intersection with N and S Launcher Road, then south along S Launcher Road to Range 37, then east along a Range firebreak road that is the center of Range 37 to a point where the Range 37 firebreak road crosses an unnamed arroyo at the foot of the Hueco Mountains. FMU 50 is bounded on the east by an unmarked line that runs south from an unnamed arroyo and follows the top of the main ridgeline of the Hueco Mountains southward to the border of New Mexico and Texas. The south boundary is the border between New Mexico and Texas from the ridge top of the Hueco Mountains west to the Meyer Range access road. The state line is the south boundary of Fort Bliss in New Mexico. The Texas side is private lands. The south boundary of Fort Bliss is unmarked along the border in the Hueco Mountains and across a desert basin until it meets a road at the south end of Meyer Range at Range 25. The west boundary is a firebreak road (S IFC Road) that heads northwest around the west side of Meyer Range past Ranges 25 through Range 1 to an intersection of the McGregor Base Camp access road and S IFC road.

Topography in FMU 50 is flat to rolling to steep slopes of the Hueco Mountains with broad canyon bottoms and piedmonts typical of the desert floor of the Tularosa Basin. Vegetation is Chihuahuan desert scrub. Typical shrubs are mesquite, creosote, cat claw, saltbush, apache plume, snakeweed, cacti, agave, ocotillo, sotol, snake weed and yucca. Typical grasses are tobosa, sand dropseed, mesa dropseed and black grama.

Fort Bliss fire history records show at least 6 wildfires have burned in this FMU since 1990. One of these wildfires became large and was associated with shrubs and grasses adapted to sandy soils. The hills and uplands or piedmonts do not support large wildfire spread due to the lack of continuous fuels in FMU 50.

Infrastructure/Assets to be Protected

Ranges 1 through 30, Ranges 32 through 36, part of range 37 and IFC 1 through 11 are located in FMU 50. There are numerous targets, facilities and infrastructure associated with these assets. Most of the military assets in FMU 50 do not have enough vegetation nearby to support wildfires that might cause harm.

Risk to Firefighters

UXO is a danger within FMU 50. There are 3 duded impact areas within FMU 50 which are off limits to all personnel. Normal environmental factors of low humidity, high heat, dust and erratic winds are safety considerations here. Firefighting operations should be restricted to roads within FMU 50 due to UXO hazards.

Most of FMU 50 falls within the SDZs for the various live-fire Ranges located here. The western boundary firebreak road and the southern access road for Ranges 26-30 are not within an SDZ. Access into any area within an SDZ requires permission from Range Operations prior to engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads on the west and south perimeters of FMU 50 including the McGregor Base Camp Access Road, N and S Launcher Road and N and S IFC roads within FMU 50. Range Operations is responsible for maintaining the Range firebreak road through Range 37.

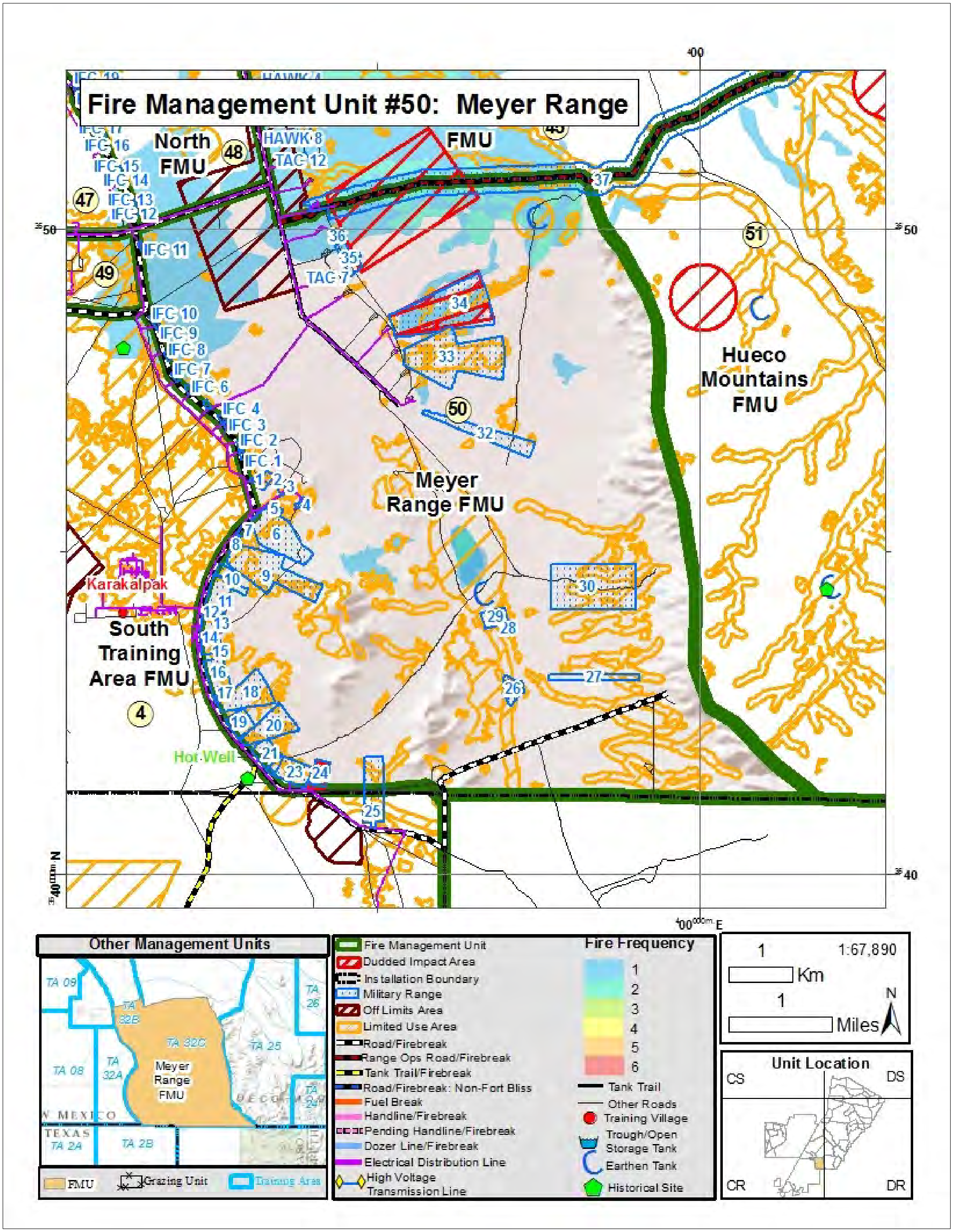
Road maintenance should generally be restricted to road surfaces because blading to bare soil around structures and road shoulders encourages the growth of tumbleweeds and other annuals that will increase both maintenance costs and fire frequency. Road shoulders should generally be mowed or brush hogged wherever feasible.

Training Asset treatment: Vegetated areas around structures should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be mowed or in the case of accumulated dried tumbleweeds, removed. Mowing of green vegetation to 6-8 inches in height should be done around targets and other flammable structures twice yearly (once in May or June and once in October before present years growth dries out) or when necessary.

Wildfire Management

Let wildfires burn themselves out in FMU 50. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may blackline or burnout along roads ahead of a wildfire. Use fire to fight fire when deemed advantageous by the Incident Commander.

2653



Fire Management Unit #50: Meyer Range
North FMU
Meyer Range FMU
Hueco Mountains FMU
South Training Area FMU
Karakalpak
Hot Well
Other Management Units
TA 08
TA 32B
TA 32C
TA 32A
TA 25
TA 26
TA 24
TA 2A
TA 2B
Meyer Range FMU
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1:67,890
1 Km
1 Miles
N
Unit Location
CS
DS
CR
DR

FMU 51 HUECO MOUNTAINS 24,916 Acres

Physical Characteristics

FMU 51 is located within TA 24, 25, 26 and within a small portion of 32C. The north boundary of FMU 51 begins at the toe of the slope that is the northwest end of the Hueco Mountains and at an unnamed arroyo and is a Range firebreak road that is the centerline of Range 37 (Convoy Live Fire Range) heading east past Flat tank, past the end of Range 37, past Charley tank to Hackberry tank where the Range road intersects with a DPW firebreak road, then east along the firebreak road to an intersection of a firebreak road that runs southeast. The east boundary of FMU 51 is the firebreak road that runs southeast then south through the Hueco Mountains, past Red House tanks, past Red Hill, past Wallbridge tanks, then continuing south on an unmarked line to the New Mexico-Texas border. The south boundary of FMU 51 is the New Mexico-Texas state line which is fenced running west to a point on the border where the fence ends at the top of the escarpment on the west side of the Hueco Mountains. The south boundary is Fort Bliss Military Reservation on the New Mexico side and private land on the Texas side. The west boundary is an unmarked line running north from the New Mexico-Texas state line along the crest of the Hueco Mountains escarpment then down the spine of a ridge to a Range road at the toe of the slope of the Hueco Mountains inside Range 37.

Topography in FMU 51 is rolling to steep mountains to flat mesa tops cut by broad canyons spilling in to large desert basins. Vegetation is typical Chihuahuan desert scrub. Shrubs are mesquite, creosote, saltbush, apache plume, rhus, littleleaf sumac, snakeweed, sotol, prickly pear, agave and yucca. Grasses are tobosa, sand dropseed, mesa dropseed, sideoats grama and black grama.

Fort Bliss fire history records show at least 6 wildfires have burned in FMU 51 since 1990. Some of these wildfires have become large and are associated with two areas. One is the broad canyon bottomlands down on the desert floor where, in years following adequate monsoon moisture, grasses and shrubs are dense enough to carry wildfires and the other is the southeast portion of the FMU in the upper reaches of the Hueco Mountains where grass fuels are continuous. The southern and western faces of the steep, rocky, limestone ridges of the Hueco Mountains do not support large wildfire spread due to a lack of continuous fuels.

Infrastructure/Assets to be Protected

Range 37 and the IED-D Village at Hackberry tank are located within FMU 51. The military assets in this FMU are targets and they do not normally have enough vegetation nearby to support wildfires that might cause harm.

There are cultural assets located at Wallbridge tanks (aka Bassett Ranch).

Risk to Firefighters

UXO is a danger within FMU 51. There are 2 duded impact areas within FMU 51 which are off limits to all personnel. Normal environmental factors of low humidity, high heat, dust, steep slopes, rolling rocks and erratic winds are safety considerations here. Firefighting operations should be restricted to roads within FMU 51 due to safety hazards.

Much of the western half of FMU 51 falls within the SDZ (Surface Danger Zone) for Ranges 37, 27, 30, 32, 33 and 34. Contact Range Operations prior to entering FMU 51 for clearance before engaging in wildfire operations.

Pre Fire Season Fuels Management Actions

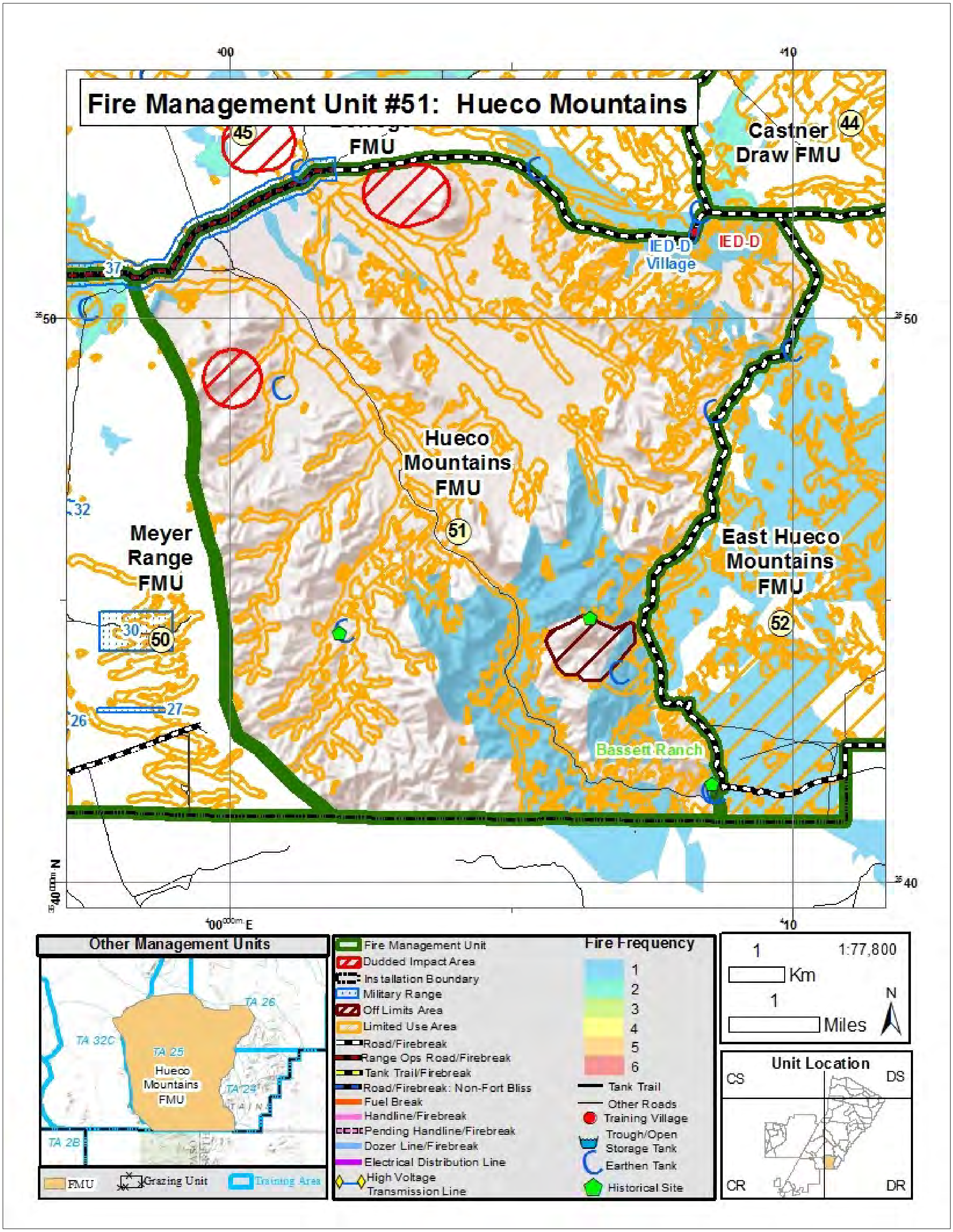
FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that bound the east perimeter of FMU 51. Range Operations is responsible for maintaining the Range firebreak road through Range 37 to its intersection at Hackberry tank with the DPW firebreak road.

