U. S. AIR FORCE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Cannon Air Force Base
&
Melrose Air Force Range

New Mexico

(See INRMP signature pages for plan approval date)

ABOUT THIS PLAN

This installation-specific Environmental Management Plan (EMP) is based on the U.S. Air Force's (AF) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has been developed in cooperation with applicable stakeholders, which may include Sikes Act cooperating agencies and/or local equivalents, to document how natural resources will be managed. Non-U.S. territories will comply with applicable Final Governing Standards (FGS). Where applicable, external resources, including Air Force Instructions (AFIs); AF Playbooks; federal, state, local and FGS, biological opinion and permit requirements, are referenced.

Certain sections of this INRMP begin with standardized, AF-wide "common text" language that address AF and Department of Defense (DoD) policy and federal requirements. This common text language is restricted from editing to ensure that it remains standard throughout all plans. Immediately following the AF-wide common text sections are installation sections. The installation sections contain installation-specific content to address local and/or installation-specific requirements. Installation sections are unrestricted and are maintained and updated by AF environmental Installation Support Teams (ISTs) and/or installation personnel.

NOTE: The terms 'Natural Resources Manager', 'NRM' and 'NRM/POC' are used throughout this document to refer to the installation person responsible for the natural resources program, regardless of whether this person meets the qualifications within the definition of a natural resources management professional in DODI 4715.03.

TABLE OF CONTENTS **PAGE**

DOCUMENT CONTROL 6

INRMP APPROVAL/SIGNATURE PAGES 6

EXECUTIVE SUMMARY 10

1.0 OVERVIEW AND SCOPE 12
1.1 Purpose and Scope 12
1.2 Management Philosophy 13
1.3 Authority 14
1.4 Integration with Other Plans 15

2.0 INSTALLATION PROFILE 17
2.1 Installation Overview 17
2.1.1 Location and Area 17
2.1.2 Installation History 19
2.1.3 Military Missions 20
2.1.4 Surrounding Communities 22
2.1.5 Local and Regional Natural Areas 22
2.2 Physical Environment 22
2.2.1 Climate 22
2.2.2 Landforms 23
2.2.3 Geology and Soils 28
2.2.4 Hydrology 30
2.3 Ecosystems and the Biotic Environment 34
2.3.1 Ecosystem Classification 34
2.3.2 Vegetation 34
2.3.3 Fish and Wildlife 41
2.3.4 Threatened and Endangered Species and Species of Concern 44
2.3.5 Wetlands and Floodplains 65
2.3.6 Other Natural Resource Information 66
2.4 Mission Impacts on Natural Resources 68
2.4.1 Natural Resource Constraints to Mission and Mission Planning 68
2.4.2 Land Use 68
2.4.3 Current Major Impacts 70
2.4.4 Potential Future Impacts 74
2.4.5 Natural Resources Needed to Support the Military Mission 75

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM 76

4.0 GENERAL ROLES AND RESPONSIBILITIES 76

5.0 TRAINING 78

6.0 RECORDKEEPING AND REPORTING 78
6.1 Recordkeeping 78
6.2 Reporting 79

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT 79
7.1 Fish and Wildlife Management 80

Cannon Air Force Base 80
Melrose Air Force Range 81
7.2 Outdoor Recreation and Public Access to Natural Resources 81
7.3 Conservation Law Enforcement 82
7.4 Management of Threatened and Endangered Species, Species of Concern and Habitats 83
Cannon Air Force Base 83
Melrose Air Force Range 83
7.5 Water Resource Protection 84
Cannon Air Force Base 84
Melrose Air Force Range 85
7.6 Wetland Protection 85
7.7 Grounds Maintenance 85
7.8 Forest Management 86
7.9 Wildland Fire Management 86
7.10 Agricultural Outleasing 88
7.11 Integrated Pest Management Program 88
Cannon Air Force Base 89
7.12 Bird/Wildlife Aircraft Strike Hazard (BASH) 90
Cannon Air Force Base 91
Melrose Air Force Range 91
7.13 Coastal Zone and Marine Resources Management 92
7.14 Cultural Resources Protection 92
7.15 Public Outreach 93
7.16 Geographic Information Systems (GIS) 94

8.0 MANAGEMENT GOALS AND OBJECTIVES 94

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS 96
9.1 Natural Resources Management Staffing and Implementation 96
9.2 Monitoring INRMP Implementation 97
9.3 Annual INRMP Review and Update Requirements 98

10.0 ANNUAL WORK PLANS 98

11.0 REFERENCES 100
11.1 Standard References (Applicable to all AF installations) 100
11.2 Installation References 100

12.0 ACRONYMS 105
12.1 Standard Acronyms (Applicable to all AF installations) 105
12.2 Installation Acronyms 105

13.0 DEFINITIONS 105
13.1 Standard Definitions (Applicable to all AF installations) 105
13.2 Installation Definitions 105

14.0 APPENDICES 106
Appendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP 106
Appendix B. Common Fauna and Habitat Associations 112
Appendix C. Fauna of CAFB and MAFR 114

Appendix D. Invasive and Noxious Plants of East-Central New Mexico 117
Appendix E. Federal Fish and Wildlife Permit 118
Appendix F. Suggested Landscape Plants 119
Appendix G. Melrose Air Force Range Plant List 2015 & 2016 123

15.0 ASSOCIATED PLANS 126

List of Figures

Map 1: Location of CAFB and MAFR…… 19
Map 2: Current MAFR Configuration, Key Areas and Location……..…….22
Map3: Topography of Cannon Air Force Base ……..…….……..25
Map 4: Topography of Melrose Air Force Range …….…….……..26
Map 5: Land Types at Cannon Air Force Base …….27
Map 6: Land Types at Melrose Air Force Range ……..28
Map 7: Soil Association Found on Melrose Air Force Range …….…… ...30
Map 8: Hydrologic Features of Cannon Air Force Base …….33
Map 9: Hydrologic Features of Melrose Air Force Range ……..34
Map 10: Habitat Types and Locations on Cannon Air Force Base ……...……. 37
Map 11: Vegetation associations found on Melrose Air Force Ran…… ….41
Map 12: Lesser Prairie Chicken Lek Site at Melrose Air Force Range Last Known Active, 2012 .61
Map 13: Prairie Dog Towns at Cannon Air Force Base ……...65
Map 14: Active and Inactive Prairie Dog Towns at Melrose Air Force Range ……..66

List of Tables

Table 1: Habitat Description, Listing Status, and Observed/Not Observed of Potentially Occurring Listed Species on Cannon Air Force Base and Melrose Air Force Range as of Surveys Conducted During 2015 & 2016 ……..….47
Table 2: Results of the Aerial Surveys Conducted on Melrose Air Force Range ……..70
Table 3: Existing Land Use at Cannon Air Force Base …….72
Table 4: Land Use at Melrose Air Force Range …….73
Table 5: Land Use Under Restricted Airspace Surrounding Melrose Air Force Range …….73

DOCUMENT CONTROL

Record of Review – The INRMP is updated not less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. In accordance with (IAW) the Sikes Act and AFI 32-7064, *Natural Resources Management*, the INRMP is required to be reviewed for operation and effect not less than every five years. Annual reviews and updates are accomplished by the base Natural Resources Manager (NRM), and/or an Installation Support Team Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the NR Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signature to the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans. Following update, the installation NRM obtains approval signatures on the updated document.

INRMP APPROVAL/SIGNATURE PAGES

The following three pages are designated for documentation of concurrence with this INRMP by the 27th Special Operations Wing Commander, the U.S. Fish & Wildlife Service, and the New Mexico Department of Game & Fish (AFI32-7064 2004, Sikes Act 2010)

27th SPECIAL OPERATIONS WING/CC

CONCURRENCE WITH CANNON AIR FORCE BASE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 U.S.C. 670a-670o), as amended, Cannon Air Force Base, New Mexico, has completed its 5-year update of the installation's Integrated Natural Resources Management Plan (INRMP). The 27 SOW/CC has reviewed the INRMP and concurs with the findings and management recommendations therein.

MICHAEL E. CONLEY, Colonel, USAF
Vice Commander, 27th Special Operations Wing

29 Nov 17
Date

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

CONCURRENCE WITH CANNON AIR FORCE BASE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 U.S.C. 670a-670o), as amended, Cannon Air Force Base, New Mexico, has completed its 5-year revision of the installation's Integrated Natural Resources Management Plan (INRMP). The U.S. Fish & Wildlife Service has reviewed the INRMP and concurs with the findings and management recommendations therein.

Acting Kay E Nicholopoulos
Regional Director

Date OCT 10 2017

NEW MEXICO DEPARTMENT OF GAME AND FISH

CONCURRENCE WITH CANNON AIR FORCE BASE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 U.S.C. 670a-670o), as amended, Cannon Air Force Base, New Mexico, has completed its 5- year revision of the installation's Integrated Natural Resources Management Plan (INRMP). The New Mexico Department of Game & Fish has reviewed the INRMP and concurs with the findings and management recommendations therein.

Alexandra Sandoval
Signature

9/21/17
Date

EXECUTIVE SUMMARY

The Department of Defense (DoD) manages approximately 25 million acres (ac) of land in the United States (U.S.). Each military installation that has suitable habitat for conserving and managing natural ecosystems is required to prepare, maintain, and implement an Integrated Natural Resources Management Plan (INRMP). This INRMP was prepared for Cannon Air Force Base (CAFB) and Melrose Air Force Range (MAFR), in accordance with the following authorities:

- DoD Instruction (DoDI) 4715.3, Environmental Conservation Program;
- Air Force Instruction (AFI) 32-7064;
- 16 U.S. Code (U.S.C.) 670a-670f, Sikes Act, as amended, 18 November 1997; and
- 32 Code of Federal Regulations (CFR) Part 190, DoD Natural Resources Management Program.

This INRMP is a long-term planning document that guides implementation of the natural resources program to help ensure support for the installation mission, while protecting and enhancing natural resources and providing a variety of outdoor recreational opportunities for station personnel. This plan documents the military mission, baseline condition of natural resources, impacts to natural resources due to the military mission, the management approaches to conserve and enhance natural resources, and a list of specific projects to protect and enhance natural resources at CAFB and MAFR.

In accordance with the Sikes Act, this INRMP was prepared in cooperation with the Secretary of the Department of Interior, acting through the Director of the U.S. Fish and Wildlife Service (USFWS), and the New Mexico Department of Game and Fish (NMDGF). Because of this coordination effort, the INRMP reflects the mutual agreement of these parties concerning conservation, protection, and management of fish and wildlife resources. Future involvement of the state and federal wildlife agencies during informal annual reviews and formal 5-year renewals will ensure continued mutual agreement and cooperation in managing the natural resources at CAFB and MAFR.

Eleven resource-specific natural resources program elements have been developed to address relevant issues at CAFB and MAFR. Existing conditions, baseline survey data, current management practices, and recommended management actions have been described for each program element. Management program elements covered in this INRMP include:

1. Fish and Wildlife Management
2. Conservation Law Enforcement
3. Rare, Threatened, and Endangered Species Management
4. Watershed Protection
5. Wetlands Management
6. Grounds Maintenance
7. Wildland Fire Management
8. Integrated Pest Management
9. Bird Aircraft Strike Hazard (BASH)
10. Cultural Resources Management
11. Geographic Information Systems (GIS) Management

The management actions and projects identified for the CAFB and MAFR natural resources program are intended to help installation commanders manage natural resources effectively to ensure installation lands remain available and in appropriate condition to support the military mission and to ensure compliance with relevant environmental regulations. These actions are based on the principles of ecosystem management and are consistent with Air Force policy on sustainable, multiple use of natural resources on Air Force (AF) property.

1.0 OVERVIEW AND SCOPE

This INRMP was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the United States Air Force. They provide the natural infrastructure needed for testing weapons and technology, as well as for training military personnel for deployment. Sound management of natural resources increases the effectiveness of Air Force adaptability in all environments. The Air Force has stewardship responsibility over the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in sustainable ways. The primary objective of the Air Force natural resources program is to sustain, restore and modernize natural infrastructure to ensure operational capability and no net loss in the capability of AF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all base personnel. The Sikes Act is the legal driver for the INRMP.

1.1 Purpose and Scope

INRMPs provide for the management of natural resources, including fish, wildlife, and plants. They incorporate, to the maximum extent practicable, multiple use ecosystem management principles and provide the landscape necessary for the sustainment of military land uses. Consistent with the use of military installations to ensure the readiness of the Armed Forces, the purpose of INRMPs is to provide for the conservation and rehabilitation of natural resources on military lands.

INRMPs assist installation commanders in their efforts to conserve and rehabilitate natural resources consistent with the use of military installations to ensure the preparedness of the Armed Forces. INRMPs are intended principally to guide the management of an installation's natural resources effectively so as to ensure that its lands remain available and in good condition to support the installation's military mission and with "no net loss" in the capability of military installation lands to support the military mission of the installation. To ensure frequent and continued use of land for military training, now and in the future, management programs and actions in INRMPs must ensure natural resource utilization is (1) sustainable, in accordance with laws and regulations, and (2) optimally integrated with existing military installation plans and mission requirements.

The CAFB and MAFR INRMP provides the foundation of ecosystem management goals and objectives to direct management and stewardship of its lands. This INRMP documents and assists the development, integration, and coordination of natural resources management on CAFB and MAFR. Further, it describes CAFB and MAFR natural resources management programs and how those programs provide for: (1) the conservation and rehabilitation of natural resources; and (2) the sustainable multiple use of resources. In addition to describing natural resources management programs, this document is intended to accomplish the following:

- Provide baseline information and conditions that support daily decision-making and compliance with regulatory and planning processes;
- Identify, document, and facilitate the organizational capacity, support, and linkages necessary for successful implementation and administration of the INRMP and management of CAFB and MAFR natural resources;

- Integrate the various natural resources management programs to reduce overlap and redundancy, improve management effectiveness, and ensure that CAFB and MAFR lands remain available and in good condition to support the military mission;
- Show the interrelationships between current and proposed components of natural resources management (e.g., vegetation, wetland, fish and wildlife), mission requirements, and other land use activities;
- Establish natural resources program management goals, objectives, and actions that will be implemented during the duration of the plan and provide time frames for proposed actions;
- Identify lower priority projects that may be done as funding becomes available; and
- Establish a process for the periodic review, update, and reporting of program goals, objectives and projects within the INRMP.

This INRMP is intended to integrate natural resources conservation and management efforts in support of land use and military mission requirements and responsibilities at CAFB and MAFR. This INRMP reflects installations' approach to natural resources management and stewardship and summarizes baseline information and agreements through which compliance with regulatory and planning processes, such as those required by the Sikes Act Improvement Act (SAIA), National Environmental Policy Act (NEPA), and Endangered Species Act (ESA), is accomplished. This INRMP also fulfills other responsibilities with regard to DoDIs and DoD Directives (DoDDs), as well as the USAF policies for natural resource planning, conservation, management, and rehabilitation in support of the Base's military training mission.

Since the last 5-year INRMP renewal two major land use changes have been made, and one major regulatory change has occurred. All agricultural outleases on MAFR were terminated. Livestock grazing no longer occurs and cropland leases no longer exist. A contiguous 10,968 acre (ac) parcel is now an integral part of MAFR and is treated as such in all environmental planning and analysis. The lesser prairie chicken has had its US Fish and Wildlife Service (USFWS) status decision vacated.

1.2 Management Philosophy

The guiding principle behind the development of this INRMP is sound ecosystem management. Managing ecosystems involves addressing the environment as a complex system of interrelated components rather than a collection of isolated units. Military operations and compliance with federal, state, and local requirements are essential components of the CAFB mission. Successful ecosystem management requires AF environmental managers to consider factors such as the military mission, state and federal laws, community values, socioeconomics, and adjacent land uses in addition to the biological environment when setting management goals.

The overall comprehensive goal of ecosystem management is to maintain and improve the sustainability and biological diversity of native ecosystems in supporting the AF mission and the needs of the military community. The INRMP implements ecosystem management by setting goals for attaining a desired land condition.