Cultural Asset treatment: Vegetated areas around flammable historic features at Wallbridge tanks should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around features warrants removal of brush. Clear brush and weeds for 30 feet from structures.

Wildfire Management

Let wildfires burn themselves out in FMU 51. Keep wildfires within FMU boundaries. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires up drainages and across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may blackline or burnout along roads ahead of a wildfire. Use fire to fight fire when deemed advantageous by the Incident Commander.

Protect cultural assets at Wallbridge tanks with wildland fire engines if a wildfire is threatening the area. Use a mixture of foam and water to wet down wooden cultural features ahead of a wildfire.



Fire Management Unit #51: Hueco Mountains
Castner Draw FMU
44
45
FMU
37
IED-D Village
IED-D
Hueco Mountains FMU
51
Meyer Range FMU
32
30
50
27
26
East Hueco Mountains FMU
52
Bassett Ranch
Other Management Units
TA 26
TA 32C
TA 25
Hueco Mountains FMU
TA 29
TA 2B
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open Storage Tank
Earthen Tank
Historical Site
1 Km
1 Miles
1:77,800
N
Unit Location
CS
DS
CR
DR

2709

FMU 52 EAST HUECO MOUNTAINS 11,100 Acres

Physical Characteristics

FMU 52 is located within TA 24 and 26. The north boundary of FMU 52 begins at the intersection of two firebreak roads east of Hackberry tank. The north boundary follows the firebreak road that heads east from that junction then turns southeast past Ivan Gray Homestead and tank site to an intersection of a firebreak road that runs east-west on the Fort Bliss Military Reservation boundary. The east boundary is unmarked and follows the Fort Bliss Military Reservation boundary to the southwest in a stair step fashion along section lines. The FMU boundary becomes marked at Mountain tank by a firebreak road and fence south to the border between New Mexico and Texas. The south boundary of FMU 52 is a road along the New Mexico-Texas state line which divides Fort Bliss to the north and private lands to the south and heads west from the southeast boundary of the Fort Bliss Military Reservation to a point on the boundary where an old fence leaves the border and heads north and then northwest to Wallbridge tanks at an intersection of firebreak roads. The west boundary is a firebreak road running north from Wallbridge tanks through the Hueco Mountains past Red Mountain, past Red House tanks to an intersection with a firebreak road just east of Hackberry tank.

Topography in FMU 52 is rolling to steep mountains ranging from narrow canyons within the Hueco Mountains to broad basins and canyons on the desert floor. Vegetation is typical Chihuahuan desert grasslands. Shrubs are mesquite, creosote, saltbush, apache plume, rhus, littleleaf sumac, snakeweed, sotol, ocotillo, cacti, agave and yucca. Typical grasses are tobosa, sand dropseed, mesa dropseed, sideoats grama, blue grama and black grama.

Fort Bliss fire history records show at least 2 wildfires have burned in this FMU since 1990. In 1994, one large wildfire burned most of FMU 52 including much of the mountainous portions and burned across the eastern boundaries of Fort Bliss.

Infrastructure/Assets to be Protected

There are no military assets located within FMU 52.

The Ivan Gray homestead is a cultural asset that should be protected from wildfire effects.

Risk to Firefighters

UXO is a slight danger within FMU 52. Normal environmental factors of low humidity, high heat, dust, steep slopes, rolling rocks and erratic winds are safety considerations here. Grass fuels are generally continuous and will support wildfire spread in FMU 52.

FMU 52 is not within an SDZ from any Fort Bliss live-fire Ranges.

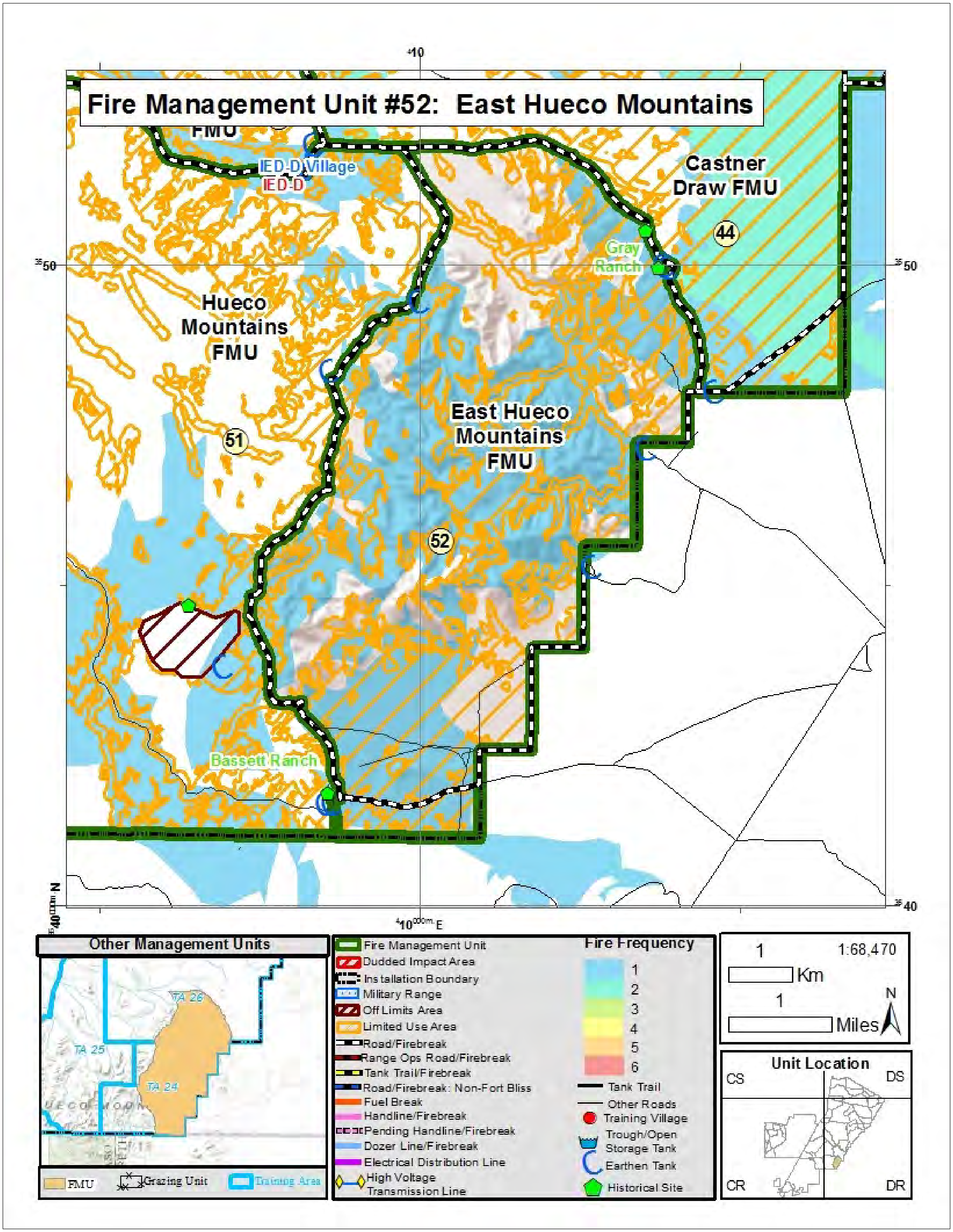
Pre Fire Season Fuels Management Actions

FMU treatments: Fort Bliss DPW O&M is responsible for maintaining the firebreak roads that are the boundaries of FMU 52. Road maintenance should generally be restricted to road surfaces because blading to bare soil around structures and road shoulders encourages the growth of tumbleweeds and other annuals that will increase both maintenance costs and fire frequency. The boundary on the east side of FMU 52 between Mountain tank and Fisher tank needs to be re-established as a fire break road. The old road is overgrown and is not navigable except by foot traffic.

Cultural Asset treatments: Vegetated areas around the Ivan Gray Homestead site should be assessed annually by Fort Bliss fire personnel to determine if fuel buildup around structures needs to be removed. Pull dried, accumulated brush away from the structure for a 30 foot clearance and burn in piles or crush down and scatter as necessary.

Wildfire Management

Let wildfires burn themselves out in FMU 52. Keep wildfires within FMU boundaries. Monitor wildfire progress from firebreak roads. During years following good precipitation, vegetation may be sufficient to carry wildfires across firebreak roads. Make use of firebreak roads to position engines and extinguish flames as wildfires approach. Firefighters may blackline or burnout along roads ahead of a wildfire if approaching wildfire intensity is high. Use fire to fight fire when deemed advantageous by the Incident Commander.



Fire Management Unit #52: East Hueco Mountains
FMU
IED-D Village
IED-D
Castner
Draw FMU
44
Gray
Ranch
Hueco
Mountains
FMU
51
East Hueco
Mountains
FMU
52
Bassett Ranch
Other Management Units
TA 26
TA 25
TA 24
FMU
Grazing Unit
Training Area
Fire Management Unit
Dudded Impact Area
Installation Boundary
Military Range
Off Limits Area
Limited Use Area
Road/Firebreak
Range Ops Road/Firebreak
Tank Trail/Firebreak
Road/Firebreak: Non-Fort Bliss
Fuel Break
Handline/Firebreak
Pending Handline/Firebreak
Dozer Line/Firebreak
Electrical Distribution Line
High Voltage
Transmission Line
Fire Frequency
1
2
3
4
5
6
Tank Trail
Other Roads
Training Village
Trough/Open
Storage Tank
Earthen Tank
Historical Site
1
1:68,470
Km
1
Miles
N
Unit Location
CS
DS
CR
DR

2774

7.2 Appendix B Mutual Aid Agreements

FINAL

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT BLISS
1 PERSHING ROAD
FORT BLISS, TX 79916-3803

REPLY TO ATTENTION OF:

IMWE-BLS-RMM

W6CLAA-09203-MAA-077

MUTUAL AID AGREEMENT
BETWEEN
BUREAU OF LAND MANAGEMENT, LAS CRUCES DISTRICT OFFICE
AND
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, US ARMY GARRISON
FORT BLISS, TEXAS

1. This agreement, between the Secretary of the Army, Fort Bliss, Texas, acting according to the authority of section 1856a, title 42, United States Code, and the Bureau of Land Management (BLM), Las Cruces District Office, pursuant to the Military Lands Withdrawal Act of 1999, is to secure for each the benefits of mutual aid in fire prevention, the protection of life and property from fire, and firefighting. This agreement is further intended to secure for each the benefits of mutual aid to support their missions, to decrease the risk and spread of catastrophic wild land fire, to use natural fire to achieve military and BLM natural resource management objectives, to use prescribed fire to achieve military and BLM management objectives, and to use fuel reduction to lower the risk of wildfire.

2. Nothing in this agreement shall obligate the BLM or the US Army to expend appropriated funds or to enter into any contract to other obligation. Specific work projects or activities that involve the transfer of funds, services or property between the parties to this agreement will require the execution of separate agreements or contracts, contingent upon the availability of funds as appropriated by Congress. Each subsequent agreement or arrangement involving the transfer of funds, services or property between the parties to this agreement must comply with all applicable statutes and regulations, including those statutes and regulations applicable to procurement activities, and must be independently authorized by appropriate statutory authority.

3. It is agreed that:

a. Upon request for firefighting equipment and personnel from a representative of BLM to the Fort Bliss Fire and Emergency Services Directorate (FESD), the Fort Bliss FESD will dispatch the requested support (when available) to any point along or within the boundary between BLM land, as defined as any area of withdrawn land that is not designated hazardous of military use and Fort Bliss land, as defined as withdrawn land that has been designated hazardous for military use or Army fee-owned acreage. On a reciprocal basis, upon request for firefighting equipment and personnel from a representative of the FESD, the BLM will dispatch the requested support (when available) to any point along or within the boundary between BLM and Fort Bliss land.

b. Support provided by the BLM to Fort Bliss will occur only after Fort Bliss representatives identify the area(s) cleared for Unexploded Ordnance (UXO).

c. A representative for either the BLM or FESD will be notified immediately of any fire found on or approaching the other's land.

d. The rendering of assistance under the terms of this agreement shall not be mandatory. The party receiving the request for assistance should immediately inform the requesting party if, for any reason, assistance cannot be rendered.

e. Any dispatch of equipment and personnel pursuant to this agreement is subject to the following conditions:

(1) Any request for aid under this agreement will specify the location to which the equipment and personnel are to be dispatched; however, the amount and type of equipment and number of personnel to be furnished will be determined by a representative of the responding organization.

(2) The responding organization will report to the officer in charge of the requesting organization at the designated emergency location, and will be subject to the orders of that official.

(3) A responding organization will be released by the requesting organization when the services are no longer required, or when the responding organization is withdrawn to respond to an emergency within the area for which it normally provides fire protection.

(4) If a crash involving aircraft, rockets, missiles, unmanned aerospace vehicles (UAV), or similar weaponry owned or operated by the United States or any foreign nation occurs within the BLM land, the Chief of the Fort Bliss FESD or his representative may assume full command upon arrival at the scene of the crash.

f. Fort Bliss and BLM hereby waive all claims for compensation for any loss, damage, injury or death occurring in the performance of the responsibilities identified in this agreement except for those claims authorized under 15 U.S.C. 2210.

g. Personnel from Fort Bliss and BLM fire fighting activities are encouraged, on a reciprocal basis, to:

(1) Visit each other's activities for guided familiarization tours (consistent with local security requirements).

(2) Jointly conduct preseason fire program inspections.

(3) Conduct wildfire risk evaluations/assessments.

(4) Jointly plan and conduct use of prescribed fire and uses of natural fire projects and reviews.

(5) Attend training and classroom exercises to meet Incident Qualifications and Certification System (IQCS) standards for fighting wild land fires and for conducting prescribed burns.

(6) Share fire weather information and any other information that pertains to planning and implementing wild land fire suppression, implementing and conducting prescribed fires, as well as conducting natural fire use.

h. The technical staffs of the Fort Bliss and BLM fire fighting departments are authorized and directed to meet and draft any detailed plans and procedures of operation to effectively implement this agreement. Such plans and procedures of operations shall become effective upon ratification by the signatory parties.

i. All equipment and personnel of either agency providing support will remain under the ownership and control of the providing agency.

j. This agreement shall become effective upon the date of the last signature hereon and shall remain in full force and effect for the duration of the McGregor Land Withdrawal.

k. This agreement will be reviewed every three years (or sooner if situation warrants) and updated by mutual agreement in writing as necessary.

4. The Office of the Staff Judge Advocate, US Army Installation Management Command, Headquarters, US Army Garrison, Fort Bliss, Texas, has reviewed this Mutual Aid Agreement and found it to be legally sufficient.

My M. Dugan

Signature of Reviewing Attorney
Office of the Staff Judge Advocate

26 Oct 09

Date

APPROVED AS TO CONTENT:

11·12·2009

STEVE BUMGARNER
Fire Management Officer
Las Cruces District, BLM

Date

11/20/2009

CHARLES J. BUTLER
Fire Chief
Fort Bliss Fire and Emergency Services Division
Directorate of Emergency Services

Date

FOR THE BUREAU OF LAND MANAGEMENT:

11-13-2009

BILL CHILDRESS
District Manager
Las Cruces District

Date

FOR THE SECRETARY OF THE ARMY:

DEC 02 2009

EDWARD P. MANNING
Colonel, US Army
Commanding

Date

7.3 Appendix C: Standard Fire Orders, 18 Watch Out Situations and LCES

The 10 Standard Fire Orders were developed in 1957 by a task force studying ways to prevent firefighter injuries and fatalities. Shortly after the Standard Fire Orders were incorporated into firefighter training, the 18 Situations That Shout Watch Out were developed. These 18 situations are more specific and cautionary than the Standard Fire Orders and described situations that expand the 10 points of the Fire Orders. If firefighters follow the 10 Standard Fire Orders and are alerted to the 18 Watch Out Situations, much of the risk of firefighting can be reduced. LCES is a short, easily memorized acronym that stands for Lookouts, Communications, Escape routes and Safety zones. These four actions must be established and made known to everyone before engaging in wildfire suppression.

The 10 Standard Fire Orders

The NWCG approved the revision of the Ten Standard Fire Orders in accordance with their original arrangement. The original arrangement of the Orders are logically organized to be implemented systematically and applied to all fire situations.

<u>Fire Behavior</u>
1. Keep informed on fire weather conditions and forecasts.
2. Know what your fire is doing at all times.
3. Base all actions on current and expected behavior of the fire.

<u>Fireline Safety</u>
4. Identify escape routes and safety zones and make them known.
5. Post lookouts when there is possible danger.
6. Be alert. Keep calm. Think clearly. Act decisively.

<u>Organizational Control</u>
7. Maintain prompt communications with your forces, your supervisor and adjoining forces.
8. Give clear instructions and insure they are understood.
9. Maintain control of your forces at all times.

<u>If 1-9 are considered, then...</u>
10. Fight fire aggressively, having provided for safety first.

The 10 Standard Fire Orders are firm. We don’t break them; we don’t bend them. All firefighters have the right to a safe assignment.

The 18 Watch Out Situations

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior
5. Uninformed on strategy, tactics, and hazards.
6. Instructions and assignments not clear.
7. No communication link between crewmembers and supervisors.
8. Constructing line without safe anchor point.

9. Building line downhill with fire below.
10. Attempting frontal assault on fire.
11. Unburned fuel between you and the fire.
12. Cannot see main fire, not in contact with anyone who can.
13. On a hillside where rolling material can ignite fuel below.
14. Weather gets hotter and drier.
15. Wind increases and/or changes direction.
16. Getting frequent spot fires across line.
17. Terrain or fuels make escape to safety zones difficult.
18. Feel like taking a nap near fireline

LCES

LCES must be established and known to ALL firefighters BEFORE it is needed.

Lookout(s)

- Experienced, competent, trusted
- Enough lookouts at good vantage points
- Knowledge of crew locations
- Knowledge of escape and safety locations
- Knowledge of trigger points
- Map, Weather Kit, Watch, IAP

Communication(s)

- Radio frequencies confirmed
- Backup procedures and check-in times established
- Provide updates on any situation change
- Sound alarm early, not late

Escape Route(s)

- More than one escape route
- Avoid steep uphill escape routes
- Scouted for loose soils, rocks, vegetation
- Timed considering slowest person, fatigue, and temperature factors
- Marked for day or night
- Evaluate escape time vs. rate of spread
- Vehicles parked for escape

Safety Zone(s)

- Survivable without a fire shelter
- Back into clean burn
- Natural features (rock areas, water, meadows)
- Constructed sites (clearcuts, roads, helispots)
- Scouted for size and hazards
- Upslope?
- Downwind?
- Heavy Fuels?

Escape time and safety zone size requirements will change as fire behavior changes.

7.4 Appendix D: FBTC Training Area and Range Procedures for Wildfire Prevention and Response

Training unit commanders should include in their pro-ops briefing to Soldiers a review of the fire danger rating for that day, a determination of the Range they are occupying is a High or Low fire hazard Range (See Table 4.1-1 and 4.1-2 In Chapter 4 Fort Bliss IWFMP), cease-fire requirements when there is a wildfire in a high wildfire hazard area and a review of the following Fort Bliss Range Regulation 385-63, Section 2.31 through Section 2.38:

2.31. Wildfires. Refer to paragraph H-12 for Fire Break Locations.

a. All wild land fires (firing ranges/training areas/Impact areas) will be reported immediately to Range Operations with the following information:

(1) Location and type

(2) Name and telephone number/call sign of person reporting.

(3) How fire started

(4) Unit, agency, or person that started the fire

(5) Direction of fire (if spreading)

b. If the fire is endangering life, equipment or facilities, Range Operations will immediately place the training site in a hold fire.

c. Training units provide a firefighting detail for low risk fires. Troops on the scene will attempt to control fires only within the range footprint and as long as personnel are not endangered.

d. No one will enter impact areas for the purpose of fighting fires.

e. Training units will not go downrange to fight fires unless authorized by Range Operations. If authorized to go downrange, the firefighting detail must have communications with Range Operations at all time.

f. Range Operations will notify Fort Bliss Fire Department of all fires on firing ranges, training areas or impact areas.

g. Upon notification of a range fire, the Fire Department becomes responsible for the firefighting efforts and for the Incident Command System.

h. Range Operations will put in hold fire all other live fire ranges that could jeopardize the firefighting efforts.

i. The OIC of the training unit renders all possible assistance, remains at the training facility until the fire is extinguished or is released by FES or the Incident Commander and maintains communications with Range Operations at all times.

j. Range Operations activates information dissemination to Chain of Command and Offices on reporting list.

k. As a minimum, the training units will have the following firefighting equipment on hand:

(1) Assigned vehicle with communications and capable of safe transportation five (5) personnel.

(2) Three (3) Shovels.

(3) Two (2) Swatters.

(4) Two (2) Fire extinguishers (10 BC or 10 ABC classification)

l. Priorities for firefighting teams:

(1) Protect personnel

(2) Protect equipment and facilities

(3) Contain and/or extinguish remaining fire (if possible)

2.32 Pyrotechnics

a. Non-standard ammunition and pyrotechnics are more dangerous than many other types of ammunition because they are more easily initiated. Pyrotechnics must be handled with care at all times. Safety precautions for handling and firing pyrotechnic cartridges and accessories are included in DA PAM 385-64.

b. Pyrotechnics may only be used in low risk training areas or firing ranges. Personnel using pyrotechnics must exercise caution to avoid accidental start of wild land fires. (See table….)

c. A thorough safety briefing will be conducted by the OIC of that unit's training addressing the proper use of pyrotechnic simulators prior to the use of such devices.

d. Detailed instructions for the safe use of simulators are contained in TM 9-1370-207-10. For systems not contained in the TM refer to system safety data sheet for requirements.

e. Trip flares and booby traps and all ignitable pyrotechnic devices not detonated during training will be removed prior to departing the area.

2.33 Range Personnel:

a. Range personnel will clear range and targets areas of debris, brush, tumble-weeds, and all other flammable materials throughout the year to prevent fires.

2.34 Fire Breaks:

a. Agencies/Offices assigned the maintenance of Fire Breaks, MSRs, and Tank Trails are responsible for keeping the roads and fire breaks clear of obstacles and properly maintained to allow for rapid movement of emergency vehicles.

2.35 Special Instructions:

a. Controlled burns may be conducted but will be coordinated for through the FBTC Range Safety Office, FBTC Range Operations Office, Fort Bliss Fire Department and Directorate of Public Works – Environmental Branch.

b. Open fires are not authorized in Fort Bliss. Exception to policy memorandums will be considered on a case-by-case basis and authorized by G-3 through Range Safety and FES.

c. Range Branch personnel and/or Contractors will not participate in firefighting.

2.36 Fire weather and fire danger

a. Weather, fuel moisture, and local conditions are watched very closely during the fire season. This data determines the local fire danger or the risk of a fire starting and its rate of spread. It is with this information, along with the types of training scheduled by troop units that determines what restrictions may be necessary to prevent the start and spread of wild land fires.

b. Ammunition, Pyrotechnics, and/or Demolition Material that could ignite flammable materials surrounding the training areas of firing ranges are subject to restrictions or suspensions during dry/drought periods (1 July – 30 September) in accordance with the States of Texas and New Mexico laws and regulations.

2.37 Fire Conditions. Below are the Fire Conditions (FIRECON) Rating System established by the National Fire Danger Rating System (NFDRS) and adapted to Fort Bliss special training requirements. Units in need to deviate from established restrictive guidelines must turn in a waiver memorandum through Range Safety and FES for approval of the Post Commander.

Fort Bliss Fire Desk and Fort Bliss FES will access official sites to update the fire conditions on a daily basis and post the updates as they become available in the Fort Bliss Share Point Site.

Fort Bliss Fire Conditions and Ammunition Restrictions Procedures:

(a) National Fire Danger Rating (Dark Green-LOW and Light Green-MODERATE) “Category 1&2”

(1.a) Fort Bliss. No ammunition restrictions

(b) National Fire Danger Rating (Yellow-HIGH and/or Orange-VERY HIGH) “Category 3&4”

(2.a) Fort Bliss. Brigade Commander’s waiver with mitigations for preventing wildfires for Ranges 65, 66A, 66B, 70, 91. North of North Grid line 67 for Impact Areas 1 and 2 and for Range 50 at Dona Ana. Centennial Range. Training areas 10, 12, 14, 23, and 33. Tarin Kalpak Village.

NOTE: A copy of the waiver with mitigations and risk analysis forwarded to G-3, Range Operations, Fort Bliss FES and Range Safety

(c) National Fire Danger Rating (Red-Extreme) “Category 5”

(3.a) Fort Bliss. Post Commander’s waiver for Ranges 65, 66A, 66B, 70, 91. North of North Grid line 67 for Impact Areas 1 and 2 and for Range 50 at Dona Ana. Centennial Range.

NOTE: Waiver with mitigations and risk analysis request forwarded to G-3 and FES through Range Safety.

(d) National Fire Danger Rating (RED FLAG)

(4.a) Fort Bliss. All Fort Bliss Training Complex prohibited ammunition; Tracers, Pyrotechnics, High Explosives, Flares, Hand Grenades, Illumination projectiles and devices, white phosphorous.

2.38 References for Wildfire Danger Rating Broadcasts:

a. National Fire Danger Rating System Fire (NFDRS) Danger Rating sent out daily early A.M. (http://www.wfas.net/images/firedanger/subsets/fdc_f_sw.png.)

b. National Weather Service (NWS), Santa Theresa, daily fire weather forecasts for the six fire weather zones (FWZs) in southern New Mexico and far west Texas.(http://www.srh.noaa.gov/epz/?n=fireweather)

c. On Monday mornings, utilize the Fire Weather Forecast for the week at (http://www.srh.noaa.gov/epz)

7.5 Appendix E: Sample Template for Delegation of Authority

Delegation of Authority
Department of the Army
Fort Bliss, Texas and New Mexico

As of ____ hours, __________________(Date), I have delegated authority to manage the _____________________________(Fire name) to Incident Commander _____________________________(Name) and his/her Incident Management Team. The fire, which originated in __________________________(where) occurring on ___________________________(Date started) is burning on lands managed by US Army Fort Bliss. My priorities and considerations for the management of this fire are:

1. Provide for firefighter and public safety.
2. Manage the fire with as little environmental damage as possible.
3. Key cultural features requiring priority protection are:
4. Key natural resources requiring protection are:
5. Restrictions for suppression actions include:
6. My agency Resource Advisor will be:
7. The fire borders are:
8. Manage the fire cost-effectively for the values at risk.
9. Provide training opportunities for our agency personnel to help strengthen our organizational capabilities.
10. Minimize disruption of military training activities without compromising firefighter or military personnel safety.
11. Ensure that military command at Fort Bliss is kept informed of major actions and decisions made during the containment of this fire.

_____________________________________ ___________________
(Signature and Rank of Garrison Commander) (Date)

Amendment to the Delegation of Authority

The Delegation of Authority dated (Date), issued to Incident Commander (Name) for the management of the (Fire name), and is hereby amended as follows. This will be effective at (Hours), (Date).

1.
2.
3.