Two major components of ecosystem management are biodiversity conservation and control of exotic and invasive species. For biodiversity, the goal is to maintain or re-establish viable populations of native species on AF controlled lands when practical and consistent with the military mission. The primary goals associated with control of exotic and invasive species are to determine presence/absence of these species and, where necessary, to develop and implement plans to control or eradicate these species. To increase the effectiveness of control, management plans for the control of exotic and invasive species should be a cooperative effort with federal, state, and/or local agencies, and adjoining landowners.

This INRMP is also based on a set of principles developed by the AF as guidelines for natural resource management (AFI 32-7064, Integrated Natural Resources Management (INRM)). These principles are:

- Maintain or restore native ecosystem types across their natural range where practical and consistent with the military mission;
- Maintain or restore ecological processes such as fire and/or other disturbance regimes where practical and consistent with the military mission;
- Maintain or restore hydrological processes in streams, floodplains, and wetlands when feasible;
- Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components as well as federal, state and local agencies and adjoining property owners.

The INRMP supports the Base Comprehensive Planning Process by identifying natural resources that need to be considered and incorporated into the Installation Development Plan (IDPP), element plans, and other component plans. Natural resources installation project plans are identified and prioritized for a five year period in the INRMP to provide for advance planning, funding, and management.

1.3 Authority

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 Sikes Act, as amended, 16 U.S.C. 670a-670f, 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 USFWS and the state fish and wildlife agencies. The 1997 amendments to the Sikes Act require the DoD to develop and implement an INRMP for each military installation with significant natural resources. INRMPs are prepared in cooperation with the USFWS and the state fish and wildlife agency and reflect the mutual agreement of these parties concerning conservation, protection, and management of fish and wildlife resources on military lands.

The Sikes Act requires the Secretaries of the military departments to prepare, implement, and review/revise INRMPs for each military installation unless exempted due to the absence of significant natural resources. To make the exemption determination, AFI 32-7064 is used to classify military installations and ranges into one of two natural resource management categories. Category I installations/ranges are those that have natural resources requiring protection and management, such as habitat for protected species, aquatic resources, or any habitat for conserving and managing wildlife. Category II installations have a limited natural resources land base and no significant natural resources. CAFB and MAFR are classified as Category I installations.

Though several other laws (e.g., Endangered Species Act of 1973, as amended [ESA] and Clean Water Act [CWA]) that require military installations to protect sensitive biological resources. The Sikes Act requires each installation possessing significant natural resources to prepare and implement an INRMP that supports the mission of the installation and complies with the suite of federal laws governing natural resources management and protection (e.g., ESA, CWA). Thus, an INRMP reflects an installation's programs and intent to comply with other federal and state laws, most notably laws associated with environmental documentation, endangered species, water quality, and management of wildlife in general.

The Sikes Act, *Updated Guidance on Implementation of the Sikes Act Improvement Act* of 10 October 2002 (U.S. DoD 2002), Office of the Secretary of Defense (OSD) *Supplemental Guidance for Implementation of the Sikes Act Improvement Act* of 1 November 2004 (U.S. DoD 2004), OSD *Supplemental Guidance for Implementation of the Sikes Act Improvement Act* of 5 September 2005 (U.S.

DoD 2005), Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, and the AFI 32-7064, *INRM* provide detailed guidance on and identify required elements to be included in the preparation and update of INRMPs.

An ecosystem management approach with natural resources stakeholders that is within the constraints of the military mission is mandated by the Sikes Act, DoDI 4715.3, and AFI 32-7064. DoDI 4715.3 further states that installation ecosystem management will be achieved by developing and implementing the INRMP and insuring that it remains current. AFPD 32-70 provides directives to clean up environmental damage, plan future activities to reduce environmental impacts, manage responsibly the natural and cultural resources and eliminate pollution from its activities whenever possible on AF installations. AFI 32-7064, implements DoD and AFPD directives by establishing the Installation INRMP as the primary planning document for natural resources at AF installations. The INRMP assures compliance with key acts, statutes, and Executive Orders (EOs) including, but not limited to:

- Clean Air Act (CAA)
- CWA
- ESA
- Migratory Bird Treaty Act (MBTA)
- EO 13112, *Invasive Species*
- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*

The ESA requires all federal agencies to implement protection programs for designated (listed) species and to use their authorities to further the purposes of the act. Other legislation protecting birds include the Bald and Golden Eagle Protection Act (BGEPA), the MBTA, and EO 13186. To comply with the ESA, the USAF is required under AFI 32-7064 to inventory for federally listed threatened and endangered species, and if present on USAF land, provide an overall ecosystem approach for the protection and management of the species. Although not required, when practical a similar approach should be used for listed federal candidate species and state-listed species (AFI 32-7064). The federal government is also legally mandated to protect and maintain healthy migratory bird populations and to ensure the conservation of more than 800 species of migratory birds and their habitats by domestic legislation and through international conventions and treaties.

Installation-Specific Policies (including State and/or Local Laws and Regulations)	
Tree Care Ordinance	It shall be the policy of CAFB to maintain an active tree program, consisting of three areas: tree planning, tree planting, and tree maintenance.

1.4 Integration with Other Plans

The 27th Special Operation Civil Engineering Squadron (27 SOCES) Civil Engineering Wing (SOCES/CE) manages several programs integral to land use of the installations. There is frequent overlap of the different subject matter experts within the squadron. The following describes how this INRMP integrates with or supports the entire Squadron's mission:

- Installation Development Plan (IDP): Objective 6 of the recently-completed plan is to "Be leaders in sustaining an environmentally conscious culture while ensuring mission effectiveness and meet or exceed all appropriate state and federal environmental laws." The INRMP is thoroughly integrated into the IDP.
- Air Installation Compatible Use Zone (AICUZ): The INRMP does not significantly overlap with the AICUZ. However, a 2016 AICUZ Study is pending and subject matter experts work closely together as part of the 27 SOCES program to ensure there are no conflicts.

- Bird/Wildlife Aircraft Strike Hazard (BASH): The BASH Program is in conformance with this INRMP as described in INRMP Section 7.12 (Bird/Wildlife Aircraft Strike Hazard) of this plan. Annual reporting of BASH activities and the annual application for a new Depredation Permit are within the purview of the Natural Resources Program (NR) Section of the Environmental Element of 27 SOCES/CEIE. Updating and renewing the INRMP is also within the purview of the NR Program. Both plans are overseen by the NR Program thus ensuring integration.
- The Integrated Pest Management Plan (IPMP): Identifies two species of mutual concern with the INRMP: black-tailed prairie dogs and burrowing owls. The Entomology department is part of SOCES/CE and coordinates with the Environmental Element of SOCES/CE to ensure adherence to INRMP Section 7.11 (Integrated Pest Management Program). Specifically, avoidance of Burrowing Owl nesting and breeding.
- Cannon Green – Sustainable Landscape Development Plan (SLDP): This plan emphasizes the use of low maintenance landscaping, specifically low water use species. The plan recommends xeriscape practices such as targeted irrigation and the use of native and drought tolerant plants. The plan is in practice and in conformance with INRMP Section 7.6 (Grounds Maintenance) of this INRMP.
- Wildland Fire Management Plan for Cannon AFB and Melrose AFR 2012: The goals of the most recent plans have changed since 2012 with the cessation of domestic livestock grazing leases. The current MAFR Prescribed Fire Burn Plan 2014 is described in INRMP Section 7.9 (Wildland Fire Plan).
- Cannon Air Force Base (Cannon Main Base & Melrose Air Force Range) 2009 Integrated Cultural Resources Management Plan (ICRMP): The intent and purpose of this plan is to be an integral part of the Base General Plan (now called IDP). The INRMP Section 7.11 (Cultural Resources Management) states the ICRMP should be consulted prior to implementation of mission or natural resources management activities.

Environmental Assessment for the Management of the CAFB and MAFR development plans will be consistent with the INRMP upon completion of all necessary planning requirements and administrative approvals. As appropriate, CAFB and MAFR plans will be reviewed and revised as needed based on the results of this integrated planning effort. The INRMP baseline information and its associated GIS layers will be reviewed annually, where necessary, using an interdisciplinary process, and revised and modified as necessary to ensure a quality foundation for integrated planning efforts and natural resource management at CAFB and MAFR. The INRMP itself must be reviewed annually with the USFWS and New Mexico Department of Game and Fish (NMDGF) and revised as needed every five years per the SAIA.

In accordance with AFI 32-1031, *Civil Engineers Operations Management*, activities that may affect natural resources require one or more of the following forms submitted: Air Force Form 332 (*Base Civil Engineer Work Request*), AF Form 813 (*Request for Environmental Analysis*), AF Form 103 (*Base Civil Engineering Work Clearance Request*), or DD Form 1391 (*Military Construction Project Data*).

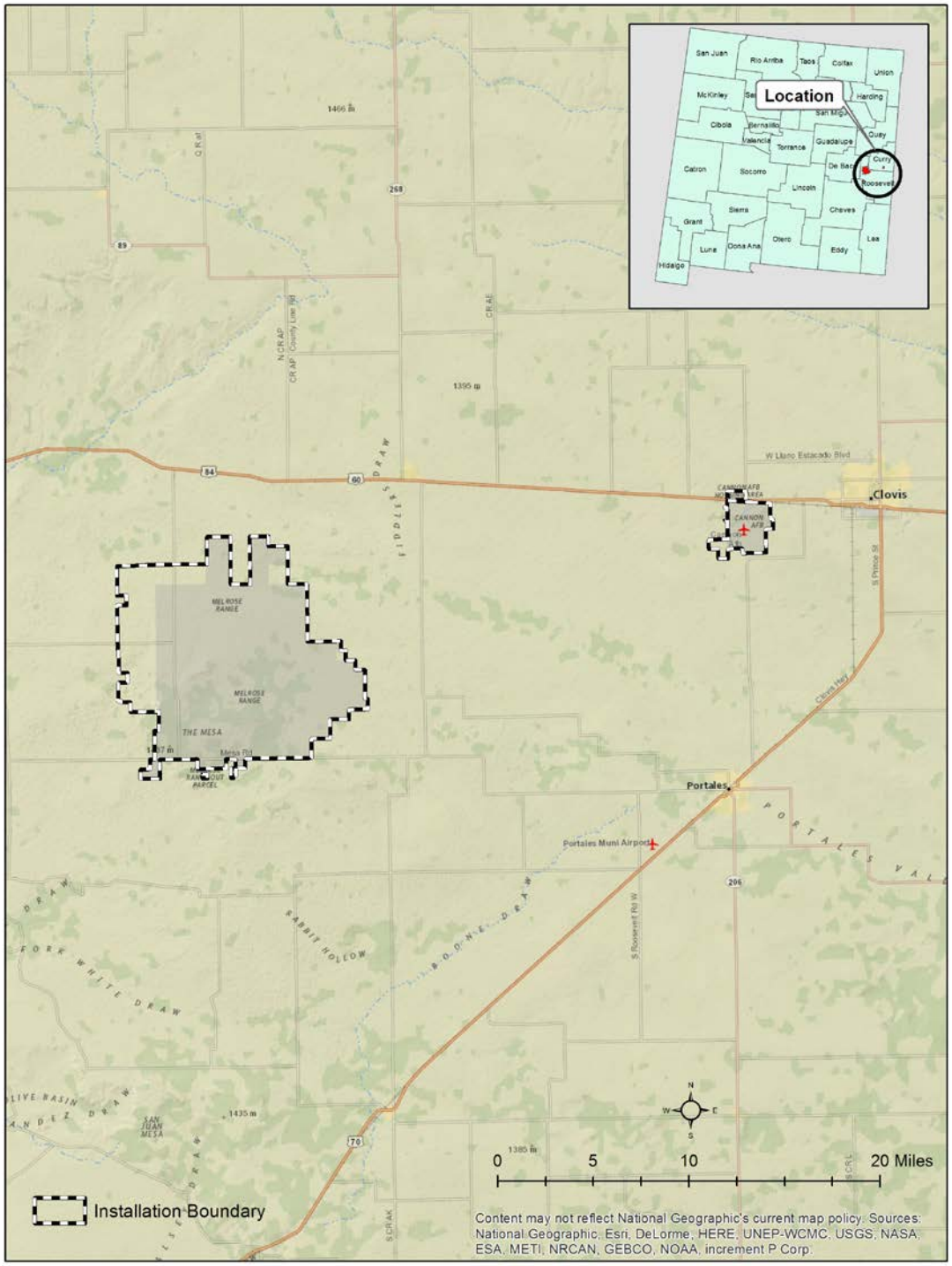
2.0 INSTALLATION PROFILE

Office of Primary Responsibility	27 SOCES/CEIE has overall responsibility for implementing the Natural Resources Management program and is the lead organization for monitoring compliance with applicable federal, state and local regulations
Natural Resources Manager/POC	Charles Dixon, Ph.D. (575) 904-6731 charles.dixon.6@us..af.mil
State and/or local regulatory POCs (For US-bases, include agency name for Sikes Act cooperating agencies)	NMDGF Mark Watson (505) 476-8115 mark.watson@state.nm.us USFWS NM Ecological Services Field Office Jennifer Davis (505) 761-4761 jennifer_l_davis@fws.gov
Total acreage managed by installation	74,767
Total acreage of wetlands	767
Total acreage of forested land	N/A
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	No
NR Program Applicability (Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	☑ Fish and Wildlife Management Program ☐Threatened and endangered species ☑ Invasive species ☐ Wetlands Protection Program ☑ Grounds Maintenance Contract/SOW ☐ Forest Management Program ☑ Wildland Fire Management Program ☐ Agricultural Outleasing Program ☑ Integrated Pest Management Program ☑ Bird/Wildlife Aircraft Strike Hazard (BASH) Program ☐ Coastal Zones/Marine Resources Management Program ☑ Cultural Resources Management Program

2.1 Installation Overview

2.1.1 Location and Area

CAFB is located in a rural area of Curry County, New Mexico. The Base comprises approximately 4,397 ac and is approximately 17 miles west of the Texas-New Mexico state line, 7 miles west of Clovis, New Mexico, and 12 miles north of Portales, New Mexico. The major highways serving the installation are U.S. Highways 60, 70, and 84. MAFR, which is administered by CAFB, is a training range. MAFR is located approximately 13 miles southwest of Melrose, New Mexico, and comprises 70,978 ac. (Map 1: Location of CAFB and MAFR).



Map 1: Location of CAFB and MAFR

Installation/GSU Location and Area Descriptions

Base/GSU Name	Main Use/Mission	Acreage	Addressed in INRMP?	Describe NR Implications
CAFB	Special Operations Command	4,397	Yes, throughout this document	Urban with artificial attractions for birds. Need to minimize bird strike hazards on airfield
MAFR	Training Range	70,978	Yes, throughout this document	Unimproved rangelands used by migratory birds and as wildlife corridor. Need to control invasive brush to maximize ground movement training

2.1.2 Installation History

Cannon Air Force Base

During the late 1920s, Portair Field was established on the current site of CAFB as a civilian passenger terminal for transcontinental commercial flights. The airport's name was changed in the 1930s to Clovis Municipal Airport. After the U.S. entry into World War II, the Army Air Corps took control of the airfield, which became known as Clovis Army Air Base. A Glider Detachment was the first military detachment to use the base. In 1943, the 16th Bombardment Operational Wing arrived, which was a training unit for the crews of the B-17, B-24, and B-29 heavy bombers. The Base was renamed Clovis Army Airfield in 1945. Flying, bombing, and gunnery classes continued until the end of World War II, with deactivation of the base in 1947. It was not until 1951 that the installation was reactivated as Clovis Air Force Base (AFB) and the airfield was reassigned to the Tactical Air Command (TAC). The first unit to arrive was the 140 Fighter-Bomber Wing. The 140 Fighter-Bomber Wing flew the F-86 “Sabre” jet fighter and was composed of Air National Guard elements from Utah, Colorado, and Wyoming. The Base became a major training site for “Sabre” pilots, with the transfer in 1954 of the 474 Fighter-Bomber Group from Taegu Air Base (AB), Korea.