_____________________________________ ____________________
(Signature and Rank of Garrison Commander) (Date)

7.6 Appendix F: 3 Rs of Explosives Safety for Firefighting Safety

Recognize, Retreat, Report

Firefighting

Firefighting Safety

It is essential that firefighting operations within or near areas that are known or suspected to contain military munitions (e.g., unexploded ordnance (UXO)) be planned with consideration of explosives safety. This is equally true where military munitions operating facilities (e.g., current of former production facilities, demilitarization facilities) exist. The local explosives safety specialists, bomb squad, or nearest military explosives ordnance disposal (EOD) unit should be contacted and used as a resource.

Millions of acres of property in the United States are known or suspected to contain UXO and discarded military munitions (DMM). The presence of UXO and DMM is for the most part a direct result of weapons system testing and troop training activities that the Department of Defense (DOD) conducted to ensure the readiness or our Nation's military forces. This property includes, but may not be limited to operational ranges on active military installations, formerly used defense sites (FUDS), installations closed or closing under the Base Realignment and Closure (BRAC) Act (BRAC sites). The potential risks posed by UXO and/or DMM could be great depending on the types and amount present.

Knowing the history of an area is paramount! Fire departments that are responsible for fighting fires that could involve areas that are part of an active military installation or that were once used by the military (e.g., a FUDS, BRAC property), should coordinate, as appropriate, with the below to become familiar with areas known or suspected to contain UXO or DMM, or other explosive hazards. This information can be obtained:

- For active installations - from the commander, fire department, director of safety or facilities engineer. (This coordination should also be done when a department has a mutual support agreement with the installation's fire department.)
- For FUDS – from the US Army Corps of Engineers’ District Commander
- For BRAC installations – from the installation commander, BRAC Environmental Coordinator, or local reuse authority, if established.

Recognizing and taking action to mitigate the potential hazards (explosive and/or chemical agent) associated with military munitions that may be present is paramount to reducing the risk of serious injury or loss of fire fighting resources when fighting fires that may potentially involve military munitions.

The ability to recognize military munitions is the first and most important step in reducing the potential risks associated with UXO. The below military munitions are likely to be encountered as UXO or DMM on operational ranges or property (e.g., FUDS) formerly used by the DoD for live-fire training or testing or military maneuvers. The potential explosives hazards from munitions vary based on a number of factors. Although the explosives hazards associated with small arms ammunition - defined as ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns - are considered minimal they should not be ignored. Any munitions encountered should be considered UXO and extremely dangerous.

UXO can be found in many different ways (e.g., on the surface, partially buried in soil or partially submerged under water, or buried or fully submerged) and in many different conditions (e.g., rusty and crusted, like new, in parts). The location and condition of the munitions found on a site depends in part on the type of munitions used, the weapon systems employed, how the munitions were used (e.g., training or the geology and environmental conditions of the area, and activities that may have taken place on the property since DoD last used the site.

UXO may be found fully intact or in parts or fragments. All UXO, whether intact or in parts, presents a potential explosion hazard and should be treated as such. Even UXO that have deteriorated present a significant explosives hazard. In addition, these munitions can also present an environmental hazard because munitions constituents, like their fillers (e.g., RDX, HMX, TNT), could become exposed.

EXPLOSIVES SAFETY MEASURES: Whether present in an area by design or by accident, UXO poses potential risks of injury or death. Remember the following:

- If you did not drop it, do not pick it up or disturb it!
- Do not enter an area known or suspected to contain munitions. All munitions, whether intact or in fragments, present a potential explosive hazard.
- If you encounter or suspect you may have encountered a munition, stop, and scan the area for additional munitions. Do not move closer.
- Never touch, move, or disturb a munition or suspect munition.
- If time permits, clearly mark the area where munitions were encountered. Do not mark the munition.
- Do not attempt to fight fires in areas known or suspected to contain munitions.
- If the types of munitions present are:
    - Unknown, larger than a 155mm artillery projectile or a heavy accumulation of munitions are known or suspected to be present, evacuate everyone within 1 mile.

        - Known to only contain isolated 155mm munitions or smaller, the evacuation distance may be reduced to 1/2 mile.

- Report the discovery of munitions to your immediate supervisor or the incident commander as soon as possible!

- Do not use radios or cell phones within 100 feet of areas known to contain munitions, unless specifically authorized or in an emergency.

Wildland Firefighting Safety Guide:

Small File PDF 1MB

Large File PDF 7.1MB

Recognize
Retreat
Report

RECOGNIZE — *when you may have encountered a munition.*

RETREAT — *do not touch, move or disturb it, but carefully leave the area.*

REPORT — *call Range Operations at 915 744-9546/9547 or 9548 or Fort Bliss DES/FES Fire Dispatch at 915 744-2115 or 911.*

7.7 Appendix G: Fire Effects Information for the Threatened, Endangered and Sensitive Plant and Animal Species Found on Fort Bliss

E-Endangered species
C-Candidate species
SC-Species of concern
S-Sensitive Species
T-Threatened species
SGCN-Species of Greatest Conservation Need

Species	Status			Habitat Descriptions	Wildfire Effects
	Federal	New Mexico	Texas		
Plants					
Alamo beardtongue *(Penstemon alamosensis)*	--	SC	SGCN	Sheltered rocky areas of the Hueco Mountains, mostly on north-facing slopes above mesic canyon bottoms, occasionally in rock crevices on soils derived from limestone; 1,300-1,620m .[1]	Wildfires pose little adverse effects to this species due to habitat requirements of sheltered areas on rocky cliffs.
Crested coral-root *(Hexalectris spicata)*	--	E	---	Found in Organ Mountains in leaf litter in oak, pine, or juniper woodlands over limestone. [1]	Wildfires pose potentially adverse effects to populations of this species due to high quantities of flammable fuel loads within its habitat.
Desert night blooming cereus *(Peniocereus greggii var. greggii)*	--	E	SGCN	Dry alluvial soils at elevations between 370 and 1,500m; on Doña Ana Range and North Training Areas; in highly broken terrain in desert grassland or Chihuahuan desert scrub, typically in sandy to silty gravelly soils on upper to mid bajadas among creosote bush, mesquite, palo verde, knife-leaf condalia. [1]	Wildfires pose little adverse effects to this species because of its habitat requirements of open desert with low fuel loads.

Hueco Mountains rock daisy *(Perityle huecoensis)*	--	—	SGCN	Vertical limestone cliffs in the Hueco Mountains within relatively narrow, deep, shaded canyons. [2]	Wildland fires pose little potential adverse effects to this species because preferred habitat is high rocky cliffs where there are low fuel loads.
Kuenzler hedgehog cactus (*Echinocereus fendleri* var. *kuenzleri*)	E	E	---	Not known to occur on Fort Bliss. Found to the north in the Sacramento Mountains in grasslands, herbaceous savannas found on limestone ledges and gentle slopes; or on flat steppes of grass-covered hillsides in lower fringes of piñon-juniper savannas. [3]	Wildfires pose potential adverse threat due to the plants slow recovery and reproductive rate. Fire effects studies showed that wildfires have caused high mortality while low severity prescribed fires caused very little mortality. [3, 4]
Nodding Cliff Daisy (*Perityle cernua*)	--	SC	--	Endemic to the Organ Mountains. [1] Grows in cracks of igneous cliffs of rhyolite or andesite.	Wildland fires pose low potential adverse effects to this species due to its habitat requirements of rocky cliffs.
Organ Mountain Paintbrush (*Castilleja organorum*)	--	SC	_	Endemic to higher elevations of the Organ Mountains. [1] Open to partly shady montane slopes and rocky canyons in piñon-juniper woodland or lower montane coniferous forest; 2000-2400 m.	Wildland fires pose moderate potential adverse effects to this species due to habitat requirements of open, grassy areas in woodlands.
Organ Mountains evening primrose (*Oenothera organensis*)	--	SC	—	Forest, woodlands and shrublands of the Organ Mountains. Restricted to canyon floor streambeds and adjacent hillside seeps where water is present for at least part of the growing season. [5]	High intensity wildfires pose a potential adverse effect due to heavy scouring and massive sediment depositions that can occur with subsequent rains within this species limited habitat.[1]
Organ Mountains figwort (*Scrophularia laevis*)	--	SC	—	Moist canyons of the Organ Mountains on quartz monzonite substrate in piñon-juniper woodlands and Rocky Mountain montane coniferous forests. [1]	Wildland fires pose low potential adverse effects due to its habitat requirements of moist soils.

Organ Mountains pincushion cactus (*Escobaria organensis*)	--	E	—	Found in the Organ Mountains on andesite, quartz-monzonite, and to a lesser extent rhyolite and limestone in broken mountainous terrain. Associated with Chihuahuan desert scrub and open oak and piñon-juniper woodland. [1]	Fires pose low potential adverse effects due to its preferred habitat of open, rocky soils.
Sand prickly pear (*Opuntia arenaria*)	--	E	SGCN	Not known to occur on Fort Bliss. Sandy areas, particularly semi-stabilized sand dunes among open Chihuahuan desert scrub, often with honey mesquite and a sparse cover of grasses. [1]	Wildland fires could pose moderate adverse effects to this species due to its habitat where there is usually abundant annual and perennial grasses and forbs.
Sandhill goosefoot (*Chenopodium cycloides*)	--	SGCN	--	Sandy soils of Doña Ana Range, frequently around the vegetated edges of blowouts on semi-stable sand dunes. Typically found in open, disturbed sites along with perennial plant species. [6, 7]	Wildland fires pose a low potential adverse effect to this species due to its habitat requirements of open, disturbed areas.
Sneed pincushion cactus (*Coryphantha sneedii*)	E	E	E	Found on Dona Ana Range. Lives in cracks in limestone in areas of broken terrain and steep slopes in Chihuahuan desert scrub. [1]	Wildland fires pose low potential adverse effects because habitat is inside rocky crevices where there is little other vegetation.
Standley whitlowgrass (*Draba standleyi*)	--	SC	SGCN	Found in the Organ Mountains on Igneous rock faces, bases of overhanging cliffs, clefts of porphyritic and andesitic rocks in shaded areas. [1]	Wildland fires pose low potential adverse effects to this species because preferred habitat is on high rocky cliffs where there are low fuel loads.

Molluscs					
Beasley Snail (*Ashmunella beasleyorum)*	—	SGCN	—	Spaces among accumulations of rock talus in the Organ Mountains within Ponderosa pine and Douglas fir. [8]	Wildland fires pose low potential adverse effects to this species because of habitat requirements of moist layers of decomposed organic material within talus slopes.
Organ Mountain Woodland Snail *(Ashmunella organensis*)	—	SGCN	—	Found in the Organ Mountains in areas of Gambel oak, wortleleaf snowberry, one seed juniper, mixed grasses, piñon pine with oak and alligator juniper, Ponderosa pine, Douglas fir, Box elder. [8]	Wildland fires pose low potential adverse effects to this species because of habitat requirements of moist layers of decomposed organic material within talus slopes.
Maple Canyon Woodland Snail *(Ashmunella todsenii)*	—	SGCN	---	Spaces among rock talus in the Organ Mountains, among Gambel's oak, wortleleaf snowberry, one-seed juniper, mixed grasses, piñon pine, alligator juniper, Ponderosa pine and Douglas fir. [8]	Wildland fires pose low potential adverse effects to this species because of habitat requirements of moist layers of decomposed organic material within talus slopes.
Boulder Canyon Woodland Snail (*Ashmunella auriculata*)	—	SGCN	—	Found in Organ Mountains in Gambel's oak, wortleleaf snowberry, one seed juniper-mixed grass and montane woodlands. [8]	Wildland fires pose low potential adverse effects to this species because of habitat requirements of moist layers of decomposed organic material within talus slopes.
Franklin Mountain talus snail (*Sonorella metcalfi*)	T	SGCN	SGCN	Inhabits talus within the Franklin Mountains, including bedrock crevices, boulder piles, and cave entrances, generally on north-facing slopes of rocky canyons. [9,10]	Wildland fires pose low potential adverse effects to this species because of habitat requirements of moist, decomposed organic litter within rocky slopes.

Reptiles					
Gray-banded Kingsnake (*Lampropeltis alterna*)	—	S	—	Exists in the Hueco Mountains but has not been documented on Fort Bliss. Prefers dry, rocky limestone and igneous dissected desert terrain, including desert flats, rocky hillsides, canyons, escarpments, limestone ledges, road-cuts, and mountain gaps with vegetation of acacia, lechuguilla, desert willow, creosote bush, mesquite, ocotillo, opuntia and sotol. [11,12]	Wildland fires pose a low potential for adverse effects to this species because habitat is rocky and seeks refuge in rock crevices.
Mottled rock rattlesnake (*Crotalus lepidus lepidus*)	—	T	—	This species has not been documented on Fort Bliss. Found in the Organ Mountains in rocky areas, including talus slopes, gorges, rim rock, limestone outcrops, rocky streambeds, in arid or semi-arid areas vegetated with pine-oak, oak-juniper, piñon pine, ponderosa pine, or agave; it also inhabits mesquite grasslands and rocky desert flats and canyons. Seeks refuge under rock crevices, animal burrows, or under stumps. [13]	Wildland fires pose a low potential adverse effect to this species because its habitat is mainly rocky areas and it seeks refuge in rock crevices.
Mountain short-horned lizard (*Phrynosoma hernandesi hernandesi*)	—	—	T	Species occurs on McGregor Range; subspecies has not been recorded on Fort Bliss. Inhabits semi-arid plains to high mountains; usually in open, shrubby, or openly wooded areas with sparse vegetation at ground level; soil may vary from rocky to sandy. [14]	Wildland fires pose low potential adverse effects to this species because its habitat is mainly rocky areas and it seeks refuge in rock crevices.

Reptiles					
Texas horned lizard (*Phrynosoma cornutum*)	—	—	T	Widespread across Fort Bliss, this species Inhabits open areas with sparse vegetation (deserts, prairies, playa edges, bajadas, dunes, foothills) with grass, cactus or scattered brush or scrubby trees. Soils may vary in texture from sandy to rocky. [15]	Wildland fires pose low potential adverse effects to this species because habitat is sparsely vegetated and it seeks refuge below ground or in rocky crevices.
Texas lyre snake (*Trimorphodon vilkinsoni*)	—	—	T	Documented on Castner Range in the Franklin Mountains. Found in arid to semi-arid, dry, rocky terrain of mountains, canyons, hills, rocky outcrops, fissured bluffs, and arroyos, with ocotillo, catclaw mimosa, white thorn, yucca, lechuguilla, prickly pear, cholla, and desert grasses or riparian vegetation (e.g., ash, hackberry, juniper, oak), sometimes on desert flats dominated by creosote bush or in shallow canyons with mesquite. [16]	Wildland fires pose low potential adverse effects to this species because its habitat is mainly rocky areas and it seeks refuge in rock crevices.

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Birds					
Baird's sparrow (*Ammodramus bairdii*)	—	T	SGCN	Migrates through and winters on Fort Bliss, primarily on Otero Mesa. Stable native or tame grasslands, lightly to moderately grazed pastures, occasionally inhabits plant covered, dry wetland basins, wet meadows, and dense stands of grass, moderately deep litter, vegetation height of >20cm but <100 cm . Moderately high, but patchy, forbs coverage; patchy grass and litter cover; and little woody vegetation. [17]	Wildland fires pose moderate potential adverse effects to this species because of habitat requirements of dense, flammable grasses. Prescribed fires can potentially improve habitat by reducing litter and woody shrub encroachment. This species will not inhabit prairie lands where woody vegetation has invaded grasslands. [18,19]
Bald eagle (*Haliaeetus leucocephalus*)	T	T	—	Forages on northern McGregor Range in the Sacramento Mountains. Typically found in areas near large water bodies such as inland lakes and rivers. Habitat selection depends greatly on prey availability and availability of tall trees. Nests in the canopy of tall, coniferous trees, surrounded by smaller trees. [20]	Wildfires pose a moderate potential adverse effect because high-intensity wildfires can destroy old-growth forests which can reduce populations. Low-intensity prescribed fires can be beneficial by reducing litter build up, controlling disease, removing less vigorous species, and allowing more vigorous trees to reach maturity. [20]
Bell's vireo (*Vireo bellii*)	—	T	—	Found occasionally on Fort Bliss in dense low shrubby vegetation, generally early succession stages in riparian areas, young second-growth forest or woodland, scrub oak, and mesquite brush lands, often near water in arid regions.[21]	Wildland fires could pose moderate potential adverse effects due to the high fuel loads found within its habitat.
Costa's hummingbird (*Calypte costae*)	--	T	—	Uncommon migrant on Fort Bliss. Inhabits desert, semi arid desert, arid brushy foothills and chaparral, in migration and in winter also found in adjacent mountains and in open meadows and gardens.[22]	Wildland fires pose low potential adverse effects to this species. Wildfires in arroyo-riparian habitats could indirectly effect local populations because of damage to food sources and nesting trees. [23, 24]

Birds					
Ferruginous hawk (*Buteo regalis*)	—	SGCN	SGCN	Occupies a variety of habitat types including open grasslands, shrub-steppe, croplands, desert, and the periphery of piñon, juniper woodlands. Similar habitat is sought for breeding, smaller scale features are important for successful reproduction [25]	Wildfires pose moderate adverse effects to this species. Fire effect studies show that fires destroy potential breeding habitat by destroying nest trees. Severe wildfires or fire suppression efforts during nesting season may cause hawks to abandon nests. Prescribed fires can be beneficial to hawk populations by providing an increased prey base. [25]
Gray vireo (*Vireo vicinior*)	--	T	—	Nests in the Organ Mountains. Inhabits desert shrub land, chaparral, coniferous, hardwood woodlands, including hot, semi-arid, shrubby habitats, especially mesquite and brushy piñon-juniper woodlands; oak-juniper woodlands. Nests where dense understory vegetation is present. [26]	Wildland fires pose moderate adverse effects to this species due to the high fuel loads found within preferred habitats.
Interior least tern (*Sterna antillarum athalossos*)	--	E	--	Not known to occur on Fort Bliss. Open habitat, narrow beaches, open, bare or sparsely vegetated sand, shell, sandbars, islands, and salt flats associated with rivers and reservoirs. [27]	Wildland fires pose low potential adverse effects due to low fuel loads of preferred habitat.
Loggerhead shrike (*Lanius ludovicianus*)	—	S	—	Winter and breeding bird from Otero Mesa and Tularosa Basin. Inhabits deserts, sagebrush, grasslands, and pastures, native and non-native grasslands with scattering of bushes, trees and bare ground. [28]	Wildland fires pose an adverse effect if nesting or large areas of winter grassland habitat are burned. Fires studies show a decline in breeding populations after wildfires due to decreases in habitat. [29]

Birds					
Mexican spotted owl (*Strix occidentalis lucida*)	T	S	T	Very rare on Fort Bliss. Inhabits seral forests or rocky canyon habitats. Nesting and roosting habitats consist of both forested and rocky-canyon habitats; mature or old-growth stands with complex structure, typically uneven-aged, multistoried, high canopy cover. In parts of its range, occupies a variety of steep, rocky-canyon habitats with a variety of desert scrub and riparian vegetation communities and prominent vertical cliffs. [30]	Wildland fires pose potentially adverse effects due to high fuel loads within its habitat, fires can reduce habitat quality. Fire studies show varied effects on owl populations, wildfires that are more intense having detrimental effects. Stand-replacement wildfires are likelier to have greater negative impacts than low-to-moderate-severity wildfires. [31] Low intensity prescribed fires have been shown to not disturb non-breeding or breeding populations. [32]
Mountain plover (*Charadrius montanus*)	—	—	SGCN	Found on Otero Mesa. Inhabits disturbed-prairie or semi-desert. Nests in disturbed grassland habitats including areas formerly occupied by bison and prairie dogs. Nests in disturbed areas, native short and mixed grass prairie, and semi-desert habitats generally dominated by saltbush or sagebrush, prefers heavily grazed areas.[33,34]	Wildland fires pose potential adverse effects to this species due to fuel loads in grasslands. Low to moderate intensity wildfires or prescribed fires can be beneficial to species based on its preference for disturbed and open habitats and because they increase prey availability. [37]
Aplomado falcon (*Falco femoralis*)	E	E	E	A few sightings of transient birds on Otero Mesa. Inhabits open terrain with scattered trees or shrubs, riparian woodlands in open grasslands, and desert grasslands with scattered mesquite and yucca. [35]	Wildland fires pose low potential for adverse effects to this species due to its mobile and transitory nature. Wildland fires could benefit this species by increasing prey availability.

Birds					
Northern goshawk (*Accipiter gentilis*)	--	S	—	An uncommon migrant on Fort Bliss. Inhabits a variety of forest types; coniferous and deciduous forests, nests in mature forests consisting of mature trees with intermediate canopy coverage and small open areas within forests for foraging. [36, 37]	Wildland fires pose low potential for adverse effects to this species due to its mobile and transitory nature. Wildland fires could benefit this species by increasing prey availability. Fire effects on raptor populations suggests that direct mortality from fire is rare, it is suspected that higher death rates might occur during breeding seasons because nestlings are unable to flee fires. [37,38]
Peregrine falcon (*Falco peregrinus anatum*)	--	T	T	Migrant that nests occasionally in the mountains of Fort Bliss. Shows no preference for specific ecological communities but prefers hunting grounds to be open or partially wooded ranging from coastal areas, plains, grasslands, shrublands, heaths, steppes, forests, and deserts. Utilizes riparian areas within desert habitats but not exclusively. Does not typically nest in areas receiving <10 in of annual rainfall. Eyries are made typically on open cliff ledges or in shallow caves. [39, 40]	Wildland fires pose low potential for adverse effects to this species due to their constant mobility. Fire-related mortality of adult raptors is likely low. Nestling mortality is potentially higher but risk of fire reaching eyries on cliff faces and rock outcrops is low. Indirectly, wildfire can affect prey base by destroying trees. Prescribed fire activities can help deter catastrophic fires but fire studies have shown that any human activities near an eyrie should be done after nestlings have fledged.[41]
Southwestern willow flycatcher (*Empidonax trailii extimus*)	E	E	—	Very rare, but occasional migrant on McGregor Range. Inhabits dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes, reservoirs. Wintering habitats include brushy savanna edges, second growth shrubby clearings and pastures, woodlands near water. [42]	Wildland fires pose potential adverse effects due to their preferred habitat and nesting sites being in trees and shrubby areas. High intensity wildfires can destroy habitat and nests. Low intensity prescribed fires that reduce ladder fuels in the understory has shown to be beneficial in preventing or limiting catastrophic fire damage to their habitat. [42]

Birds					
Sprague's's Pipit (*Anthus spragueii*)	C	—	—	Migrant and winter resident on Otero Mesa. Inhabits native prairie grasslands of intermediate height and sparse to intermediate vegetation density. Will use exotic grasslands but are more abundant in native prairie grasslands.[43]	Wildland fires pose potential adverse effects to this species because habitat preference is grasslands with intermediate litter depth. Prescribed burning in late spring after birds have migrated north and prior to monsoon onset has shown to be beneficial to some populations. [43]
Western burrowing owl (*Athene cunicularia hypugaea*)	—	SGCN	SGCN	Occurs throughout Fort Bliss in all desert shrub land and grassland vegetative communities and other open areas such as agricultural areas, old fields, extensive forest clearings, airports, golf courses, and spacious residential zones. [44, 45]	Wildland fires pose a low potential for adverse effects to this species but high intensity wildfires can alter vegetation which may affect prey base. Frequent low intensity prescribed fires can potentially improve habitats by reducing plant height and cover.[46]
White-faced ibis (*Plegadis chihi*)	—	SGCN	T	Regular migrant at sewage lagoons, playas and earthen tanks on McGregor Range. Inhabits freshwater wetlands, especially cattail, bulrush marshes, feeds in flooded hay meadows, agricultural fields, and estuarine wetlands. Seasonal habitats include wet mudflats, wet meadows, and shallow emergent marshes. [47]	Wildland fires pose low potential for adverse effects to this species due to habitat preferences of wetlands and marshes.

Birds					
Yellow-billed cuckoo (*Coccyzus americanus*)	—	SGCN	SC	An uncommon migrant on Fort Bliss. In the desert Southwest, nesting habitat is invariably riparian woodlands, particularly those with intact understory, occasionally nesting in orchards and other riparian-associated woodlands. Nests typically placed in dense patches of broad-leaved deciduous trees usually with relatively thick understory. In western portions of its range, its nests are often situated close to water, likely because of lack of dense vegetation away from water. [48, 49]	Wildland fires pose potentially adverse effects to this species due to high fuel loads in its preferred habitats of dense, riparian vegetation. On Fort Bliss, there is very little potential to adversely affect this species due to the lack of suitable habitat.
Zone-tailed hawk (*Buteo albonotatus*)	—	—	T	An uncommon migrant on Fort Bliss. Habitat ranges from open to forested areas, preferring areas with water and rugged topography with some forest component. It nests in large trees or on cliffs situated in riparian woodlands or forested canyons. Breeding habitats include montane forest within or near steep-walled canyons and with extensive cliffs, groves of mature riparian trees, usually cottonwoods.[50, 51]	Wildland fires pose a potential adverse effect because its preferred habitat is wooded areas, where wildfires can potentially destroy nests. [50]

Mammals					
Arizona black-tailed prairie dog (*Cynomys ludovicianus arizonensis*)	__	S	SGCN	Occurs on Otero Mesa. Inhabits grasslands, including short- and mixed-grass prairie, sagebrush steppe, and desert grasslands, dominated by buffalo grass, blue grama, and/or western wheat grass. [52]	Wildland fires pose low potential adverse effects. There is no evidence of direct mortality due to wildfire; it is assumed that burrows protect them. [56] Wildfire might benefit prairie colony expansion if it removes woody shrubs and other visual obstructions. Prescribed burning during the spring followed by mechanical brush removal resulted in colony expansion into treated areas. [53]
Organ Mountains Colorado chipmunk (*Tamias quadrivittatus australis*)	__	T	—	Occurs in the Organ Mountains. Inhabits ponderosa pine, deciduous oaks, juniper, apache plume and sumac, mountain mahogany, gray oak, wavyleaf oak. [54]	Prescribed fires can benefit habitat, catastrophic wildfires potentially destroy habitat. During monitoring surveys, chipmunks were associated with burned habitats. Prescribed burns of areas inhabited by Organ Mountain Colorado chipmunks may be beneficial to help avoid destructive wildfires. [54]
Spotted Bat *(Euderma maculatum)*	__	T	SGCN	Found on Fort Bliss. Habitat ranges from desert shrub to coniferous forest. Riparian habitats consisting of creosote bush, mesquite, tamarisk, desert willow, baccaris, arrow weed. Douglas fir, subalpine meadows, ponderosa pine, white-fir, and aspen. Roosts in limestone cliffs and ridges. [55, 56]	Wildland fires pose potential adverse effects to this species because they are sensitive to disturbance. Prescribed fires can be potentially beneficial if avoiding 2.5 km radius of known roosts. Low intensity prescribed burns can help to conserve foraging habitats. [57]

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7.8 Appendix H Minimum Impact Suppression Tactics (MIST) Guidelines

IMPLEMENTATION

Keep this question in mind: What creates the greater impact, the fire suppression effort or the fire?

SAFETY

Apply principles of LCES to all planned actions.

Constantly review and apply the 18 Watch out Situations and 10 Standard Firefighting Orders.

Be particularly cautious with:

- Burning snags allowed to burn.
- Burning or partially burned live and dead trees.
- Unburned fuel between you and the fire.

Escape Routes and Safety Zones

In any situation, the best escape routes and safety zones are those that already exist. Identifying natural openings, existing roads and trails and taking advantage of safe black will always be a preferred tactic compatible with MIST. If safety zones must be created, follow guidelines similar to those for helispot construction.