The installation was renamed CAFB on June 8, 1957, in honor of the late General John K. Cannon, a former commander of the TAC. The 474 and 312 Fighter-Bomber Groups were also redesigned as Fighter Attack Group during this year, with the 832nd Air Division being activated to oversee their activities. Two years later, the 312 Fighter-Bomber Group was deactivated and replaced by the 27th Tactical Fighter Wing (TFW), an F-100 unit transferred from Bergstrom AFB, Texas. When F-100 training ceased at CAFB in 1969, the 27 TFW was re-equipped with the F-111E.

In July 1971, the last F-111E left CAFB, to be replaced with the F-111D in November of that same year. Following deactivation of the 832nd Air Division in July 1975, the 27 TFW became the principal AF unit at CAFB. On October 1, 1991, the 27 TFW was renamed the 27 Fighter Wing (FW). In preparation for the DoD-announced retirement of the F-111 in 1996 and EF-111 in 1998, the 27 FW began receiving F-16s in May 1995.

On 15 September 1998, the 428 Fighter Squadron was reactivated at CAFB. The squadron was a hybrid USAF/Republic of Singapore Air Force (RSAF) F-16 Fighter Squadron manned by highly experienced USAF instructor pilots, maintenance and support personnel. The squadron operated 12 RSAF-owned F-16C/Ds. With approximately 25 USAF personnel and 140 RSAF personnel, the unit was responsible for continuation training of Singapore personnel in rapid deployment and tactical employment of the F-16

throughout a wide spectrum of missions including air-to-air, joint maritime, and precision air- to-ground weapons delivery (USAF 2003).

Aircraft flight training for the 27 FW continued until 2007. On October 1, 2007, the 27 FW at CAFB was inactivated and command of the CAFB and MAFR was transferred to Air Force Special Operations Command (AFSOC), 27 SOW.

Melrose Air Force Range

Since the Korean War, AF, Navy, and Marine Corps units have used MAFR for bombing and gunnery practice. Early in 1952, the AF leased 7,771 ac of land near Melrose, New Mexico. The land served as a bombing range for the F-86 aircraft stationed at Clovis AFB (now CAFB). Over the years, faster aircraft with more complex weapon systems were introduced (first the F-100, then the F-111). These new weapon systems increased the requirements for larger and more sophisticated range facilities. Between 1968 and 1989, the AF bought more than 60,000 ac of land for approximately $12.5 million to expand the range, increasing the impact area to 8,800 ac. Since the early 1990s, the AF has used MAFR as a training range for a wide variety of military aircraft (USAF 2003). A land gift from the State of New Mexico added 10,968 ac to the western edge of the existing range. In 2008, the impact area of the range expanded to almost 10,000 ac (Map 2: Current MAFR Configuration, Key Areas and Location Map) and expanded total usable training area on MAFR to 70,978 ac.

2.1.3 Military Missions

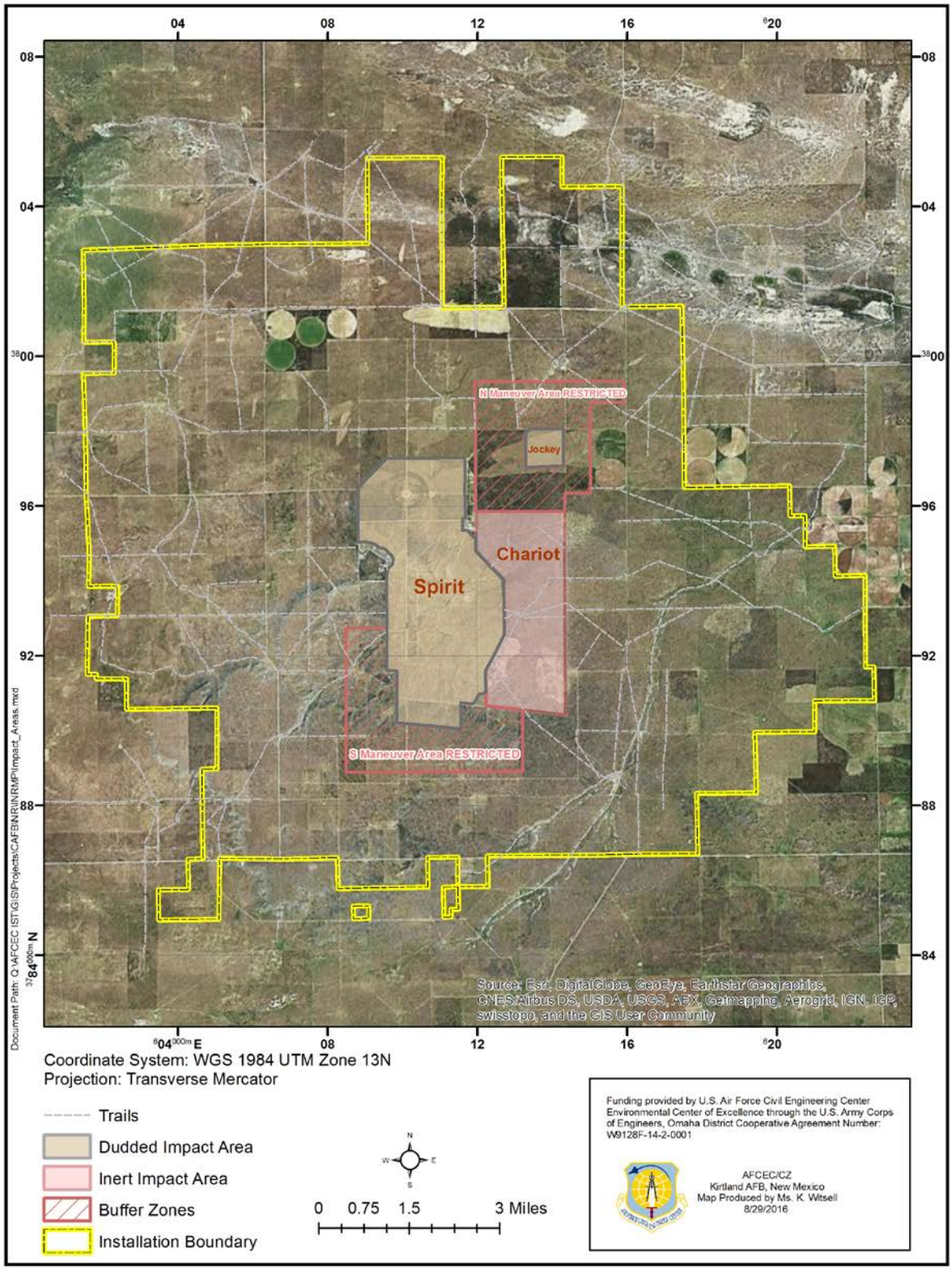
The AFSOC official mission statement is “America’s specialized air power…a step ahead in the changing world, delivering Special Operations anytime, anywhere”. AFSOC, which was established on 22 May 1990, is a Major Command (MAJCOM) and the AF component of the U.S. Special Operations Command (USSOCOM). AFSOC forces provide global ability to conduct special operations missions. Prior to adding CAFB to AFSOC’s mission, AFSOC was responsible to USSOCOM for the worldwide readiness of AF special operations forces (SOF). AFSOC’s core tasks are grouped into four mission areas: forward presence and engagement; information operations; precision employment and strike; and SOF mobility. The primary components of AFSOC are highly trained, deployable airmen who are capable of utilizing highly specialized aircraft.

Based on the *AFSOC Assets Beddown at Cannon Air Force Base, New Mexico Environmental Impact Statement* (AFSOC 2007) mission-related training that could occur during the current military mission includes:

- Flight training (touch and go, aerial re-fueling, and practice missions) with AFSOC aircraft (C-130 gunships, CV-22s, Predator Unmanned Aerial Systems, and additional aircraft) at CAFB, MAFR, and on existing military training routes;
- Live fire training for C-130 gunships at MAFR;
- Drop and landing zone training at CAFB and MAFR;
- Infiltration and exfiltration of military personnel at MAFR and potentially outlying areas; and
- Amphibious training outside of MAFR.

27 Special Operation Wing

The primary mission of the 27 SOF is to support USSOCOM by developing, achieving, and maintaining forces capable of meeting needs. Major groups within the 27 SOW include Operations, Mission Support, Maintenance, and Medical groups.



Map 2: Current MAFR Configuration, Key Areas and Location Map

Listing of Tenants and NR Responsibility

Tenant Organization	NR Responsibility
AFSOC 26th Special Tactics Squadron	None – no significant natural resources
AFLOA Area Defense Council	None – no significant natural resources
AFSOS WC551st Special Operations Squadron	None – no significant natural resources
AFISRA 43rd Intelligence Squadron	None – no significant natural resources
AFOSI Detachment 120	None – no significant natural resources
AETC 373rd TRS Detachment 17	None – no significant natural resources

2.1.4 Surrounding Communities

The nearest community to CAFB is Clovis, New Mexico. Clovis has an estimated 2014 population of 39,860 and is the county seat of Curry County, which had a population of 48,376 (U.S. Census Bureau 2013). Clovis has one airport accessible to small commercial and personal aircraft. The nearest major airports are in Lubbock, Texas (~100 miles southeast of Clovis) and Amarillo, Texas (~100 miles northeast of Clovis); (USAF 2003).

The nearest community to MAFR is the village of Melrose in Curry County, New Mexico. Melrose is located on the northeast side of the range, approximately 13 miles from the impact area. The population of Melrose was 651 in 2010 when the most recent census was conducted (U.S. Census Bureau 2010).

2.1.5 Local and Regional Natural Areas

Several natural areas occur in the general region of CAFB and MAFR. The Grulla and Muleshoe National Wildlife Refuges (NWRs) are within 30 miles of CAFB and provide habitat for various migratory bird species. Anderson Basin National Historic Landmark (Blackwater Draw Museum and Archaeological Site) is located in Roosevelt County between Clovis and Portales. Oasis State Park, located approximately 11 miles southwest of CAFB, is the closest state park. The nearest national forest to CAFB or MAFR is the Lincoln National Forest, which lies approximately 120 miles southwest of CAFB. Additionally, the Kiowa National Grassland is located approximately 125 miles north of CAFB. The nearest river is the Pecos River which lies approximately 55 miles west of CAFB. The City of Clovis has 17 public parks. These parks contain typical playground equipment, picnic facilities, team sport infrastructure, and a zoo (USAF 2003). Two Prairie Chicken Areas owned by NMDGF, Claudel and Liberty, lay 6 miles south and 12 miles southwest, respectively.

2.2 Physical Environment

2.2.1 Climate

The climate of CAFB and MAFR is arid or semiarid, with light precipitation, a high percentage of clear days, low relative humidity, and a relatively large change in diurnal temperatures (AFSOC 2007). For the city of Clovis, approximately 8 miles to the east of CAFB, the annual average maximum temperature is 72.0 degrees Fahrenheit (°F); the average minimum temperature is 43.0°F. Average monthly maximum temperatures range from 51.1°F in January to 92.0°F in July; average minimum temperatures range from 23.5°F in January to 62.2°F in July. The average annual rainfall in the area is 17.88 inches (in.), with the majority occurring in the summer months. Most of the precipitation for this region comes from sudden thundershowers which form over the mountains west of Clovis and travel east over the area. Monthly

precipitation averages vary from 0.4 in. in the winter months to nearly 3.0 in. in July and August (Western Region Climate Center 2009).

The downslope warming of air from the mountains tends to modify and temper the air masses which pass over this area from the west and northwest. Winds from the northwest blow downslope and enhance atmospheric ventilation, while winds from the south and east blow upslope and lead to increased cloud formation and precipitation. Winds in the area average 12 miles per hour (mph) and are often gusty and persistent. Wind speeds are typically highest during March and April. Prevailing surface winds are from the west (USAF 2001a).

2.2.2 Landforms

Topography

CAFB and MAFR are located on a southeastward-sloping regional plateau known as the Southern High Plains. Within this area of the plateau, the topography is typified by flat, featureless terrain having almost no relief. Characteristically, the High Plains have a smooth and gently sloping or undulating surface on which scattered, normally dry, flat-bottomed depressions are the dominant relief feature.

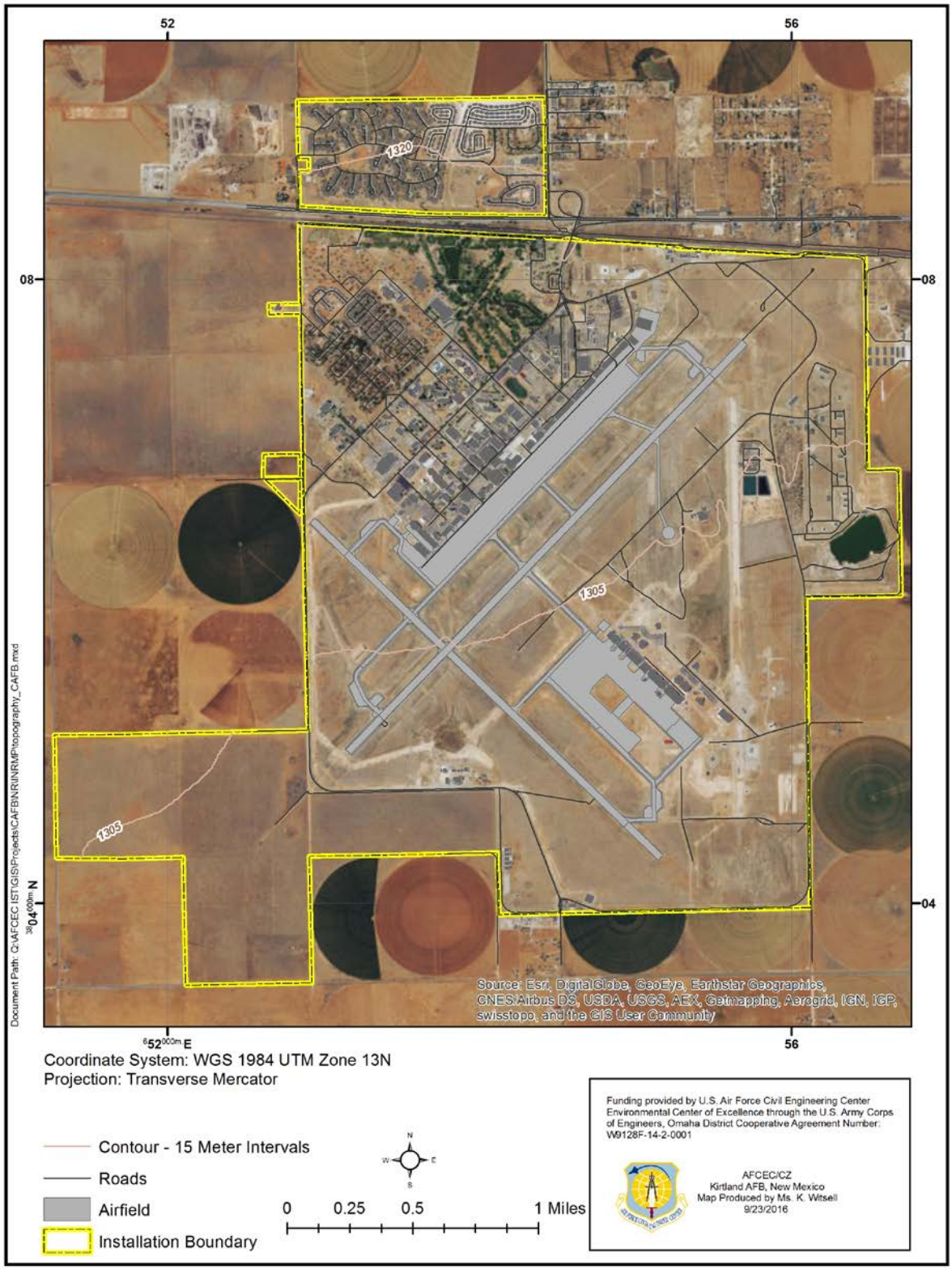
The highest elevation on CAFB is 4,330 feet (ft.) above sea level (asl.) in the northwest portion of the base, while the lowest point is 4,260 ft. asl. in the southeast portion. The natural land surface is flat, sloping to the southeast. The only topographical features are several small, shallow, playa lake beds (Map 3: Topography of Cannon Air Force Base). Playas are shallow lakes which collect water during rain events and often contain wetland or hydrophytic vegetation during wet seasons.

Elevations at MAFR range from approximately 4,200 ft. asl. in the northeast portion to over 4,600 ft. asl. in the southwest portion (Map 4: Topography of Melrose Air Force Range). Several drainages and small canyons are present on MAFR (e.g., Sheep Canyon), and playas can be found in the flat portions of MAFR. The largest topographic feature of MAFR is the Mesa, a northeast trending, flat-topped hill rising 4,660 ft. asl. on the southwest side of the range (USAF 2003).

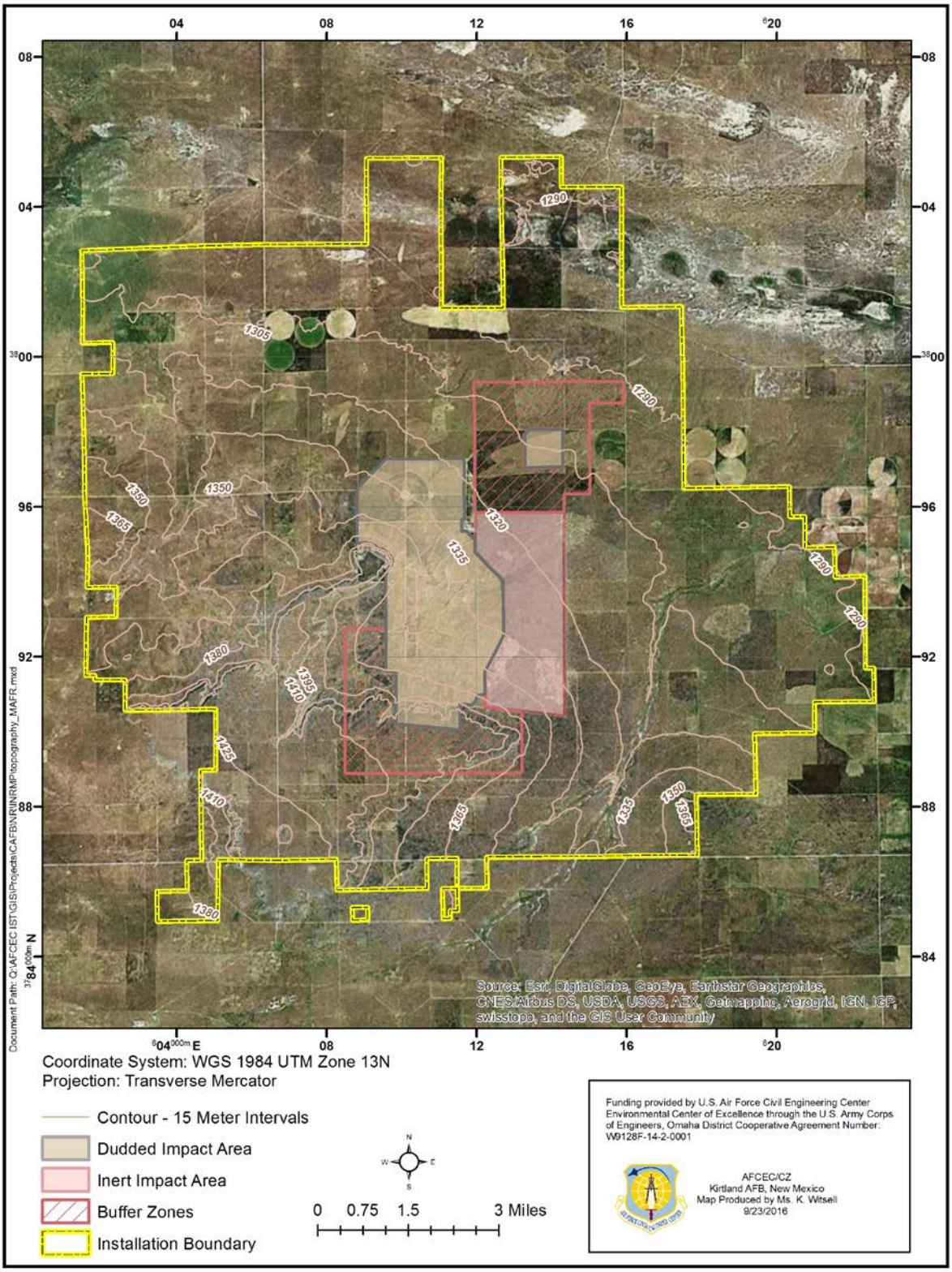
Improved, Semi-Improved, and Unimproved Lands

Improved, semi-improved, and unimproved lands consist of all land and water acreage for which an installation commander has responsibility. Improved grounds include acreage on which intensive maintenance activities must be planned and performed annually as fixed requirements. Semi-improved grounds are areas on which periodic maintenance is performed but to a lesser degree than the improved grounds. Unimproved grounds include all areas not improved or semi-improved (DoD 1996).

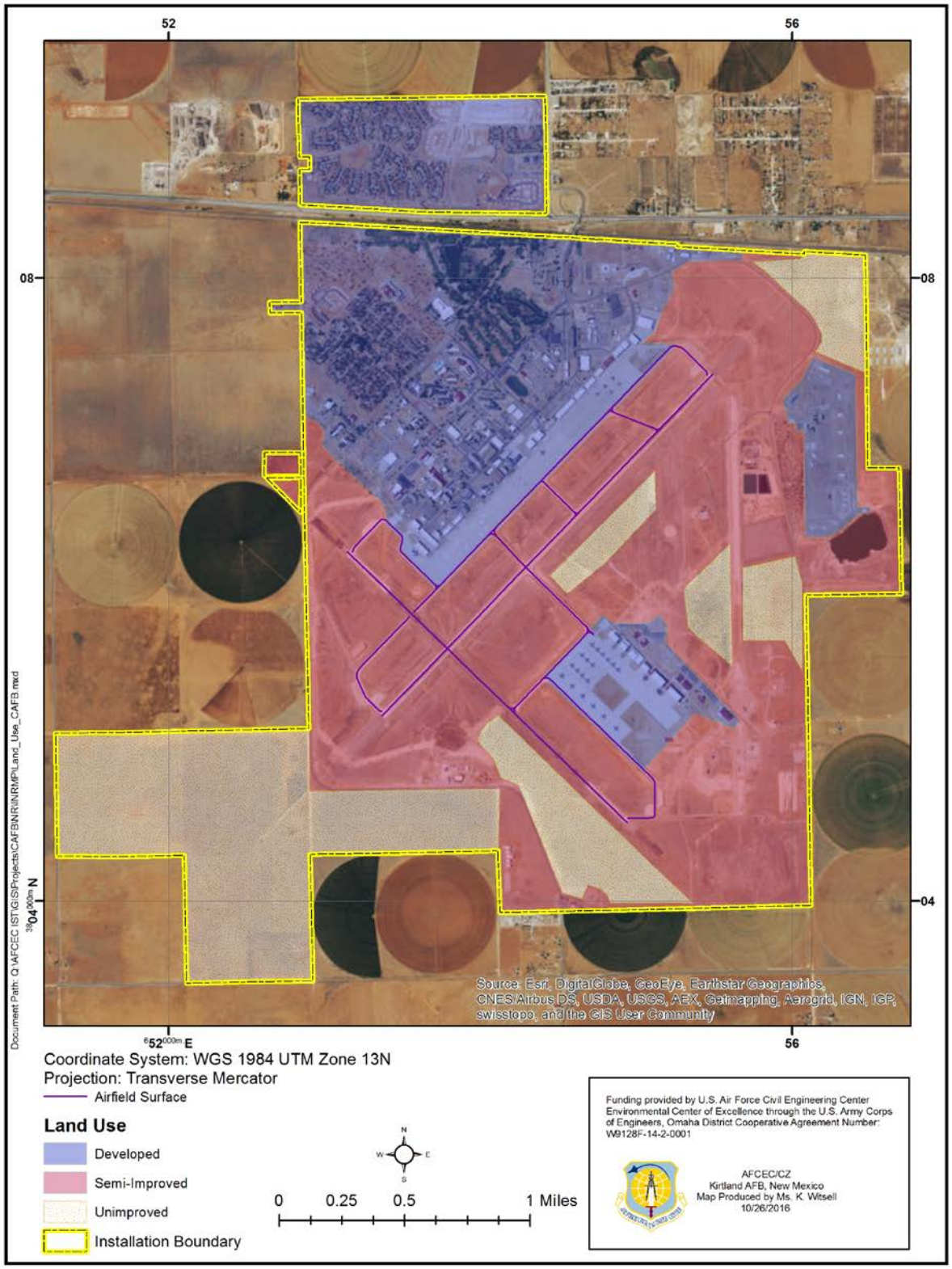
The total acreage of CAFB is 4,397 ac. Improved grounds at CAFB account for a total of 470 ac that include administrative areas, recreational areas, and housing areas. Semi-improved areas total 1,729 ac, areas with easements/license are 602 ac and unimproved lands total 1,596 ac; (Map 5: Land Types at Cannon Air Force Base). MAFR encompasses 70,978 ac. The range administrative area, which covers less than an acre, and Ground Electronic Combat Operations (GECO) compound, approximately 10 ac, are the only improved lands on MAFR. The impact area covers 10,126 ac and is classified as semi-improved land. Five areas previously used for agricultural crops are now in transition to a natural state and can be considered neither improved nor unimproved. Currently these former agricultural areas are disturbed but not ruderal. The remainder of land (60,841 ac) on MAFR is unimproved (Map 6: Land Types at Melrose Air Force Range).



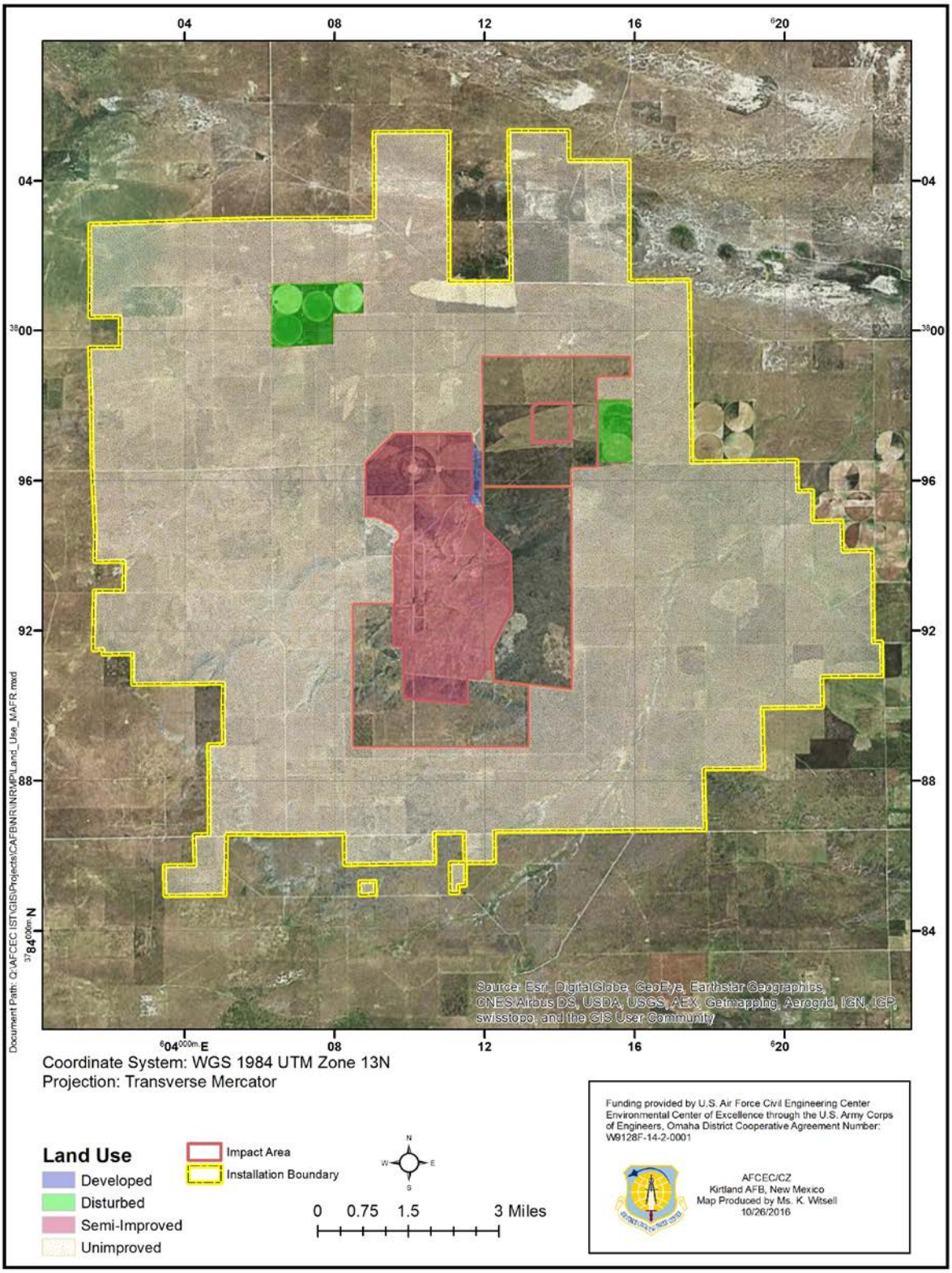
Map3: Topography of Cannon Air Force Base



Map 4: Topography of Melrose Air Force Range



Map 5: Land Types at Cannon Air Force Base



Map 6: Land Types at Melrose Air Force Range

2.2.3 Geology and Soils

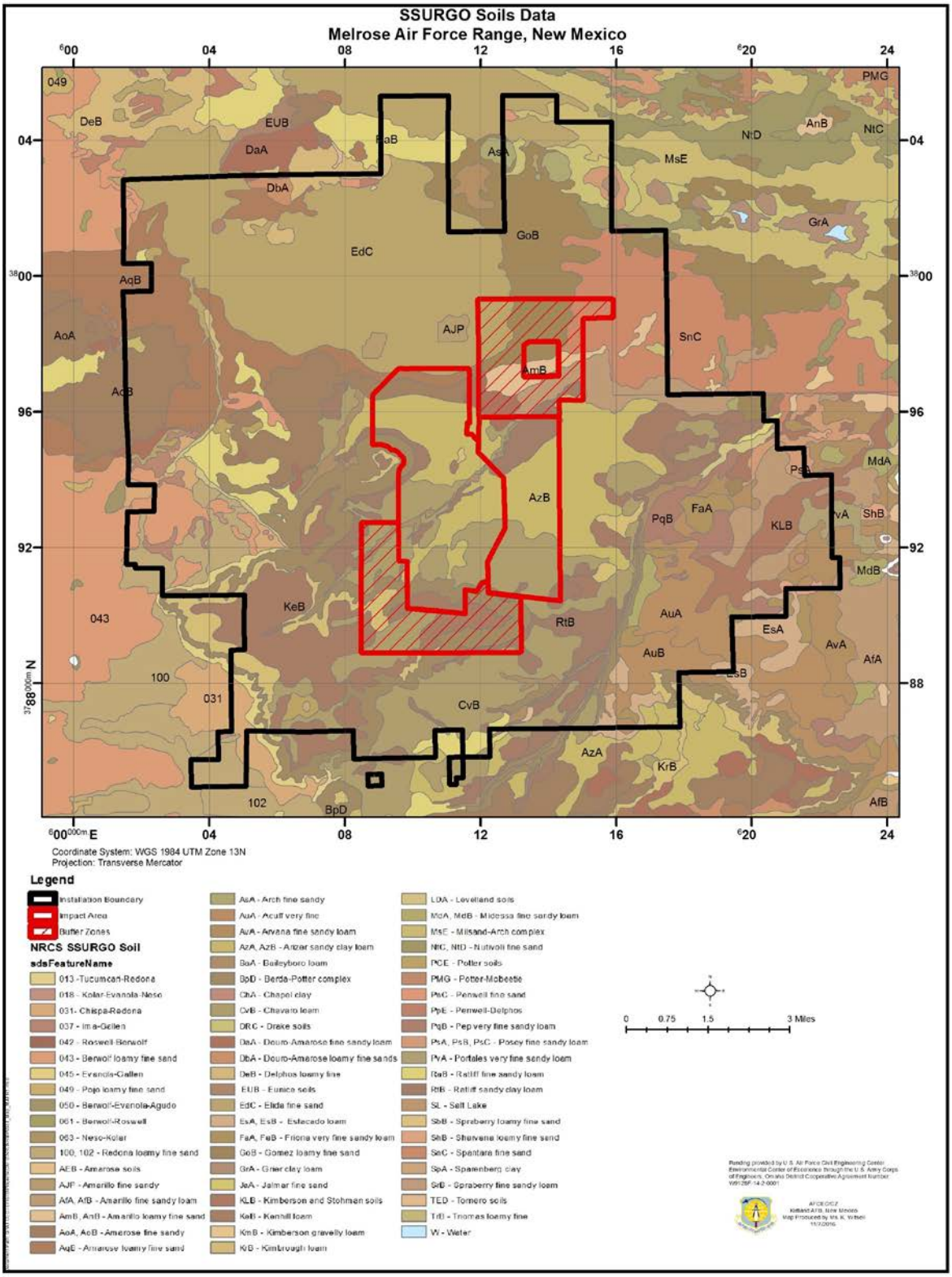
CAFB and MAFR are located in the Great Plains province, which consists primarily of horizontal Mesozoic and Cenozoic formations overlying slightly warped Paleozoic structure. As part of the Raton Section of the Great Plains, the area is unique in having high mesas and plateaus capped in part by Tertiary lava flows. The area is generally underlain by approximately 200 to 400 ft. of unconsolidated sediments deposited over sandstone known as the Triassic redbeds (USAF 2001a). These sediments are composed of unconsolidated poorly sorted gravel, sand, silts, and clays. This stratum of sediments forms the base of a section of the Ogallala aquifer, which is developed within the overlying sediments. The predominant extractable natural resources are oil, natural gas, sand and gravel, natural carbon dioxide, lime, and scoria (USAF 2002).