Constructed escape routes and safety zones in heavier fuels will have a greater impact, be more time consuming, labor intensive, and ultimately less safe.

GENERAL CONSIDERATIONS

Consider the potential for introduction of noxious weeds and mitigate by removing weed seed from vehicles, personal gear, cargo nets, etc. Equipment should be washed down before leaving the incident in order to prevent the spread of noxious weeds.

Consider impacts to riparian areas when setting up water handling operations.

- Use longer draft hoses to place pumps out of sensitive riparian areas.
- Plan travel routes for filling bladder bags to avoid sensitive riparian areas.

Ensure adequate spill containment at fuel transfer sites and pump locations. Stage spill containment kits at the incident.

LINE CONSTRUCTION PHASE

Select tactics, tools, and equipment that least impact the environment.

Give serious consideration to use of water or foam as a fire lining tactic.

Use alternative mechanized equipment such as motor patrols, disks, rubber-tired skidders, etc., when available and appropriate rather than dozers when constructing mechanical line.

When constructed fireline is necessary, use only the width and depth to prevent the fires spread.

Allow fire to burn to natural barriers and existing roads and trails.

Monitor and patrol firelines to ensure continued effectiveness.

Ground Fuels

Use cold-trail, wet line, or combination when appropriate. If constructed fireline is necessary, use minimum width and depth to stop fire spread.

Consider the use of fireline explosives (FLE) for line construction and snag falling to create more natural appearing firelines and stumps.

Burn out and use low impact tools like swatters and gunny sacks.

Minimize bucking to establish fireline: preferably move or roll downed material out of the intended constructed fireline area. If moving or rolling out is not possible, or the downed log/bole is already on fire, build line around it and let the material be consumed.

Aerial Fuels–brush, trees, and snags

Adjacent to fireline: limb only enough to prevent additional fire spread.

Inside fireline: remove or limb only those fuels which would have potential to spread fire outside the fireline.

Cut brush or small trees necessary for fireline construction flush to the ground.

Trees, burned trees, and snags:

- Minimize cutting of trees, burned trees, and snags.
- Do not cut live trees unless it is determined they will cause fire spread across the fireline or seriously endanger workers. Cut stumps flush with the ground.
- Scrape around tree bases near fireline if hot and likely to cause fire spread.
- Identify hazard trees with flagging, glow sticks, or a lookout.

When using indirect attack:

- Do not fall snags on the intended unburned side of the constructed fireline unless they are an obvious safety hazard to crews.
- Fall only those snags on the intended burn-out side of the line that would reach the fireline should they burn and fall over.

MOPUP PHASE

Consider using “hot-spot” detection devices along perimeter (aerial or handheld).

Use extensive cold-trailing to detect hot areas.

Cold-trail charred logs near fireline: do minimal scraping or tool scarring. Restrict spading to hot areas near fireline.

Minimize bucking of logs to check for hot spots or extinguish fire: preferably roll the logs and extinguish the fire.

When ground is cool return logs to original position after checking.

Refrain from piling: burned/partially burned fuels that were moved should be arranged in natural positions as much as possible.

Consider allowing larger logs near the fireline to burn out instead of bucking into manageable lengths. Use a lever, etc., to move large logs.

Use gravity socks in stream sources and/or combination of water blivets and fold-a-tanks to minimize impacts to streams.

Personnel should avoid using rehabilitated firelines as travel corridors whenever possible because of potential soil compaction and possible detrimental impacts to rehabilitation work.

Avoid use of non-native materials for sediment traps in streams.

Aerial fuels (brush, small trees, and limbs): remove or limb only those fuels which if ignited have potential to spread fire outside the fireline.

Burning trees and snags:

- Be particularly cautious when working near snags. *(*Ensure adequate safety measures are communicated.)
- The first consideration is to allow a burning tree/snag to burn itself out or down.
- Identify hazard trees with flagging, glow sticks or a lookout.
- If there is a serious threat of spreading firebrands, extinguish with water or dirt.
- Consider felling by blasting, if available.

AVIATION MANAGEMENT

Minimize the impacts of air operations by incorporating MIST in conjunction with standard aviation risk assessment processes.

Possible aviation-related impacts include:

- Damage to soils and vegetation resulting from heavy vehicle traffic, noxious weed transport, and/or extensive modification of landing sites.
- Impacts to soil, fish and wildlife habitat, and water quality from hazardous material spills.
- Chemical contamination from use of retardant and foam agents.
- Biological contamination to water sources; e.g., whirling disease.
- Safety and noise issues associated with operations in proximity to populated areas, livestock interests, wildland-urban interface, and incident camps and staging areas.

Helispot Planning

- When planning for helispots, determine the primary function of each helispot; e.g., crew transport or logistical support.
- Consider using long-line remote hook in lieu of constructing a helispot.
- Consult Resource Advisors in the selection and construction of helispots during incident planning.
- Estimate the amount and type of use a helispot will receive and adapt features as needed.

Balance aircraft size and efficiency against the impacts of helispot construction.

Use natural openings as much as possible. If tree felling is necessary, avoid high visitor-use locations unless the modifications can be rehabilitated. Fall, buck, and limb only what is necessary to achieve a safe and practical operating space.

Retardant, Foam, and Water Bucket Use

Assess risks to sensitive watersheds from chemical retardants and foam. Communicate specific drop zones to air attack and pilots, including areas to be avoided.

Fire managers should weigh use of retardant with the probability of success by unsupported ground force. Retardant may be considered for sensitive areas when benefits

will exceed the overall impact. This decision must take into account values at risk and consequences of expanded fire response and impact on the land.
Consider biological and/or chemical contamination impacts when transporting water.
Limited water sources expended during aerial suppression efforts should be replaced.
Consult Resource Advisors prior to extended water use beyond initial attack.

LOGISTICS, CAMP SITES, AND PERSONAL CONDUCT

Consider impacts on present and future visitors.
Provide portable toilets at areas where crews are staged.
Good campsites are found, not made. If existing campsites are not available, select campsites not likely to be observed by visitors.
Select impact-resistant sites such as rocky or sandy soil, or openings within heavy timber.
Avoid camping in meadows and along streams or shores.
When there is a small group, try to disperse use. In the case of larger camps, concentrate, mitigate, and rehabilitate.
Coordinate the layout of the camp components carefully from the start. Help to define cooking, sleeping, latrine, and water supplies areas.
Prepare bedding and campfire sites with minimal disturbance to vegetation and ground.
Personal Sanitation:

- Designate a common area for personnel to wash up. Provide fresh water and biodegradable soap.
- Do not introduce soap, shampoo, or other chemicals into waterways.
- Dispose of wastewater at least 200 feet from water sources.
- Toilet sites should be located a minimum of 200 feet from water sources. Holes should be dug 6-8 inches deep.
- If more than one crew is camped at a site, strongly consider portable toilets and remove waste.

Store food so that it is not accessible to wildlife, away from camp and in animal resistant containers.
Do not let garbage and food scraps accumulate in camp.
Monitor travel routes for damage and mitigate by:

- Dispersing on alternate routes or
- Concentrating travel on one route and rehabilitate at end of use.

If a campfire is built, leave no trace of it and avoid using rock rings. Use dead and down wood for the fire and scatter any unused firewood. Do not burn plastics or metal.

- Consider using a fire pan or “mound fire” in sensitive areas.

Use “scrim” (porous ground cloth) to protect high traffic areas from trampling.

RESTORATION AND REHABILITATION

Firelines:

- After fire spread has stopped and lines are secured, fill in deep and wide firelines and cup trenches and obliterate any berms. The berm material should be spread back into the fireline or re-contoured to the fireline.

- Be careful not to reignite or spread hot material hidden in berms across the fireline.
- Restore drainages by removing fill or dams, reestablish crossings and return to natural configuration.
- Use waterbars only when necessary to prevent erosion or use woody material to act as sediment dams. Waterbars should only be used on steep slopes and only when necessary. General guidelines for waterbar spacing are listed in the table below. However, it is important to note that improper construction and inappropriate placement of waterbars can create excessive erosion.

Maximum Waterbar Spacing General Guidelines

Percent Grade	Maximum Spacing (Feet)
< 9	400
10 – 15	200
15 – 25	100
25 +	50

- Ensure stumps are cut flush with ground.
- Camouflage cut stumps by flush-cutting, chopping, covering, or using FLE to create more natural appearing stumps.
- Any trees or large size brush cut during fireline construction should be scattered to appear natural.
- Discourage the use of newly created firelines and trails by blocking with brush, limbs, poles, and logs in a naturally appearing arrangement.

Camps:

- Restore campsite to natural conditions.
- Scatter fireplace rocks and charcoal from fire, cover fire ring with soil, and blend area with natural cover.

Pack out all garbage and dispose of in an approved facility.

General:

- Remove all signs of human activity.
- Remove all flagging.
- Restore helicopter landing sites.
- Fill in and cover latrine sites.

Walk through adjacent undisturbed areas and take a look at your rehabilitation efforts to determine your success at returning the area to as natural a state as possible.

7.9 Appendix I 1AD CAB Helicopter Usage on Fort Bliss Wildfires

1 AD CAB helicopters will not automatically respond to Fort Bliss wildfires. Aerial assets are ordered by the IC onsite or by the Fort Bliss WFPM. The request for helicopters to aid in wildfire suppression operations on Fort Bliss should be based on a risk analysis of the threat to human resources and/or structures, the potential for a wildfire to escape Fort Bliss boundaries and the potential exposure of ground-based firefighters to multiple risk factors including steep slopes, ingress/egress, escape routes, safety zone accessibility and wildfire entrapment. Helicopter bucket support will be especially beneficial for suppressing wildfires located in remote, inaccessible terrain such as that found in the Organ and Sacramento Mountains.

Helicopters from the 1st Armored Division Combat Aviation Brigade (CAB), equipped with “bambi” buckets can currently deliver thousands of gallons of water for the purposes of extinguishing wildfires located on Fort Bliss. An estimated 790,000 gallon storage tank with an open top to allow for helicopter bucket fill has been built on Doña Ana Range. It is located just east of the junction of NM 213 (War Road) and the southern terminus of Firing Line Road (See Table 4.5-2 for location in MGRS). 1 AD CAB helicopters have begun training with the “bambi” buckets at the Doña Ana dipsite. Currently the CAB has two 2,000 gallon collapsible “bambi” buckets for the CH-47s (Chinooks) and four 660 gallon ‘bambi’ buckets for the UH-60s (Blackhawks).

A “bambi” bucket connected directly to the helicopter belly cargo hook works well for dipping out of standing, open water. It is best for extinguishing flames from wildfires when the helicopter is able to do a passing or trailing drop at 10-15 knots forward air speed. The bucket should be a minimum of 30’ above the fire to keep rotor wash from fanning the flames. Helicopters should not come to a hover over a wildfire before delivering a load of water due to the increased rotor wash which accomplishes more fanning of the flames.

Interagency helicopter pilot experience qualifications for flying contract helicopters on federal wildland fires are listed in Table 4.5-1 (Forest Service Handbook 5709.16 2009) for reference.

Table 0-1 Interagency Flight Hour Requirements for Contracted Helicopter Pilots

	PIC	Make and Model	Model in the last 12 months	Weight class of helicopter* “small” “medium” “heavy”	Turbine engine time	mountainous terrain**	mountainous terrain in make and model
Helicopter flight hour requirements for contract pilots to meet federal wildland firefighting certification	**1,500 hrs**	**50 hrs.**	**10 hrs.**	**100 hrs.**	**100 hrs.**	**200 hrs.**	**10 hrs.**

*"Small" helicopter is defined as having a gross weight of 7,000 pounds or less, a "Medium" helicopter has a gross weight from 7,000-12,500 pounds and a "Heavy" helicopter has a gross weight of greater than 12,500 pounds.
***Mountainous terrain experience is defined as: Experience in maneuvering a helicopter at more than 7,000 feet mean sea level (MSL) altitude including numerous takeoffs and landings in situations indicative to mountainous terrain. This terrain consists of abrupt, rapidly rising terrain resulting in a high land mass projecting above its surroundings, wherein complex structures in which folding, faulting, and igneous activity have taken place. These mountainous areas produce vertical mountain winds and turbulence associated with mountain waves, producing abrupt changes in wind direction often resulting in upflowing or downflowing air currents (FSH 5709.16 2009).*

An excellent resource for aviation users and anyone involved in helicopter operations within the wildland fire environment is the Interagency Helicopter Operations Guide (IHOG). The IHOG and the IHOG Supplemental Forms Package are available for viewing and downloading at: http://www.nifc.gov/aviation/av_ref_ihog.html.

An SOP for helicopter use on wildfires on Fort Bliss will be developed and contain the following:

1. 1 AD CAB helicopters are considered an initial attack asset for Fort Bliss use only. Fort Bliss use of an Interagency Incident Management Team for extended attack wildfires means that aerial resources from outside agencies will be brought in to fight the wildfire. 1 AD CAB helicopters will return to normal duties when these other aerial assets are brought in.
2. Outline of the process for how military helicopters are to be dispatched for wildfire assignments on the FBTC including:

   A. An order for helicopter support on a wildfire should come from the onsite Incident Commander (IC) to the Fort Bliss FES Dispatch.
      a. The order should include which type of helicopter is needed (Chinook or Blackhawk), b. who the helicopter should report to,
      c. where the helicopter should go first (MGRS coordinates for the location needs to be provided with the request).
   B. The request for helicopter support is routed from the wildfire to Fort Bliss FES Dispatch who sends request to 1AD CAB:
      a. FES Dispatch should provide the information in A. above to the CAB, as well as:
      b. the radio frequency that the ground forces on the incident are using,
      c. any fire information that would be pertinent (fuels burning, wildfire size, weather information).
   C. 1 AD CAB helicopter should provide to FES Dispatch:
      a. the call sign of the helicopter being dispatched,
      b. estimated time enroute to incident,

c. souls on board and equipment on board (with or without bucket hooked to external cargo hook),

d. radio frequencies, if pre-assigned, for air-to-ground and air-to-air communications.