Soils in the region are comprised of a thin layer of topsoil that is underlain at relatively shallow depths by a leached clay-carbonate “caliche” hardpan. Caliche forms as calcium carbonate are leached from overlying sediments and precipitated in the pore spaces of underlying host sediments. Tightly cemented layers of caliche are present in several horizons in the natural soils and the Ogallala aquifer below.

Five major soil associations can be found on CAFB. These include Amarillo fine sandy loam, Amarillo loamy fine sand, Estacado loam, Randall clay, and Ranco clay. Amarillo fine sandy loam is the dominant soil association, covering about 90 percent of CAFB. The Amarillo series consists of very deep, well-drained, moderately permeable soils. Amarillo soils formed in loamy eolian sediments from the Blackwater Draw Formation of Pleistocene age. These soils are on nearly level to gently sloping plains. Slope ranges from 0 to 5 percent.

The soils on MAFR are much more complex than CAFB (Map 7: Soil Association Found on Melrose Air Force Range). Forty-nine primary soil associations are found on MAFR, with the most dominant being:

- Springer loamy fine sand - The Springer series consists of very deep, well-drained, moderately to rapidly permeable soils that formed in eolian sediments and alluvium. These nearly level to hummocky soils are on interdunes and dunes of sand sheets on stream terraces alluvial plains. Slope ranges from 0 to 10 percent.
- Clovis loam - The Clovis series consists of very deep, well-drained, moderately permeable soils that formed in medium and moderately fine textured sediments from quartzite gneiss, schist, sandstone, and limestone. The Clovis soils are on fan terraces, piedmont slopes, and plains. Slopes are 0 to 20 percent.
- Stegall loam - The Stegall series consist of soils that are well-drained and moderately deep, continuing down to the petrocalcic horizon. They are moderately to slowly permeable above the petrocalcic horizon and have a very slow permeability below the petrocalcic horizon. These soils formed in loamy eolian sediments over a layer of indurated caliche which is underlain by loamy calcareous material derived from the Blackwater Draw Formation of Pleistocene age. They are on broad, smooth, nearly level to very gently sloping plains. Slope ranges from 0 to 3 percent.
- Mansker and Portales loams - The Mansker series consists of very deep, well-drained, moderately permeable, soils. These soils formed in loamy, calcareous eolian sediments derived mainly from the Blackwater Draw Formation of Pleistocene age. These soils are on nearly level to moderately sloping plains. Slope ranges from 0 to 8 percent. The Portales series consists of very deep, well-drained, moderately permeable soils. These soils formed in medium to moderately fine textured, calcareous, lacustrine sediments of Pleistocene age. These soils are on nearly level to very gently sloping concave plains associated with playa lake basins. Slope ranges from 0 to 1 percent.



Map 7: Soil Association Found on Melrose Air Force Range

- Olton loam - The Olton series consists of very deep, well-drained, moderately slowly permeable soils that formed in loamy, calcareous eolian sediments in the Blackwater Draw Formation of Pleistocene age. These soils are on nearly level to gently sloping plains and upper side slopes of playas and draws. Slope ranges from 0 to 5 percent.

Permeability of the soils ranges from moderate in the loam soils to high in the sand soils. The soils are highly susceptible to erosion from the persistent winds of the plains.

Soil capability classifications are groupings of soils that show, in a general way, how suitable these soil groups are for most kinds of farming. It is a practical grouping based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The eight capability classes in the broadest grouping are designated by I through VIII. Class I soils have the fewest limitations, the widest range of use, and the least risk of damage when they are used. The soils in the other classes have progressively greater natural limitations. Class VIII soils and landforms are so rough, shallow, stony, or otherwise limited that they do not produce worthwhile yields of crops, forage, or wood products.

2.2.4 Hydrology

Surface Water

Cannon Air Force Base

Regional drainage in Curry County flows either into poorly developed ephemeral streams or closed basins as a result of the low annual precipitation and minimal topographic variation. Stream drainage is predominately to the southeast and east in long shallow valleys (locally known as draws and arroyos) that extend almost from the western edge of the High Plains to the eastern boundary of the plateau. The valleys eventually drain into one of three river valleys. These drainages seldom contribute actual flow to the rivers except during periods of heavy rainfall since the bulk of precipitation is otherwise lost to evaporation and infiltration into the ground (ACC 1996).

In areas not drained by the draws, surface runoff collects in playa lakes. These ephemeral lakes are widespread on the High Plains and are important for migrating waterfowl and shorebirds, as well as intermittent sources of water for other wildlife. Playas have no surface outlet, and any water they collect is eventually lost to evaporation, infiltration, or use by plants and animals (ACC 1995).

Storm water runoff at CAFB is entirely contained on base and either evaporates or infiltrates into the ground. An insignificant amount of storm water may migrate off the installation at very isolated areas, such as the extreme northeast and northwest corners. Approximately 50 percent of the storm water runoff from CAFB is conveyed to two playa lakes either by drainage ditches, storm sewers, or sheet flow. Most runoff from along the flight line is conveyed to the South Playa Lake. Storm water north of the Fire/Crash Rescue Facility spreads out and evaporates on the eastern side of Runway 4/22. Runoff also collects in several ponds and a wetland located on the golf course (Map 8: Hydrologic Features of Cannon Air Force Base).

The South Playa Lake is located on the south side of CAFB (ACC 1995) and is fed by surface runoff. Other surface features on the base include North Playa Lake and a golf course pond which receive effluent from the wastewater treatment plant. No permanent surface waters exist near CAFB. Water supplies are obtained exclusively from ground water. All are ephemeral, intermittent features with no nexus with waters of the U.S.

Melrose Air Force Range

Drainage in Roosevelt County at MAFR is mostly internal, although numerous small draws drain water from higher areas. Many playas are present in this county (U.S. Department of Agriculture [USDA] 1967). The drainage patterns expand in long shallow draws and arroyos that extend nearly from the western edge of the High Plains to the eastern boundary of the Southern High Plains Plateau. Although the draws in the area extend to the river valleys to the east as drainage systems, they rarely contribute actual flow to the rivers because the bulk of precipitation is lost to evaporation and infiltration into the ground.

The most prominent surface water features on MAFR occur in the long shallow valleys of the Canada del Tule and Sheep Canyon draws; several smaller drainages carry runoff from the Mesa (Map 9: Hydrologic Features of Melrose Air Force Range). The Canada del Tule draw carries seasonal runoff from the southeastern half of the range and flows northeast through it. Historically, the draw carried water to Tule Lake, located northeast of the range; however, due to the numerous impoundments along its course, flow has decreased and evidence of surface water flow north of Sundale Valley Road is difficult to identify.

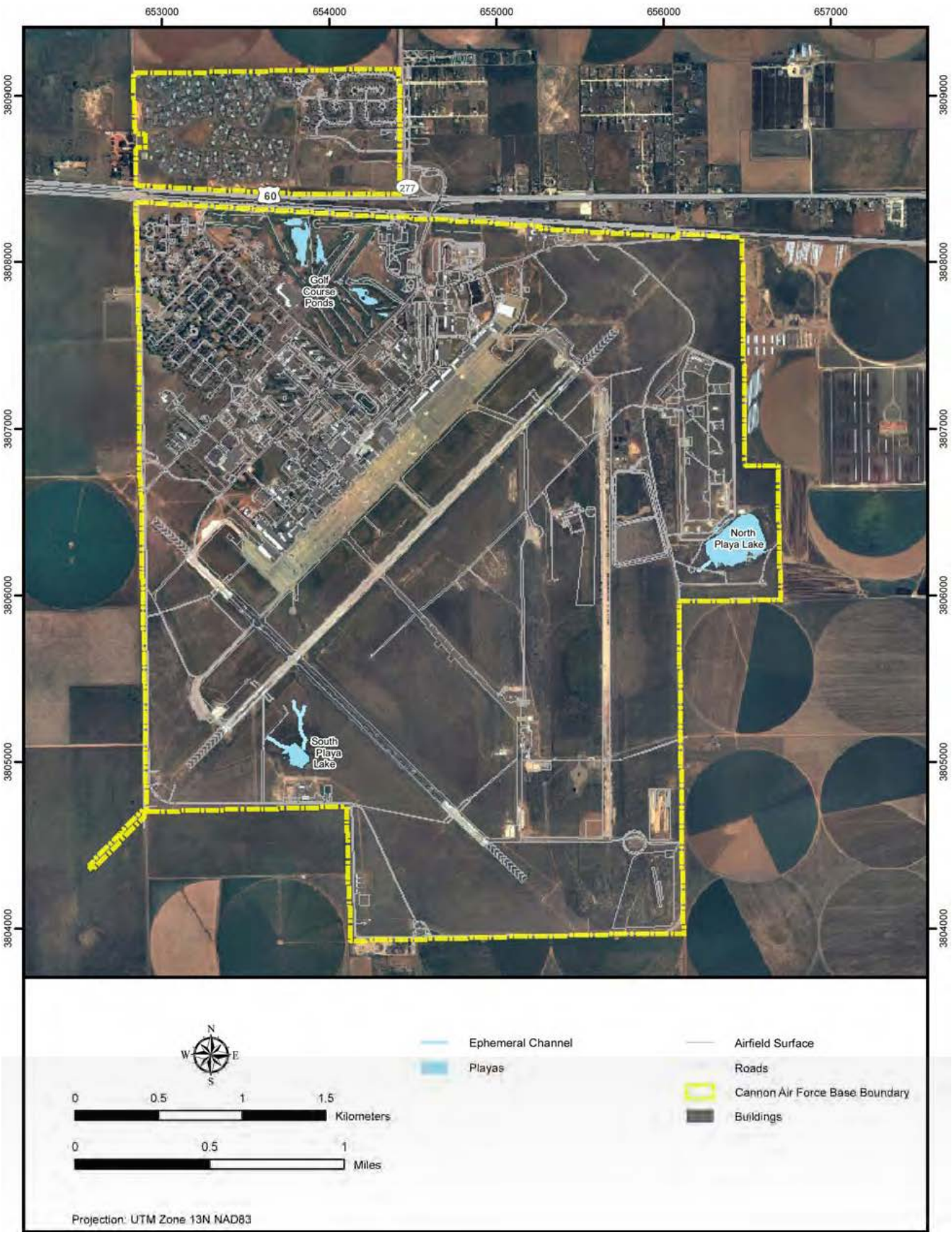
The Sheep Canyon drainage area is comprised of a single major drainage that flows northeast from the Mesa and several small seasonal tributaries. Other surface water features on MAFR include four periodically flooded wetlands primarily located in shallow playa basins in the eastern portion of the range, two playa ponds, and numerous on-channel impoundments in natural and man-made drainages. All MAFR features are ephemeral, intermittent features with no nexus with waters of the U.S.

Groundwater

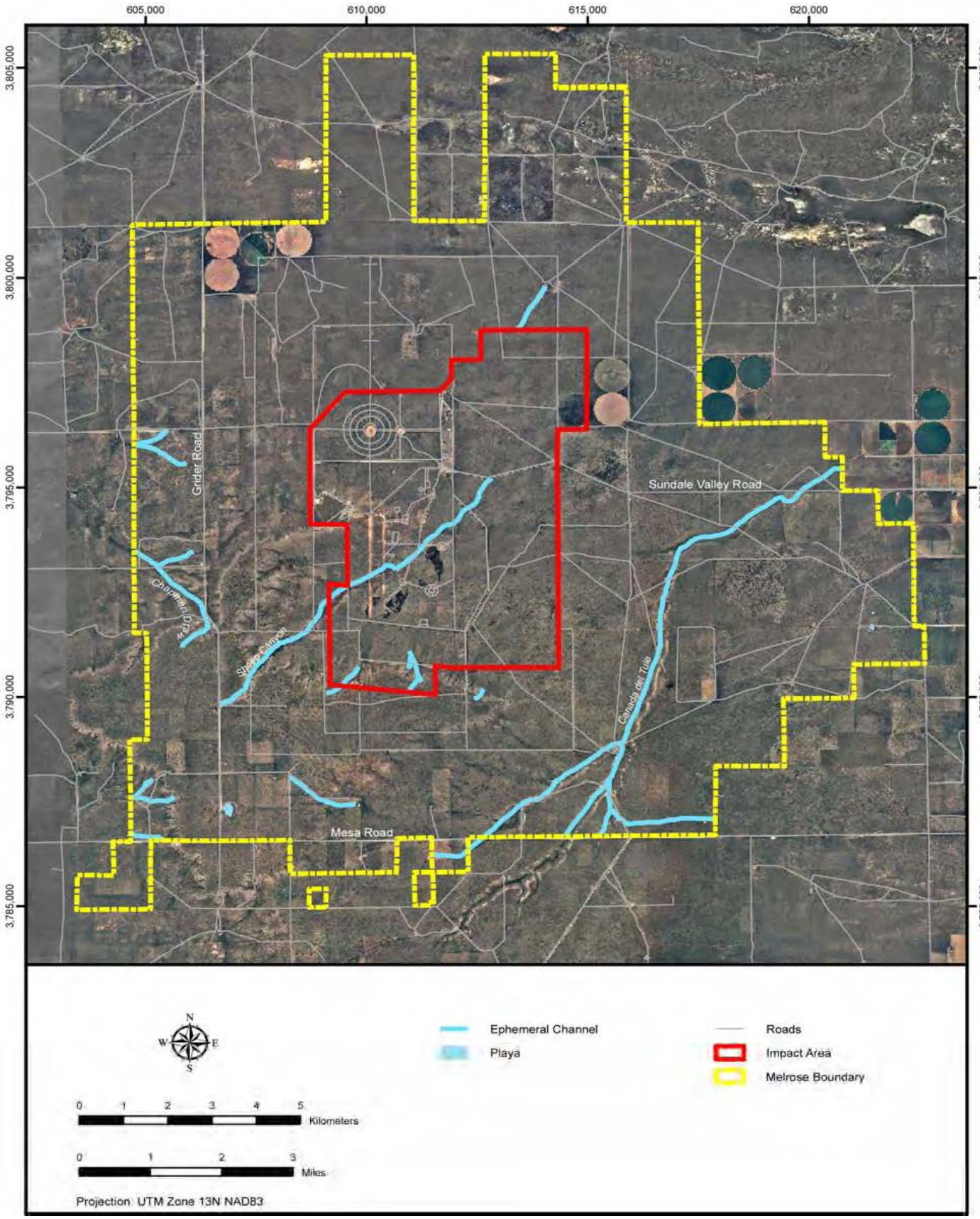
Groundwater occurs under unconfined conditions at CAFB and MAFR. The base is underlain by a portion of the High Plains aquifer (regionally known as the Ogallala Aquifer) which developed in the unconsolidated sediments of the Ogallala Formation. Given the relative lack of permanent surface water resources, water supplies for irrigation, industrial, and domestic purposes are obtained from groundwater. Some irrigation is from treated effluent from the wastewater treatment plant. The thickness of the aquifer ranges from zero, where the Ogallala Formation wedges out against older rocks, to as much as 150 ft. in parts of Curry County. The groundwater flows generally in an east to southeast direction and the slope of the water table is a relatively flat 7 to 15 ft. per mile. The upper 50 ft. of sediments are composed of silty sand with zones cemented by caliche. These caliche zones lower the permeability and amount of infiltration of surface water through the near-surface sediments. Most groundwater in the Ogallala aquifer is a calcium magnesium carbonate type, although some areas of southeastern New Mexico exhibit a bicarbonate sulfate quality due to high concentrations of dissolved sulfate (Rebman 2016).