D. 1 AD CAB helicopter, once on scene should recon the fire area prior to filling the water bucket for the first time:

a. to look for hazards

b. to locate the fire and firefighters,

c. determine the best approach and departure paths,

d. establish communications with the ground forces who may be working the incident.

E. Fill bucket at the Doña Ana helicopter dipsite.

3. The locations and numbers of helicopter accessories, such as buckets, cargo nets, leadlines, swivels and long lines.
4. The location and description of all potential water sources.
5. Pre-established air-to-ground and air-to-air radio frequencies.
6. Safety protocols for external loads and water delivery.
7. Safety protocols for working with ground resources.
8. Training protocol that includes practice with buckets and long lead lines. Forest Service Handbook 5709.16 requirement for contract pilots is a minimum of 10 hours for longline vertical reference (VTR) experience. IHOG guidelines state that if a longline is utilized for water bucket operations then the longline shall be a minimum of 50 feet in length to reduce the risk of bucket or long line entanglement with the tail rotor or tail boom. Pilots utilizing long lines with water buckets must be approved for VTR operations (IHOG 2009). Pilots that are not approved for VTR operations must attach the bucket directly to the belly hook during water bucket operations (IHOG 2009).

7.10 Appendix J Wildland/Urban Interface/Intermix (WUI) Wildfire Safety Considerations and Operations

(Excerpted from Firescope California, Wildland Urban Interface (WUI) Structure Defense, October 21, 2013)

INTRODUCTION

Wildland firefighting by itself is very challenging and adding structures and other improvements into the equation greatly increases the complexity. Over the last several decades an expansion of communities, homes and other improvements into wildland areas has created a significant challenge for the fire service agencies responsible for providing fire protection in those areas.

WUI fires often overtax the local fire agency resulting in the activation of mutual aid and automatic aid agreements to augment jurisdictional resources. Nearly every WUI fire includes responses from a variety of wildland and municipal fire agencies resulting in the need for clear text and common terminology among emergency responders. This appendix on WUI operations and structure defense is designed to provide common terminology and operating principles for responders. It also includes guidelines and checklists to complement and enhance first responders differing levels of training and experience.

This document describes tactical actions that emphasize firefighter safety during structure defense assignments. Successful WUI firefighting operations are accomplished by selecting sound strategies supported by effective tactical actions that keep firefighters safe, protect the public and minimize property loss.

Firefighters can prepare themselves for structure defense activities by developing a sound understanding of the wildland structure environment, fire behavior and forecasting, the Risk Management process, tactical terms and associated tactical actions. An understanding of all these components will allow firefighters to safely mitigate the fire's impact upon the values they are charged with protecting.

Over the past several decades there has been a growing trend of building homes and improvements in the Wildland Urban Interface (WUI) area. Wildland Urban Interface can be defined as a location where people and their development meet or are intermixed with wildland fuels. There are two different wildland urban conditions. They are:

• **Interface**– a condition where structures abut wildlands. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. There is a greater risk for house to house ignition in the interface.

• **Intermix**– a condition where structures are scattered throughout a wildland area. There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area.

- Each structure must be assessed independently
- Usually more complex to triage than an interface condition
- Usually more complex to defend than an interface condition

• Usually requires a higher ratio of engines to structures than an interface condition

DEFINITIONS

Safety Zone–A preplanned area of sufficient size and suitable location that is expected to protect fire personnel from known hazards without using fire shelters.

Temporary Refuge Area (TRA) – an identified area that firefighters can immediately take refuge for temporary shelter and short-term relief without using a fire shelter in the event that emergency egress to an established Safety Zone is compromised. Examples: lee side of structure, inside of structure, large lawn or parking area, cab of apparatus.

FIRE BEHAVIOR FORECASTING

Firefighter and public safety is the first priority in every fire management activity. Using the Standard Firefighting Orders, firefighters are guided to make a fire behavior prediction that considers the fire potential at the time of contact with the structure. If at any time risk to firefighters is determined to be too great, an alternative action should be selected.

It is important to remember that fire conditions can change very quickly, so constant observation and reassessment is necessary; the tactic selected may need to change. Tactical maneuver or agility is essential to ensure firefighter safety. Safety Zones should always be identified in the WUI environment in conjunction with a viable escape route; however, they may not always be immediately available. Often a Temporary Refuge Area (TRA) is more accessible in the WUI environment. A TRA will provide temporary shelter and short-term relief from approaching fire without the use of a fire shelter and allow the responders to develop an alternate plan to safely survive the increase in fire behavior..

FIRE BEHAVIOR/STRUCTURE DEFENSE SIZE-UP

Use standardized references to validate your fire behavior prediction:

• Incident Response Pocket Guide
• Lock up, Look Down, Look Around indicators
• Extreme Fire Behavior indicators (spotting, crowning, rate of spread)
• Know what the fire is doing at all times in order to maintain an accurate fire behavior prediction.
• Evaluate surrounding fuels for type, height, continuity, and conditions. Observe current burning activity in order to predict flame length and intensity.
• Consider local factors and fire history.
• Know current weather conditions and forecasts. Consider wind speed, direction, relative humidity, temperatures.
• Evaluate for wind shifts, micro-climates, weather indicators and hazards.
• Evaluate location of the structure and surrounding area. Is wind and slope in alignment with topography leading to the structure?
• Location of the structure on the slope; canyon bottom, mid-slope, or ridge top.
• Is the structure in or near a chute, chimney, saddle, or other topographic hazard?

STRUCTURE TRIAGE CATEGORIES

Not Threatened - Safety Zone and TRA's are present and construction features or defensible space make it unlikely that the structure will ignite during initial fire front contact.
Threatened Defensible - Safety Zone and TRA is present and construction features, lack of defensible space, or other challenges requires firefighters to implement structure protection tactics during fire front contact.
Threatened Non-Defensible - No Safety Zone and TRA are present. Structure has challenges that do not allow firefighters to commit to stay and protect the structure.

STRUCTURE TRIAGE GUIDELINES

Factors to consider during structure triage:

- Safety Zones should be established and made available based upon predicted fire behavior.
- Temporary Refuge Areas (TRA) should be identified in the event that emergency egress to an established Safety Zone is compromised.
- Adequate space to park your apparatus safely based upon predicted fire behavior
- Adequate lookout and communication capability
- Proximity of the fuels and predicted flame length to structure, no defensible space
- Position on slope relative to fire spread, avoid narrow canyon bottoms, mid-slopes with fire below, or narrow ridges near chimneys and saddles
- Fire behavior and intensity (the greater the intensity, the wider the defensible space needed)
- Narrow roads, unknown bridge limits, and septic tank locations
- Ornamental plants and combustible debris next to the structure
- Open vents, eaves, decks, and other ember traps
- Power lines
- Limited water supply flow rates and gpm output
- Property owners that remain on site
- Flammability of roof and siding (wood roof and siding, vinyl siding, along with inadequate defensible space may make structure impossible to protect)
- Timing and available resources (not having time to position resources or lack of resources to protect structure)

STRUCTURE DEFENSE GUIDELINES

Personal Protective Equipment (PPE):

- Structure defense tactics can be undertaken utilizing standard wildland PPE.
- If the structure becomes involved in fire, and a decision is made to extinguish the fire, utilize the appropriate Structure Fire PPE including SCBA's as required.
- **DO NOT** enter a structure unless you are trained, equipped, and authorized. If safe, a structure can be used as a temporary refuge.
- Supervisors must keep in close communication with those they supervise and adjoining forces in the area.

Equipment Placement:

• Identify escape routes and Safety Zones and TRA's and make them known to all crew members
• STAY MOBILE and wear all of your PPE
• Back equipment in for quick escape
• Park in a cleared area (watch for overhead hazards)
• Protect your equipment (park behind structure, placing structure between equipment and fire front; be aware of spot fires occurring behind you)
• Watch for hazards (drop-offs, pot holes, above-ground fuel storage, chemicals, and septic tanks)
• Keep egress route clear
• Have an engine/crew protection line charged and readily available
• Avoid long hose lays
• Try to keep sight contact with all crew members

Water Use Guidelines:

• Keep at least 100 gallons of water reserve in your tank
• Top off tank at every opportunity, use garden hose(s)
• Draft from swimming pool, hot tub, lake, stream and fishpond
• Stay mobile. Be aware that hydrants may not always work if system is electric powered and power is lost in the area
• Conserve water, avoid wetting down an area well before the fire front arrival
• Apply water only if it controls fire spread or significantly reduces heating of structure being protected
• Keep fire out of the heavier fuels
• Extinguish fire at its lowest intensity, not when it is flaring up
• Knock down fire in the lighter fuels
• Have enough water to last duration of main heat wave and to protect crew

Class A Foam/Gel Use Guidelines:

• Direct Attack with Class A Foam – apply to base of flame
• Indirect Attack with Class A Foam – lay out wet line and burn out
• Apply Class A Foam to structure (roof and siding) 10-15 minutes before fire arrives, (reapply as necessary)
• Foam or gel the structure and the vegetation immediately surrounding the structure

Preparing Structure:

• Determine if residents are home. If residents remain on scene, advise them to use structure as refuge if it is safe to do.
• For roof access, place owner's ladder at a corner of structure on side with least fire threat and away from power line drop zone.
• Clear area around above-ground fuel tank and shut off tank
• Place combustible outside furniture inside the structure
• Close windows and doors, including garage, leaving them unlocked
• Remove combustibles immediately next to the structure and scatter fire wood
• Construct fire line around out-buildings, power poles and fuel tanks
• Remove vegetation from the immediate area of the structure
• Have garden hose(s) charged and place strategically around structure for immediate use
• AS A LAST RESORT, YOU MAY NEED TO USE THE STRUCTURE AS A TEMPORARY REFUGE

STRUCTURE DEFENSE STRATEGIES

The Incident Commander (IC) or Operations Section Chief (when assigned) is responsible for establishing the strategy. The strategy should reflect a "general" plan that is broad in scope and provides direction for accomplishing the incident objectives. For example, the strategy for protecting structures on the right flank of a wildland urban interface (WUI) fire is to keep the fire away from the homes using a coordinated direct attack with aircraft, dozers and crews. At the same time, the strategy for controlling the left flank on the same fire is to develop an indirect attack, utilizing resources to burn out along a series of small dirt roads and create a line that will stop the fire from spreading. The strategy must reflect a realistic approach for meeting the objectives for all portions of the fire.

The strategy must take into consideration the numbers and types of resources necessary to accomplish the incident objectives and the reflex time it will take to have them in position. A strategy that requires a large number of resources to execute the plan will fail if the needed resources cannot arrive in a timely fashion.

The strategy is also subject to change due to changes in weather, fire behavior, resource availability and any change to the objectives. For example, firefighters planning to burn out from a road system a mile from the fire front may be forced to change to a direct suppression strategy if a forecast calling for cool weather with accompanying moisture is predicted to arrive before the burnout can be executed.

STRUCTURE PROTECTION TACTICS

Where the strategy gives firefighters a general plan, tactics are the specific actions firefighters will take to accomplish the incident objectives. The choice of which tactic to use can come in the form of direction from the IC or the Operations Section Chief or it may be a decision made by the Division/Group Supervisor.

The chosen tactical action must be capable of stopping the advance of the fire or prevent the fire from damaging property and do so without incurring injuries to firefighting personnel. This means that when choosing a tactical action or making a tactical plan it is very important to know what the fire behavior will be at the time firefighters engage the fire.

Making accurate fire behavior predictions in advance of the fire's arrival is the wildland firefighter's greatest challenge. Accurate predictions are difficult to make with absolute certainty and at the same time is the crux for determining if a tactical measure will be effective and safe.

Recognizing that there is always the potential for error in our fire behavior prediction means that we must compensate for the uncertainties by having alternative actions built into the plan. The key point here is to never get locked into a single plan of action.

TACTICAL MANEUVER

Tactical maneuver implies movement or purposeful reaction to change. Tactical maneuver builds *agility* into a tactical plan by allowing resources to work and move around in a hazardous environment without injury, while remaining effective. Tactical maneuver is most effective when potential changes to the primary plan have been identified and fire fighter's reactions to those changes are planned out.

Firefighters must be prepared to utilize tactical maneuver when changing from structure defense mode (defensive) to suppression mode (offensive) when fire behavior allows. It is imperative to take advantage of situations that allow for firefighters to take perimeter control actions and suppress the fire.

Tactical planning must be developed in conjunction with anticipated changes in the fire environment, or fire behavior. Tactical maneuver (*agility*) is essential to ensure fire fighter safety since legitimate Safety Zones are not always immediately present in the WUI.

Firefighters should focus on *agile tactical solutions* to unanticipated changes as opposed to a rigid and inflexible siege approach. It is imperative that contingency planning be part of every tactical plan. The tactic selected may need to change to compensate for a change in the fire's behavior. Always have a way out!

Tactical maneuver can be an offensive or defensive action. Be prepared to move decisively during lulls in fire activity or take shelter in Temporary Refuge Areas or Safety Zones when the fire is active. Examples of tactical maneuver would be an engine crew going from one structure to another, moving with the fire, or staying behind a house when the fire is hitting hard and moving into full suppression mode when the fire subsides. This requires a continuous assessment of the fire and it's potential. Crews must continually identify Temporary Refuge Areas and Escape Routes to Safety Zones.

STRUCTURE DEFENSE TACTICAL ACTIONS

After making a fire behavior forecast and triaging the assigned structures, responders must now implement the necessary tactics to defend the structure from the advancing fire front. Supervisors must keep in close communication with those they supervise and adjoining forces in the area. The following are the seven tactical actions available to structure defense resources:

CHECK AND GO- a rapid evaluation to check for occupants requiring removal or rescue:

- Structure Triage Category – Threatened Non-Defensible
- This tactic is most appropriate when there is no Safety Zone or TRA present and the forecasted fire spread, intensity, and the projected impact time of the fire front prohibit resources from taking preparation action to protect the structure.
- Complete a rapid evaluation to check for occupants at a structure, evaluate life threat and to assist in evacuation
- Used when fire spread, intensity, lack of time or inadequate defensible space prohibit firefighting resources from safely taking action to protect the home when the fire front arrives
- Evaluate the structure for follow up action when additional resources become available, the fire front passes or fire behavior intensity is reduced

PREP AND GO - implies that some preparation of the structure may be safely completed prior to resources leaving the area:

- Structure Triage Category – Threatened Non-Defensible
- A tactic used when a Safety Zone and TRA are not present and/or when fire spread and intensity are too dangerous to stay in the area when the fire front arrives, but there is adequate time to prepare a structure for defense ahead of the fire front.