Impoundments

Several man-made impoundments are present on CAFB and MAFR. On CAFB, three impoundments exist on the golf course and a playa lake (North Playa Lake) located along the installation’s eastern boundary Both North Playa Lake and a golf course pond receive effluent from the wastewater treatment plant (USAF 2002). On MAFR approximately 10 earthen stock tanks are present. The average size of these earthen stock tanks is estimated at one-third acre. No known water quality concerns have been documented at any of these impoundments. All are ephemeral, intermittent features with no nexus with waters of the U.S.



Map 8: Hydrologic Features of Cannon Air Force Base



Map 9: Hydrologic Features of Melrose Air Force Range

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

As discussed earlier, CAFB and MAFR are located within the High Plains Ecoregion. This ecoregion is higher and drier than the Central Great Plains to the east, and in contrast to the irregular, mostly grassland or grazing land of the Northwestern Great Plains to the north, much of the High Plains is characterized by smooth to slightly irregular plains with a high percentage of cropland. Grama-buffalo grass is the potential natural vegetation in this region as compared to mostly wheatgrass-needlegrass to the north, Trans-Pecos shrub savanna to the south, and taller grasses to the east.

Specifically, CAFB and MAFR are within a sub-ecoregion of the High Plains known as the Llano Estacado. Thousands of playa lakes (seasonal, depressional wetlands) occur in this area, many serving as recharge areas for the important Ogallala Aquifer. These playa lakes are also essential for waterfowl during their yearly migration along the Central Flyway of North America. The Llano Estacado was once covered with shortgrass prairie, composed of buffalograss, blue and sideoats grama, and little and silver bluestem. About 80-90 percent of the Llano Estacado in Texas and New Mexico is presently tilled for agriculture, with more rangeland to the west. Farmers produce cotton, corn, and wheat under dryland agriculture or irrigated with water pumped from the Ogallala Aquifer.

Ecosystems

Broadly, CAFB and MAFR have two primary environments that support biotic communities; terrestrial and freshwater ecosystems. The terrestrial ecosystem can be further divided into shortgrass prairies, mesquite scrubland, sandsage/soapweed yucca, sand hills, canyons, current and former prairie dog towns, wind breaks, former homesteads, habitat management areas, former cropland, managed lands, disturbed lands, and urban areas (Map 10: Habitat Types and Locations on Cannon Air Force Base). Each of these areas has a distinctive vegetation association, and often unique fauna. These communities will be described in more detail in the Vegetation section. The freshwater ecosystem is comprised of playa lakes and ephemeral streams and channels. Flora and fauna assemblages for each are also described in the following Vegetation section.

2.3.2 Vegetation

Floral community descriptions are based on existing data from land condition trend analysis, wetland, and invasive plant surveys.

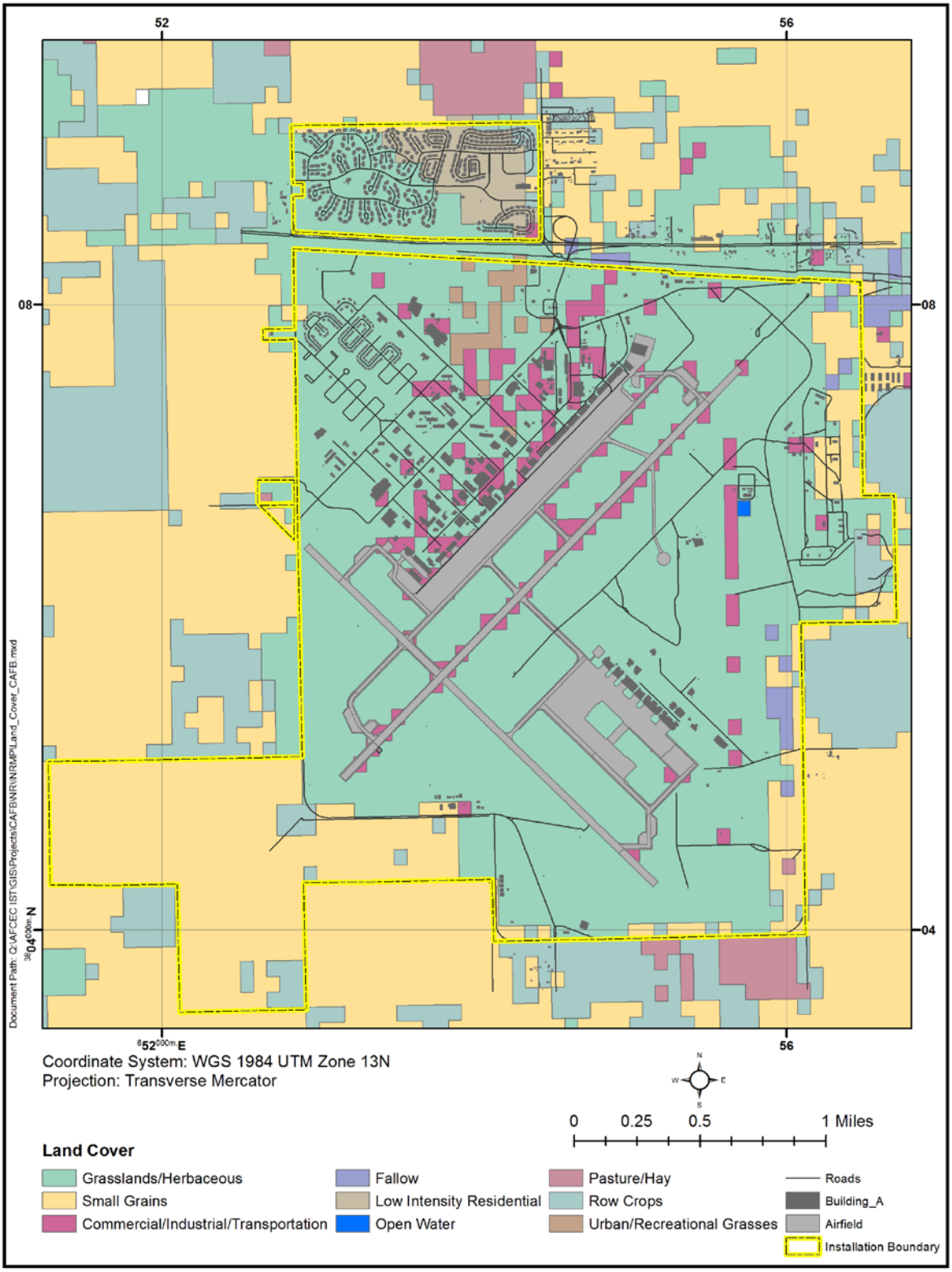
2.3.2.1 Historic Vegetative Cover

Historically, the areas now occupied by CAFB and MAFR were a treeless grassland with a very small brush component (Marcy 1850, Bray 1906, Holden 1932). Dependent on soil type the grassland varied from a shortgrass to a midgrass prairie with a tall grass component. The short grass areas were historically dominated by black grama (*Bouteoua eriopoda*) (**Dick-Petty 1993, USDA a, b, c, d**). Currently blue grama (*Bouteloua gracilis*) and buffalograss (*Buchloe dactyloides*) dominate the short grass areas with black and sideoats grama (*Bouteloua curtipendula*) subdominant. The short grasses occurred over soils with higher proportions of loam and clay. As the soil texture gradates to a more sandy texture the vegetative composition transitions to mid and tall grass species. Cane (*Bothriochloa barbinodis*), silver (*Bothriochloa laguroides*), little (*Schizachyium scoparium*) and sand bluestem (*Andropogon halli*), sand (*Sporobolus cryptandrus*),

spike (*Sporobolus contractus*) and giant dropseed (*Sporobolus giganteus*), giant sandreed (*Calamolvilfa gigantea*), plains bristlegrass (*Setaria leucopila*) and others dominated these areas. Following settlement of the area under to the Homestead Act most of the area was used as rangeland or for tillage agriculture. Brush species became a more prominent component of the rangeland as fire was controlled and grazing pressure was confined primarily to grasses, the plants preferred by horses and cattle.

Prior to airfield construction at CAFB, cultivated agricultural fields covered the area now occupied by the base (Buchanan and Ross 1958). Agricultural fields, dairies, and rangeland currently surround the base.

Until 2012, much of MAFR range was managed for cattle grazing and farming under CAFB's agricultural outlease program. The grazing and farming programs were terminated in 2012. Infrastructure to facilitate these activities are on longer present. Currently, fire is the primary tool to control fire danger and manage the rangelands on MAFR. With fire a major component of grassland management, brush species should decrease in height and density. If herbicides and mechanical treatment of brush are employed as proposed, brush reduction will occur more rapidly. Tumble weed (*Salsola tragus*) is often among the first plants to colonize the bare areas following treatment. The previously farmed areas have reverted back to modified grasslands, but are generally dominated by introduced and weedy species with a large forb component. Species-specific vegetation associations for MAFR are shown in figure (Map 11: Vegetation associations found on Melrose Air Force Range). A complete list of all vegetation documented from 2012 to 2016 on CAFB and MAFR can be found in Appendix F Melrose Air Force Range Plant List 2015-2016.



Map 10: Habitat Types and Locations on Cannon Air Force Base

2.3.2.2 Current Vegetative Cover

Shortgrass Prairies

Shortgrass prairie habitat occurs on the southern portions of MAFR. This plant community is dominated by blue grama and buffalograss with black grama prominent in some areas and lesser amounts of forbs and shrubs unevenly distributed across the landscape. The perennial grass and perennial forb components remain fairly constant in relation to each other, with the total production of both components increasing or decreasing in relation to precipitation timing and amount. The woody component has increased and become a major component of the composition except where control measures were implemented and to a lesser extent in areas where fire has occurred. Cholla (*Cylindropuntia imbricate*), honey mesquite (*Prosopis glandulosa*) and broom snakeweed (*Gutierrizia sarothrae*) are the primary shrubby species in this area. Forbs include annual buckwheat *(Eriogonum annuum*), silverleaf nightshade (*Solanum elaeagnifolium*), sunflower (*Helianthus annuas*) and dotted gayfeather (*Liatris punctata*). Variations in temperature, rainfall and fire are the primary drivers of the annual grass and annual forb components. Large variations in the annual component occur as these plants are opportunistic and first to colonize bare areas following prolonged drought or fire.

The typical percent composition is made up of 70-75 percent grasses, around 10 percent woody species, and 10-15 percent forbs. Additional grasses found in this area are silver bluestem, threeawn species (*Aristida* spp.) and tobosa (*Pleuraphis mutica*).

Prairie Dog Towns

The composition of prairie dog towns is somewhat similar to the surrounding short grass prairies except the vegetation is shorter and a larger number of forbs are present. IRNR 2016b (*Cynomys ludovicianus*) clip the plants surrounding their burrows, therefore, species shorter in stature such a buffalograss are more common than taller grasses. Forbs are more common than in the short grass prairie but they too are clipped short. Silverleaf nightshade and scarlet globemallow (*Sphaeralcea coccinea*) are common but are shorter than those plants found in surrounding areas. More bare ground if found in prairie dog towns and plants that grow prostrate to the soil surface. Prairie bluet (*Hedyotis nigricans*), small matweed (*Gulleminea densa*), prostrate spurge (*Chamaesyce prostrata*) and wooly tidestromia (*Tidestromia lanuginosa*) are examples.

Mesquite Scrubland

The mesquite grassland dominated habitats on MAFR are generally located north of the shortgrass prairie, however, some portions of the shortgrass prairie are heavily invaded by mesquite, also. Honey mesquite is native to eastern NM but density has increased over time as grazing concentrated on grass plants and fire suppression was implemented following settlement and increased in effectiveness over time. The individual mesquite plants range in maturity and height (mainly 3-5 ft. but can reach >12 ft. in height) and are the dominant species in this habitat type. The mesquite generally grows in closely spaced clusters or closed canopied stands. Honey mesquite exerts a profound influence on neighboring vegetation, soils, subcanopy microclimate, wildlife, and insect populations. High densities of mesquite suppress grass growth and can reduce understory species diversity.

The mesquite grassland habitat is made up of ≥40 percent mesquite with the remaining vegetation consisting of forbs and grasses. The dominant forbs and grasses in this habitat include: blue, sideoats and hairy grama, purple three-awn (*Aristida purpurea*), silver bluestem, buffalograss, red lovegrass (*Eragrostis secundiflora*), tobosa, Hall's panicum (*Panicum hallii* var. *halli*), pricklypear (*Opuntia spp*), broom snakeweed, western ragweed (*Ambrosia psilostachya*), annual buckwheat, spinytooth gumweed (*Grindelia nuda* var. *nuda*), and common sunflower.

Initial treatment or control of mesquites requires mechanical or chemical control followed by maintenance suppression to keep mesquite from repopulating. On MAFR, some of the mesquite infested pastures have been grubbed to open the canopy and eliminate competition allowing forbs and shortgrass species to establish. Tumble weed, an exotic forb, often is first to colonize these disturbed areas. These plants break loose and blow across the land and can cause fence damage and problems on area roads. In some areas the canopy was reduced by fire, however, mesquite respond vigorously to removal of their tops and quickly recover to canopy at or above pre-burn levels. Mesquite in grubbed areas are reinvading from portions of plants not killed in the grubbing process and newly sprouting plants. Young mesquite can be controlled by fire, however, mechanical of chemical methods are required for those plants that survived the grubbing process.

Sandsage/Soapweed Yucca

This habitat is dominated primarily by sand sagebrush (*Artemisia filifolia*) and soapweed yucca (*Yucca glauca*). The shrub components of this type are important in terms of nutrient cycling and ecosystem function where sagebrush, soapweed yucca and other subdominant shrubs trap and accumulate particulates and nutrients. This continuing accretion of organic matter and nutrients is especially important to insects and ultimately to rodents, herpetofauna, and birds that consume them (Whitford et al. 1998).

An understory of grasses and forbs is also present surrounding the woody species. Dominant grass species interspersed with the sandsage and soapweed yucca are hairy grama (*Bouteloua hirsuta*), purple threeawn, sand dropseed, red lovegrass, and mesa dropseed (*Sporobolus flexuosus*), needle and threadgrass (*Hesperostipa comata*), fringeleaf paspalum (*Paspalum setaceum*) and Hall's panicum. Queen's delight (*Stillingia sylvatica*), paperflower (*Psilostrophe tagetina*), western ragweed, small-flowered gaura (*Gaura paviflora*), annual sunflower and annual buckwheat are the dominate forb species in this habitat. Grass and forb production fluctuates widely from year to year dependent on the amount and timing of precipitation. This is the primary habitat for Lesser Prairie Chickens on MAFR.

Sand Hills

The sandhill habitat is located in the northeastern portion of MAFR and the south portion of the NM Land Gift Area and is characterized by sand dune hills. Vegetative cover varies from areas that have no vegetation to those with moderate cover. The sandhill habitat is dominated by scattered shrubs such as sand sage and soapweed yucca with a mixed-grass and forb understory. A very small amount of shinnery oak (Quercus harvardii) is found in both the northeast and southwest areas of MAFR. The shrub populations are the most constant, changing with long-term moisture cycles. Forb populations fluctuate widely from year to year with amount and seasonal distribution of rainfall, past grazing regime and fire frequency. Gaura (*Gaura* sp.), western ragweed, annual sunflower, annual buckwheat, and queen's delight are the typical forb species found in this habitat type. Grasses consist largely of giant, mesa, sand and spike sandreed, sand bluestem, black grama and needle and threadgrass. These areas are an important component of Lesser Prairie Chicken habitat on MAFR

Soils in this habitat type are typically deep and well drained with a low water holding capacity and are highly erodible. The soil can become unstable when organic residues and vegetative cover are removed. The vulnerability of the sandhill habitat to wind erosion and blowouts increases as these areas are disturbed.

Canyons

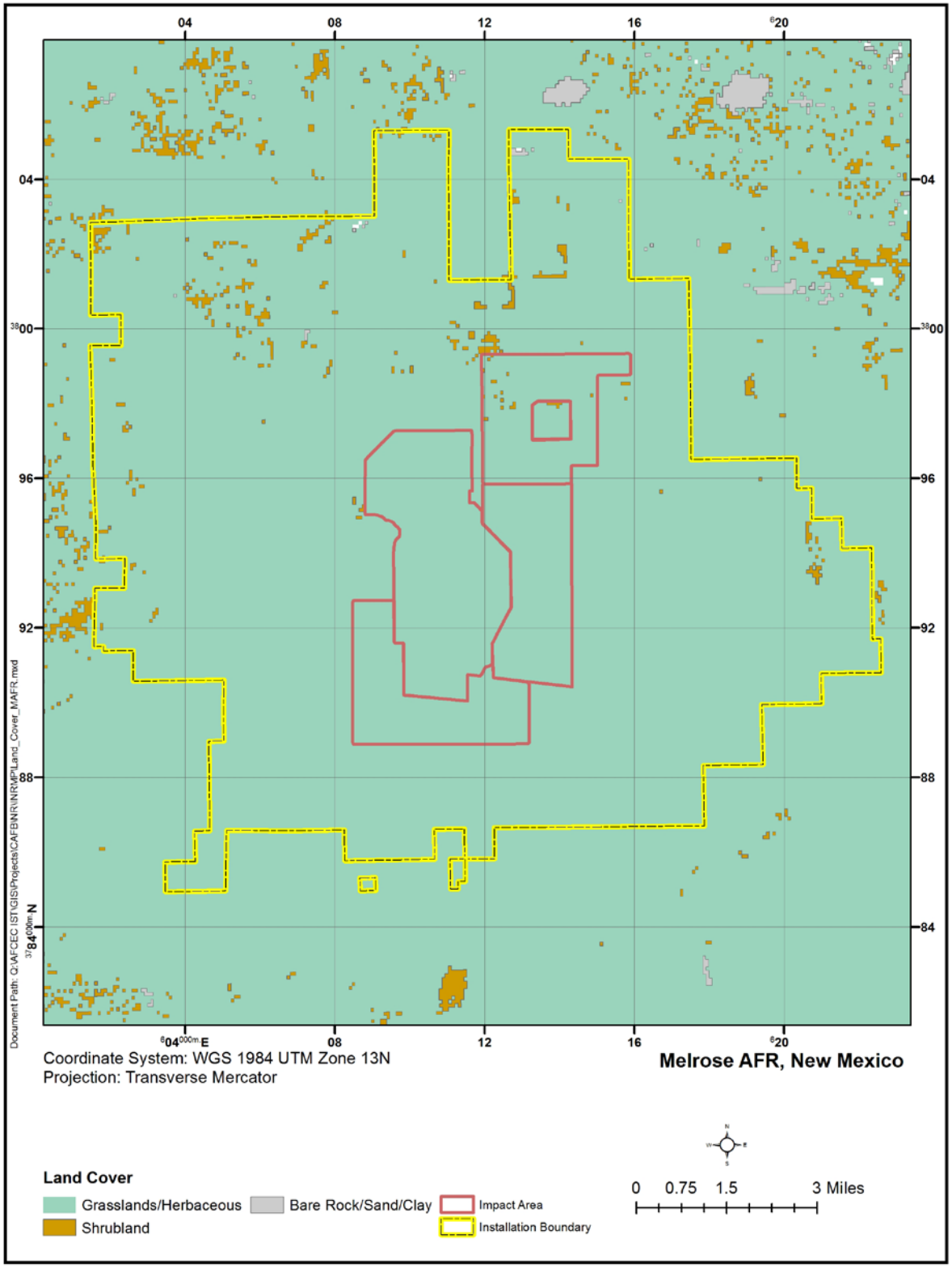
This habitat is confined to the southwestern portion of MAFR. The rocky limestone outcrops and canyon wall provide the steepest topographical relief on MAFR. The canyon habitat is largely composed of

shortgrass species with varying amount of perennial forbs and a few scattered shrubs. Dynamic climatic flux is exhibited by the annual grass and annual forb species composition which fluctuate annual with variation in rainfall and other climatic factors.

Of the plants found in this habitat type 70-80 percent of the populations is composed of grasses, 5-10 percent woody species, and 10-15 percent forbs. The dominant grass species in this habitat are blue, hairy and black grama (Bouteloua hirsuta), buffalograss, false buffalograss (Munroa squarrosa), purple threeawn, sixweeks threeawn (*Aristida adscensionis*), silver bluestem, tumble windmill grass (*Chloris verticillata*), ring muhley (*Muhlenbergia torreyi*), and sand dropseed. Forbs include blackfoot daisy (*Melampodium leucanthum*), bigelow sage (*Artemisia bigelovii*), broom snakeweed, chocolate flower (*Berlandiera lyrata*), feather dalea (*Dalea formosa*), and scarlet globemallow (*Sphaeralcea coccinea*). The shrubs and cacti consist of net- leaf hackberry (*Celtis reticulata*), three-leaf sumac (*Rhus trilobata*), brown spine prickly pear (*Opuntia phaeacantha*), ephedra (*Ephedra torreyana*), mesquite, jumping cholla (*Cylindropuntia tunicata var. davisii*), lace hedgehog cactus lace hedgehog (*Echinocereus reichenbachii*), and rabbitbrush (*Chrysothamnus pulchellus ssp. baileyi*).

Old fields

Areas are scattered across MAFR that were at one time cultivated. Some are deflated having lost large amounts of soil, primarily to wind, over the time they were cultivated and/or after they were abandoned or efforts made to return them to grasslands. Sand ridges are evident primarily on the east and north sides where blowing soil accumulated during wind events. Cultivation destroyed the soil structure and ecology thus the recovery rate under the semiarid windy conditions is a long term proposition. Fields that were abandoned or reseeded shortly after the homestead period are visible from the air and on the ground. Plant composition differs from surrounding grasslands and is less diverse. Some were planted to native grasses but never back to the mix that was disturbed at cultivation. Others were planted to a single species such as side-oats grama many years ago and the composition has changed little since that planting. Fields recently planted to grasses were commonly planted to non-native species such as Caucasian bluestem (*Bothriochloa ischaemum*) and weeping lovegrass (*Eragrostis curvula*) that are invasive. Weedy species including common sandbur (*Cenchrus spinifex*), Russian thistle (*Salsola targus*), kochia (*Kochia scoparia*) and other annual plants are common and in places dominate the composition of those old fields most recently cultivated. These old fields tend to have a smaller proportion of the soil covered by perennial grasses, a greater proportion of forbs and a greater amount of bare ground that surrounding native grasslands. Overseeding these areas with appropriate native grass and forb seeds could improve them as wildlife habitat, reduce bare ground and help bring them back to a healthier state.



Map 11: Vegetation associations found on Melrose Air Force Range

2.3.2.3 Turf and Landscaped Areas

Urban Areas

Flora – Urban habitat on CAFB comprises a large portion of the base in the northwest quadrant. Buildings, housing, munitions storage, aircraft hangers, and parking lots are all located in this habitat. The small urban habitat area on MAFR is located near the range offices and the range tower in the central portion of the range. The urban habitat is highly maintained and is comprised primarily of ornamental and non-native grasses, shrubs, and trees. Artificial watering has assisted many of the plants in establishment and allowing for denser, thicker vegetation than found in other habitats. The grass in this area is composed primarily of Bermuda grass (*Cynodon dactylon*), Johnson (*Sorghum halapense*), buffalograss, tumble windmillgrass, and blue grama. Many of the vacant lots, however, are overgrown with various forb species including sandbur, Russian thistle, pigweed, and kochia. Various exotic and ornamental trees and shrubs are found throughout the urban habitat areas. Siberian elms are plentiful throughout the urban housing areas on CAFB.

Fauna – The abundance of large trees and shrubs provide habitat for many common avian species including mourning dove, Eurasian collared dove (*Streptopelia decaocto*), great-tailed grackle (*Quiscalus mexicanus*), European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and American robin (*Turdus migratorius*)

2.3.3 Fish and Wildlife

Faunal community descriptions are based on surveys for endangered, threatened, candidate, sensitive species plus general biological surveys.

2.3.3.1 Descriptions of Terrestrial Fauna

The wildlife on CAFB and MAFR have changed considerably since the area was settled by Europeans. Immense bison (*Bison bison*) herds wandered over large expanses and were the dominant species of the treeless plain. Their pounding hooves and foraging left an enormous impact to the environment as they moved through an area. Fire was another major force, which was responsible for the lack of trees and minimal brush. Large numbers of pronghorn (*Antilocarpa americana*) were resident as the bison and fire promoted the forbs and small shrubs that make up their diet. Mesquite was virtually absent from the landscape. Cholla, although present, were smaller and did not form dense thickets as they are today. Only those species not dependent on brush or trees were found in the area. Raptors and ravens were limited with few perches available. Additionally, wolves (*Canis lupus*), the top predator on the plains were extirpated and top predator role fell to the coyotes (*Canis latrans*).

CAFB

The land parcel that hosts CAFB is 4397 acres in size, consisting of a highly impacted short grass prairie. Impacts include a golf course, runways, streets, parking areas, xeriscape, buildings, mowed grasslands, lawns, recreation areas, playas that receive supplemental water, ponds with permanent water, landfills, and others. Every portion of CAFB is highly modified from the natural state. Despite this fact, CAFB provides habitat to a variety of resident, transitory and migrant wildlife species.

Ungulate species are seldom, if ever, present on CAFB due to several factors, primarily a fence constructed to exclude unauthorized access. Large animals would present a hazard if they wandered onto the runways. Pronghorn and Mule Deer (*Odocoileus hemionus*), although found nearby, are unlikely to find their way onto CAFB, though they have been photographed along the fence. CAFB does not provide suitable mule deer habitat, but if they, or any other large animal, did wander onto the base, they would be removed to eliminate runway hazards.

Several native species are present on CAFB, including three NM Species of Greatest Critical Need (SGCN); the black-tailed prairie dog (*Cynomys ludovicianus*) and Western burrowing owl (*Athene cunicularia*). The Black-tailed prairie dog is one of the most visible species and is present across much of CAFB. Their abandoned burrows are used by Western burrowing owl, cottontail rabbits, snakes, lizards and other wildlife.

CAFB is home to ponds, playas, drainages, and wetlands that add to the diversity of wildlife found on the base. These wet areas are not classified as jurisdictional waters of the U.S. The playas, natural wetlands found on CAFB receive larger amounts of water than similar playas in the surrounding landscape. This additional water has two primary sources; the sewage treatment plant and runoff from rain events in excess of normal as a result of an abundance of impervious surfaces such as buildings, parking lots, streets, sidewalks and runways. The north playa has standing water on a continual basis, as it receives water from the sewage treatment plant in addition to overland flows from rainfall events. This playa is home to fish and provides habitat for numerous water and wading birds including mallards (*Anas platythyncos*), ruddy duck (*Oxynura jamaicensis*), American avocet (*Recurvistra americana*) and great blue heron (*Athea herdias*). Other birds and mammals use the playa as a source of drinking water. The availability of water, the presence of humans, and the food left out for pets makes CAFB one of the more likely places in the area to find raccoon (*Procyron lotor*).

See Appendix C for a list of species observed on CAFB.

MAFR

In the recent past, the majority of MAFR was grazed rangeland, similar to surrounding rangelands. Since the fall of 2012, grazing has ceased. Fire has since been used, instead of cattle, to manage rangeland vegetation and wildfire risk in support of the military mission. With frequent fire, a shift from a scrub/grasslands toward pure grassland is probable. If herbicides and/or mechanical methodologies are applied, this shift will occur more rapidly. Brush species such as mesquite, cholla, sandsage, yucca, etc., will become a lesser portion of the species composition and those that remain will be shorter. Forbs will be a larger component of the plant composition. If large areas infested with mesquite are treated with herbicides, the action will promote a shift toward a pure grassland. Grass species most adapted to fire will dominate. Shifting herbaceous speciation will promote a proportional shift in wildlife species to those more adapted to grassland. Pronghorn will be favored over mule deer, and the habitat will be more suited to horned larks and Western meadowlarks than for loggerhead shrikes (*Lanius loudovicianus*) and Bullock's orioles (*Icterus bullokii*).

No permanent water bodies exist on MAF, though there are three playas classified as wetlands. Temporary and ephemeral water is present during wet periods in playas, drainages, and ponds developed for livestock. These provide temporary habitat for water related species such as waterfowl and amphibians, supply water for various wildlife, and add diversity to flora and fauna on the landscape.

The elevation of MAFR ranges from approximately 4200 feet in the north to 4600 feet on the southern mesa. Soils, vegetation, and wildlife change with the terrain. In the lower elevations, soils tend to be sandy and grasses taller. The higher elevations tend toward loamy soils and short grasses. Some wildlife species, for example coyotes, are generalist in their habitat selection and are found across MAFR. Most of the reptiles are widespread as well, such as prairie rattlesnakes (*Crotalus viridis*), coachwhips (*Masticophis flagellum*), bullsnakes (*Pituophis catenifer*), prairie lizards (*Sceloporus undulatus*), lesser earless lizards (*Holbrookia maculata*), Texas horned lizards (*Phrynosoma cornutum*), ornate box turtles (*Terrapene ornata*) and other species. Pronghorn rely on speed and line-of-sight for defense, and so prefer open habitats. Hearing may be more important to mule deer, which employ a stotting (bouncing) gait for evasion

and prefer areas with more cover. Mourning doves (*Zenaida macroura*), striped skunk (*Mephitis mephitis*), desert cottontail (*Sulvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*) and white footed mice (*Peromyscus leucopus*), too, can be found across the entire range. Other species are much more location-specific. For instance, cactus wren (*Campylorhynchus brunneicapillus*) are only found where there are large cholla, in which they build their nest and rear their young. Similarly, loggerhead shrikes are found in mesquite areas, and burrowing owls where there are existing burrows to inhabit.

Shortgrass Prairies

While many species are common across MAFR habitats, some are only prevalent in areas with shorter vegetation. These animals prefer open areas with clear lines of sight or other aspects of this habitat. Pronghorn are common in shortgrass prairies, as are the thirteen-lined ground squirrel (*Spermophplus tridecemlineatus*), grasshopper mouse (*Onychomys leucogaster*), plains pocket mouse (*Perognathus flavescens*), and plains pocket gopher (*Geomys bursarius*). Bird species preferring these areas include horned lark (*Eremophila alpestris*) and long-billed curlew (*Numenius americanus*).

Prairie Dog Towns

Black-tailed prairie dogs shape the landscape through the creation of communal habitats known as "prairie dog towns." Black-tailed prairie dog populations vary drastically from year to year with births, deaths, disease and precipitation. These towns provide habitat for numerous other species through there creation of burrows and relatively vegetation free areas that are exploited by numerous other species. Killdeer (*Charadrius vociferus*) prefer the openness of these areas for nesting, rearing young and obtaining food. Burrowing owl almost exclusively use abandoned burrows for nesting and brood rearing. desert cottontails, plus numerous small mammals and reptiles utilize the areas for their numerous abandoned burrows. Prairie dog towns attract predators such as American badger, coyote, gray fox (*Urocyon cinereoargenteus*), ferruginous and red-tailed hawk (*Buteo jamaicensis*).