- Utilized for structures where potential fire intensity makes it too dangerous for fire resources to stay when the fire front arrives
- There is some time to prepare a structure ahead of the fire; resources should engage in rapid, prioritized fire protection preparations and foam the structure prior to leaving
- Resources should leave with adequate time to avoid the loss of Escape Routes
- Advise residents to leave and notify supervisors of any residents who choose to stay so that you can follow-up on their welfare after the fire front passes
- As with Check and Go, Prep and Go is well suited for engine strike teams and task forces.

PREP AND DEFEND - a tactic used when a Safety Zone and TRA are present and adequate time exists to safely prepare a structure for defense prior to the arrival of the fire front:

- Structure Triage Category – Threatened Defensible
- An ideal multiple resource tactic especially in common neighborhoods where efforts may be coordinated over a wide area. A tactic used when it is possible for fire resources to stay when the fire front arrives. Fire behavior MUST be such that it is safe for firefighters to remain and engage the fire
- Adequate Escape Routes to a Safety Zone must be identified. A Safety Zone or TRA must exist on site
- Firefighters must be vigilant to sudden changes in fire intensity and be prepared to move to the TRA or withdraw along the Escape Route to the Safety Zone
- Adequate time must exist to safely prepare the structure for defense prior to the arrival of the fire front.

FIRE FRONT FOLLOWING - a follow up tactic employed when Check and Go, Prep and Go, or Bump and Run tactics are initially used:

- A tactic used to come in behind the fire front.
- This action is taken when there is insufficient time to safely set up ahead of the fire or the intensity of the fire would likely cause injury to personnel located in front of the fire
- The goal of "Fire Front Following" is to search for victims, effect perimeter control, extinguish spot fires around structures, control hot spots and reduce ember production.

BUMP AND RUN - a tactic where resources typically move ahead of the fire front in the spotting zone to extinguish spot fires and hot spots, and to defend as many structures as possible:

- Bump and Run may be effective in the early stages of an incident when the resource commitment is light and structure defense is the priority.
- Bump and Run may also be used on fast moving incidents when there are adequate resources available, but where an effort must be made to control or steer the head and shoulders of the fire to a desired end point.
- Perimeter control and structure defense preparation are secondary considerations with the Bump and Run tactic.
- Resources must remain mobile during Bump and Run and must constantly identify Escape Routes to Safety Zones and Temporary Refuge Areas as they move with the fire front.

- Bump and Run is a defensive tactic when fire front impact in the WUI is imminent and there are not enough resources to effectively take perimeter control action. It is an offensive tactic when resources are steering the head of the fire to a desirable end point.
- The tactic is useful when terrain and fuels are suitable for mobile attack.
- Fire line supervisors and Strike Team/Task Force Leaders must realize that Bump and Run places resources in front of the advancing fire front and that extreme caution should be exercised.
- Control lines in front of the fire should be identified and prepared with dozers and fire crews enabling the Bump and Run resources to direct the fire to logical end point. This is a frontal attack strategy and a watch out situation. Control lines in front of the main fire must be reinforced with retardant drops, coordinated firing operations and engine support.

ANCHOR AND HOLD - a tactic utilizing control lines and large water streams from fixed water supplies in an attempt to stop fire spread. The goal is to extinguish structure fires, protect exposures, and reduce ember production.

- Anchor and Hold can be referred to as taking a stand to stop the progression of the fire.
- Anchor and Hold tactics are more effective in urban neighborhoods where the fire is spreading from house to house.
- Establishing an Anchor and Hold line requires considerable planning and effort and utilizes both fixed and mobile resources:
    - o Fixed engines should be spotted in safe areas where they can safely withstand any fire situation.
    - o Mobile engines or task forces can engage in individual structure defense actions or perimeter control and re-supply from fixed water source.
    - o Mobile engines should be prepared to re-deploy to other areas should the fire escape the Anchor and Hold line.
- Ground resources, such as engine crews and fire crews should staff hose lines and be prepared to extinguish hot spots, fire perimeter, and structures. Hand crew strike teams should be deployed to construct fire control lines wherever needed and conduct firing operations.

TACTICAL PATROL - a tactic where the key element is mobility and continuous monitoring of an assigned area: Tactical Patrol can either be initiated:

- After the main fire front has passed and flames have subsided but when the threat to structures still remains:
- Patrol areas where the fire has passed but the risk to structures remains from fire brands smoldering in void spaces, on roofs, in rain gutters and stored material near buildings.

In neighborhoods away from the interface where there is predicted to be significant ember wash and accumulated ornamental vegetation:

- The goal is to patrol areas downwind of potential ember showers
- This tactic should be used to extinguish hot spots or secondary structure ignitions, and address safety issues such as power lines, weakened trees, and other hazards.
- Vigilance, situational awareness and active suppression actions are a must

WILDLAND FIRE MANAGEMENT GUIDING PRINCIPLES

1. The first priority for all-risk decisions is human survival, both firefighters and the public.

2. Incident containment strategies specifically address and integrate protection of defendable improved property and wildland values.

3. Direct protection of improved property is undertaken when it is safe to do so, where there are sufficient time and appropriate resources available, and when the action directly contributes to achieving the overall incident objectives.

4. The firefighter's decision to accept direction to engage in structure defense actions is based on the determination that the property is defendable and the risk to firefighters can be safely mitigated under the current or potential fire conditions.

5. A decision to delay or withdraw from structure defense operations is the appropriate course of action when made in consideration of firefighter safety, current or potential fire behavior, or lack of defensibility of the structure or groups of structures.

6. Firefighters at all levels are responsible for making risk decisions appropriate to their individual knowledge, experience, training, and situational awareness.

7. Every firefighter is responsible for awareness of the factors that affect their judgment and the decision-making process, including: a realistic perception of their own knowledge, skills, and abilities, the presence of life threat or structures, fire behavior, availability of resources, social/political pressures, mission focus, and personal distractions such as home, work, health, and fatigue.

8. An individual's ability to assimilate all available factors affecting situational awareness is limited in a dynamic wildland and urban interface environment. Every firefighter is responsible to understand and recognize these limitations, and to decide, and act in preparation for the "worst case."

9. It is the responsibility of *every* firefighter to participate in the flow of information with supervisors, subordinates and peers. Clear and concise communication is essential to overcome limitations in situational awareness.

RISK MANAGEMENT PROCESS

Step 1 Situation Awareness
Gather Information
Objective(s) Previous Fire Behavior
Communication
Weather Forecast
Who's in Charge?
Local Factors
Scout the Fire

Step 2 Hazard Assessment
Estimate Potential Fire Behavior Hazards
Look Up/Down/Around Indicators
Identify Tactical Hazards
Watch Outs
What other safety hazards exist?
Consider severity vs. probability?

Step 3 Hazard Control
Firefighting Orders
LCES Checklist – MANDATORY
Anchor Point
Downhill Checklist (if applicable)
What other controls are necessary?

Step 4 Decision Point
Are controls in place for identified hazards?
- NO – Reassess situation
- YES – Next question

Are selected tactics based on expected fire behavior?
- NO – Reassess situation
- YES – Next question

Have instructions been given and understood?
- NO – Reassess situation
- YES – Initiate action

Step 5 Evaluate
Personnel: Low experience level with local factors?
Distracted from primary tasks?
Fatigue or stress reaction?
Hazardous attitude?
The Situation: What is changing?
Are strategy and tactics working?

TACTICAL ENGAGEMENT PROCESS - PACE

Structure defense firefighting in the Wildland Urban Interface (WUI) is inherently dangerous because it is primarily associated with *in-direct* firefighting. An approaching fire is a dynamic event and subject to sudden changes that can be very difficult to anticipate. Structure defense should start with a determination of the exit strategy.

In-direct firefighting safety mitigations depend on fire behavior forecasts made in advance of the fires arrival. Accurate fire behavior forecasts are difficult to make with absolute certainty and at the same time these forecasts are the crux for determining effective safety mitigations. (Tactical Refuge Areas, Escape Routes and Safety Zones)

With firefighter safety hanging in the balance of accurate fire behavior estimates that cannot be assured, it is imperative that a multi-step safety plan be established to compensate for the uncertainties.

Firefighters must anticipate the unexpected and build agility (Tactical Maneuver) into their plan with *contingency planning.* The lexicon for contingency planning is PACE:

P - Primary Plan [Offense]
Is focused on firefighter safety
Is focused on mission objectives
Yields the most desirable results
(Manning hose lines to suppress the fire around a structure)

A - Alternate Plan [Offense]
A fallback plan that closely supports the Primary Plan
The results may be less desirable but still supports the Primary Plan
(Retreating into or behind the structure until fire intensity diminishes)

C - Contingency Plan [Defense]
A plan totally focused on the firefighter's safety
Move to a tactical refuge area (an area that provides short-term relief) or;
Withdraw along the Escape Route
Move into a Safety Zone

E - Emergency Plan [Defense]
A plan totally focused on individual firefighter survival
When threatened by fire, firefighters should get into their fire shelter:
ALWAYS HAVE A DEPLOYMENT SITE IDENTIFIED!
Implement PACE prior to engaging in any structure defense action.
P – Primary A – Alternate C – Contingency E – Emergency

LEVELS OF ENGAGEMENT - DRAW-D

As with military operations, there are FIVE Levels of Engagement in firefighting – DRAW-D. These actions apply to all aspects of wildland firefighting from the incident strategy to the individual line assignments and structure defense. They identify a thoughtful and mindful approach to choosing the appropriate tactical action. Use of DRAW-D as Levels of Engagement incorporates a "can do" attitude in every level of engagement and every level of engagement is equal in value to the overall effort as the other.

D - Defend – Holding actions, protecting priority areas
Protect the structures
Hold and improve the line

R - Reinforce –
Bring more resources to bear
Add resources necessary to *advance* or *defend*

A - Advance – Anchor and Flank
Direct or indirect attack
Active burnout operations

W - Withdraw – Cease current activities until conditions modify
Abandon an established position or constructed line in response to an increase in fire intensity
Not a stigma, but a decision to move away from a threat

D - Delay – Wait until the situation has modified sufficiently to allow a different level of engagement
Waiting for conditions to meet pre-identified triggers necessary to *advance* or *defend*
Not a lack of effort, but a conscious decision to maximize long-term effectiveness

STRUCTURE ASSESSMENT CHECKLIST

Address/Property Name

- Numerical street address, ranch name, etc.
- Number of residents on site

Road Access

- Road surface (paved, gravel, unimproved, dirt)
- Adequate width, vegetation clearance and Safety Zones along road
- Undercarriage problems (4x4 access only)
- Turnouts and turnarounds
- Bridges (load limits)
- Stream crossings (approach angle, crossing depth and surface)
- Terrain (road slope, location on slope-near chimneys, saddles, canyon bottom)
- Grade (greater than 15%)

Structure/Building

- Single residence or multi-complex, out building (barn, storage)
- Does building have unknown or hazardous materials?
- Exterior walls (stucco or other noncombustible, wood frame, vinyl, wood shake)
- Large unprotected windows facing heat source
- Proximity of any aboveground fuel tanks (LPG, propane, etc.)
- Roof material (wood shake, asphalt, noncombustible)
- Eaves (covered with little overhang, exposed with large overhang)
- Other features (wood deck, wood patio cover and furniture, wood fencing)

Clearances/Exposures/Defensible Space

- Structure location (narrow ridge, canyon, mid-slope, chimney)
- Adequate clearance around structure-minimum of 100 feet (steeper the slope, the more clearance required)
- Surrounding fuels (larger, denser the fuels, the more clearance required)
- Flammable fuels (trees, ladder fuel, shrubs) adjacent to structure (is there time for removing these fuels?)
- Other combustibles near structure (wood piles, furniture, fuel tanks)
- Is there adequate clearance around fuel tank?
- Power lines or transformers (DO NOT park under lines)

Hazardous Materials

- Chemicals (Look for DOT/NFPA/UN symbols)
- Pesticides and herbicides
- Petroleum products
- Paint products

Water Sources

• Hydrant/standpipe (When connecting with hydrant, be aware of flow rate and gpm output, size and venting capability of engine or water tender may not be able to handle hydrants with high flow and gpm rates.)
• Storage tank
• Swimming pool
• Hot tub
• Fish pond
• Irrigation ditch

Evacuation

• Is safe evacuation possible? (Identify safe refuge for those who cannot be evacuated.)
• Coordinate with on-scene law enforcement and emergency services personnel.

Estimated Resources for Protection

• Number(s) and type(s) of engines, water tenders, crews, dozers (General Guidelines: one engine per structure, one additional engine for every four structures to be used as "backup" and for patrol. For structures that are close together (50 feet or less), one engine may be adequate to protect two structures.)
• Type and number of aircraft available

POWERLINE SAFETY

• Downed conductor on vehicle: stay in vehicle until the power company arrives.
• If the vehicle is on fire or fire is near, jump clear, keep feet together and don't hang on.
• Smoke, water, and retardant are all good conductors and can cause power line-to-ground arc.
• Don't operate heavy equipment under power lines
• Don't use right-of-way as a jump or cargo drop spot
• Don't drive with long antennas under power lines
• Don't fuel vehicles under power lines
• Don't stand near power lines during retardant drops
• Don't park under power lines
• Don't apply straight stream to power lines
• Spot fires or low ground fires can be fought with hose lines if heavy smoke or flame is not within 100 feet of the power lines
• If safe, extinguish wood poles burning at the base to prevent downed wire hazards later