Mesquite Scrubland

The mesquite scrublands come in a variety of configurations, to include; scattered mesquite in grasslands, grasslands dominated by dense mesquite, areas dominated by sand mesquite mounds, and all variations in between. The added scrub cover provides structure for southern plains woodrat (*Neotoma micropus*) to build middens. At times, mesquite bark becomes a major winter food. These shrubs provide a place for loggerhead shrikes to nest and hang their prey. Mule deer are more likely to be found amongst these shrubs than in the open grasslands. Some areas with mesquite infestations could provide habitat for lesser prairie chickens (*Tampanuchus pallidicintus*) if the mesquite is controlled and the branches that are used as perches by raptors are removed.

Sandsage/Soapweed Yucca

The sandsage (*Artemesia filifolia*), soapweed yucca (*Yucca glauca*), and associated bunch grasses provide a habitat more open at ground level, of greater height, and more diverse structure than the grasslands or mesquite shrublands. This is the primary lesser prairie chicken habitat on MAFR. Often this area supports a higher proportion of forbs than most other habitats in the area, resulting in more food for seed-eating birds. Scaled quail use this type habitat for escape cover, and several species of small birds find sites to nest among the shrubs. Cassin's sparrow (*Aimorphia cassinii*) in prefer these shrubs, both for nesting and as a perch for singing and display. White-tailed deer (*Odocoileus virginianus*) were observed in this area, including some of the mesquite shrublands and sand hills but no observations are documented since 2012. This was the year lesser prairie chickens were last observed on MAFR, also.

Sand Hills

Sand hills are often surrounded by sandsage/soapweed yucca communities and are closely associated. Thus,

wildlife found in one community are also found in the other. The sand makes for easy digging and is used as dens for coyote, fox, badger and others for bearing and rearing young. During the extreme heat of summer, this community is used by mule deer, lesser prairie chickens and others to escape heat as the dunes promote cooler microclimates. The open areas provide a place for birds such as common nighthawks (*Chordeiles minor*) to lay their speckled eggs on the bare earth. There they incubate and hide their chicks depending solely on camouflage to avoid predation.

Canyons

The canyons make up a small portion of MAFR but are the most diverse in topography, soils, plants, elevation, wildlife use, moisture retention, and more. The rock outcroppings are a unique, limited feature within the range and are widely exploited by resident wildlife. They are perches for raptors, denning/basking areas for reptiles, rodents and carnivores, and so on. The canyons provide hiding cover for mule deer, escape cover for species such as scaled quail, ambush concealment for species like bobcat (*Lynx rufus*), and escape from the wind for many other species. The ephemeral streams in the canyon bottoms provide primary habitat for New Mexico spadefoot toad (*Spea miltiplicata*), green toad (*Bubo debilis*), Woodhouse toad (*Bufo woodhousii*) and barred tiger salamander (*Ambystroma tiginum*) in addition to many other, less habitat-specific, species.

Old fields

The old fields are much the same as the surrounding grasslands in terms of wildlife species present. Often these old fields provide less hiding cover but a higher proportion of forbs than the surrounding native grasslands. No species are known to be obligate to the old fields. A portion of the old fields in the north are potential lesser prairie chicken habitat and would be more attractive to a majority of the resident wildlife species if converted to native grasses more similar to the surrounding grasslands

2.3.4 Threatened and Endangered Species and Species of Concern

The ESA requires all federal agencies to implement protection programs for designated (listed) species and to use their authorities to further the purposes of the act. Other legislation protecting birds include the Bald and Golden Eagle Protection Act (BGEPA), the MBTA, and EO 13186. To comply with the ESA, the USAF is required under AFI 32-7064 to inventory for federally listed threatened and endangered species, and if present on USAF land, provide an overall ecosystem approach for the protection and management of the species. Although not required, when practical a similar approach should be used for listed federal candidate species and state-listed species (AFI 32-7064). The federal government is also legally mandated to protect and maintain healthy migratory bird populations and to ensure the conservation of more than 800 species of migratory birds and their habitats by domestic legislation and through international conventions and treaties.

Sixty-eight federal and state threatened, endangered, and candidate species, species of concern, species of conservation concern, and state-designated species of greatest conservation need that could potentially occur on CAFB and MAFR are presented in **(**Table 1: Habitat Description, Listing Status, and Observed/Not Observed of Potentially Occurring Listed Species on Cannon Air Force Base and Melrose Air Force Range as of Surveys Conducted During 2015 & 2016). The table also indicates if these species have been documented on CAFB or in recent surveys from 2014-2016. No resident threatened or endangered species are resident to CAFB or MAFR.

Several species which were formally listed and/or currently listed by the federal and/or state government were seen on CAFB or MAFR prior to the CAFB 2003 INRMP. Peregrine falcon, loggerhead shrike, and

Baird's sparrow were all seen on CAFB in 1997 (over 18 years ago). Bald eagle and mountain plover were seen on MAFR in 1998, over 17 years ago. The delisted Lesser Prairie-Chicken was last sighted in 2012 nearly 5 years ago. These species were considered rare, accidental, or uncommon migrants.

Recent Surveys for Listed Species

Cannon Air Force Base

Since 2014, two studies with relevance to threatened and endangered species have been conducted on CAFB as noted below:

- Federal Candidate Species and Federal Species of Management Concern Plans, Melrose Air Force Range, New Mexico (IRNR 2016b),
- Migratory and Breeding Bird Survey Report, Cannon Air Force Base and Melrose Air Force Range, New Mexico (IRNR 2016e).

Both studies (IRNR 2016b; IRNR 2016e) directed the species survey effort to emphasize listed species and birds of conservation concern that are breeding/nesting birds. During the 2015-2016 surveys, no federally or state-listed species or potentially occurring state-listed sensitive species were observed. Based on surveys conducted in 2015-2016, no federally listed species breeds on CAFB; however, one avian federal species of concern and one mammal species of concern were observed on CAFB:

- Burrowing owl (federal species of concern, summer resident/nester)
- Black-tailed prairie dog (federal species of concern, state-sensitive, resident)

Four federal avian species of conservation concern were found on CAFB during the 2015-2016 surveys:

- Prairie falcon
- Burrowing owl
- Cassin's sparrow
- Lark bunting

Table 1: Habitat Description, Listing Status, and Observed/Not Observed of Potentially Occurring Listed Species on Cannon Air Force Base and Melrose Air Force Range as of Surveys Conducted During 2015 & 2016

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Amphibians						
Plains Leopard Frog (*Lithobates blairi*)	Permanent and intermittent waters sources and flooded prairie habitats		SGCN	No	No	Curry, Roosevelt
Tiger Salamander (*Ambystoma tigrinum*)	Permanent water sources with little or no current; shelter in rodent burrows or under structures where ample moisture is present		SGCN	Yes	No	Curry, Roosevelt
Reptiles						
Desert Massasauga (*Sistrurus catenatus edwardsii*)	Prairie wetlands and dry shortgrass plains		SGCN	No	Yes	Roosevelt
Eastern Collared Lizard (*Crotaphytus collaris*)	Shortgrass steppe, midgrass prairie, barren rock outcrops		SGCN	No	Yes	Roosevelt
Milk Snake (*Lampropeltis triangulum*)	Terrestrial and riparian habitats; Shortgrass and midgrass prairie grasslands with some or no shrub cover		SGCN	No	No	Roosevelt
Ornate Box Turtle *(Terrapene ornate)*	Desert and Semi-desert grasslands		SGCN	Yes	Yes	Curry, Roosevelt
Dunes Sagebrush Lizard *(Sceloporus arenicolus)*	Active sand dunes vegetated by shinnery oak		E, SGCN	No	No	Roosevelt
Western Diamond-backed Rattlesnake (*Crotalus atrox*)	Rocky hillsides and canyons and in a variety of vegetative types including mesquite-grassland and desert; most abundant in xeric or seasonally dry lowland regions		SGCN	No	Yes	Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Western Painted Turtle (*Chrysemys picta bellii*)	Still or slow-flowing bodies of water, ditches, and cattle tanks; can travel up to a mile away from water sources		SGCN	No	No	Roosevelt
Birds						
American Golden-Plover (*Pluvialis dominica*)	**Migration**: short-grass prairies, burned grasslands, recently plowed fields, sun-baked stubble, occasionally beaches/shores adjacent to water	MBTA		No	No	Curry, Roosevelt
Arctic Peregrine Falcon *(Falco peregrinus tundrius)*	**Migration and Winter**: Areas with abundant prey	MBTA SOC	T	No	No	Curry, Roosevelt
Baird's Sparrow *(Ammodramus bairdii)*	**Migration and Winter**: desert to upland grasslands	MBTA SOC	SGCN	No[3]	No	Roosevelt
Bald Eagle *(Halieetus leucocephalus)*	**Nesting**: large trees near or along rivers and lakes **Migration and Winter**: rivers, lakes, ponds, and reservoirs; sometimes wanders through plains and grasslands searching for carrion and/or prairie dog towns, far from water.	MBTA, SOC	T, SGCN	No	No[3]	Curry, Roosevelt
Band-tailed Pigeon (*Patagioenas fasciata*)	**All Year**: Irrigated and non-irrigated agricultural fields with less than 5% wood cover.	MBTA	SGCN	No	No	Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Bank Swallow (*Riparia riparia*)	**All Year:** areas of open water, mud flats, and sites containing extensive cover; breed in open country and savannas, especially near running water; usually found where insect prey is abundant and in association with dirt or sand banks where it digs its burrows	MBTA	SGCN	No	No	Curry
Bell's vireo (*Vioeo bellii*)	**Nesting**: thickets along streams or second growth shrubs, forest edges, brush patches	MBTA SOC	T	No	No	Curry, Roosevelt
Black-throated Gray Warbler (*Setophaga nigrescens*)	**Migration:** urban-residential developments with trees or riparian areas **Nesting and Winter**: areas of dense, woody vegetation	MBTA	SGCN	No	No	Roosevelt
Buff-breasted sandpiper (*Tryngites subruficollis*)	**Migration**: short-grass prairies, burned grasslands, recently plowed fields, sun-baked stubble, occasionally beaches/shores adjacent to water	MBTA SOC		No	No	Curry, Roosevelt
Burrowing Owl *(Athene cunicularia hypugaea)*	**Nesting, Migration, Winter**: treeless areas with short vegetation (<4 in. tall) within and adjacent to prairie dog colonies; nests only in prairie dog, badger, fox burrows	MBTA SOC	SGCN	Yes	Yes	Curry, Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Cassin's sparrow (*Aimophilia cassinii)*	**Nesting and Migration**: short-grass prairie with scattered shrubs, sometimes in shrublands with grassy openings. Territory composition: 20% to 35% bare ground, 40% to 80% short-grass/mixed-grass, >4% shrub cover	MBTA		Yes	Yes	Curry, Roosevelt
Chestnut-collared longspur (*Calcarius ornatus*)	**Migration and Winter**: short-grass and mixed grass prairie with scattered shrubs with a preference for a mix of short and tall grasses (<20 in. tall)	MBTA, SOCC		No	No	Curry, Roosevelt
Eared Grebe (*Podiceps nigricollis*)	**All year**: vegetated lakes at middle elevations; rest in waters where they feed; prefer undisturbed bodies of water during migration	MBTA	SGCN	No	No	Curry
Elf Owl (*Micranthene whitneyi*)	**All year**: open to dense vegetation of shrubs, low trees, and succulents; riparian woodlands at lower (2800-5500 ft.) to middle (5000-7500 ft.) elevations	MBTA	SGCN	No	No	Roosevelt
Ferruginous hawk (*Buteo regalis*)	**Nesting**: grasslands, deserts, open areas with isolated trees and shrubs, in areas with less than 50% cultivation **Migration and Winter**: prairie dog towns in grasslands in and south of nesting range	MBTA	SGCN	No	Yes	Curry, Roosevelt
Golden Eagle *(Aquila chrysaetos)*	**Nesting:** on cliffs near open habitats **Migration and Winter**: cliffs and in large expanse of dry treeless grassland	MBTA, SOC	SCGN	No	Yes	Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Grasshopper Sparrow (*Ammodramus savannarum*)	**Nesting**: most types of grassland, especially tall grass and mixed-grass prairies, but also shortgrass, especially where scattered shrubs, trees, or other tall plants are present; require some areas of bare ground, up to 35% of their territory; prefer sites where much of the vegetation is at least 4" tall **Migration and Winter**: found in areas of dense grass with scattered low shrubs, and in weedy fields	MBTA	SGCN	No	No	Curry, Roosevelt
Interior Least Tern *(Sterna antillarum athalassos)*	**Nesting**: river sand bars; and islands, ponds, lakes with gravel and/or sand bars, often surrounded by water **Migration:** thought to use river corridors, but may travel across terrestrial terrain using other aquatic habitats (lakes, ponds, reservoirs) in-route to nesting area	MBTA E	E	No	No	Curry, Roosevelt
Lark Bunting (*Calamospiza melanocorys*)	**Nesting:** grasslands, short grass prairie, cultivated areas. **Migration and Winter:** grasslands, short grass prairie, cultivated areas	MBTA, SOCC		Yes	Yes	Curry, Roosevelt
Lesser Prairie-chicken *(Tympanuchus pallidicinctus)*	**All Year:** arid natural grasslands with interspersed shrubs 3 ft. tall or less; in New Mexico the species is normally found in habitat with shinnery oak	MBTA	ST, SGCN	No	No	Curry, Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Lewis woodpecker *(Melanerpes lewis)*	**Migration and Winter:** vagrant to open country with scattered trees. In fall areas must have fruits/berries and in winter needs oaks with acorns	MBTA, SOCC	SGCN	No	No	Curry, Roosevelt
Loggerhead Shrike *(Lanius ludovicianus)*	**All Year:** open country with scattered brush and trees, with a mix of short (<4 in.) and tall grasses (>8 in.)	MBTA	SGCN	No[3]	Yes	Curry, Roosevelt
Long-billed curlew (*Numerius americanus*)	**Nesting:** short -grass and mixed grass prairie usually <12 in. and often <4 in. with a total ground cover of 50% to 95%; occasionally within wheat stubble (often within 0.25 miles of water) **Migration:** similar to nesting habitat but also includes open fields and shores of freshwater lakes	MBTA, SOCC	SGCN	No	Yes	Curry, Roosevelt
Lucy's Warbler (*Oreothlypis luciae*)	**Nesting and Migration:** lowland riparian woodlands; open to dense vegetation of shrubs, low trees, and succulents	MBTA	SGCN	No	No	Roosevelt
McCown's longspur (Calcarius mccownii)	**Migration and Winter:** sparse, shortgrass habitat due to low soil moisture or the presence of scattered shrubs, mixed grass prairies and stubble-fields; in winter bare and freshly plowed fields utilized	MBTA, SOCC		No	No	Curry, Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Mountain Plover *(Charadrius montanus)*	**Nesting:** short grass prairie on flat and gently sloping topography with sparse vegetation cover (>30% bare ground and very short grass [<2 in.) **Migration and Winter:** alkali flats, plowed or burned fields, fallow fields, sod farms, heavily grazed grassland	MBTA SOCC	ST, SGCN	No	No[3]	Curry, Roosevelt
Mourning Dove (*Zenaida macroura*)	**Nesting:** variety of tree species, shrubs, vines, and building structures **Nesting and Migration:** utilize a variety of habitat types from agricultural fields, grasslands, to coniferous and deciduous forests	MBTA	SGCN	Yes	Yes	Curry, Roosevelt
Northern harrier *(Circus cyaneus)*	**Nesting:** open area (e.g., prairies, plains, meadows, swamps, and marshes) with herb or low woody vegetation for nest concealment **Migration and Winter:** similar to nesting habitat	MBTA	SGCN	No	Yes	Curry, Roosevelt
Northern Pintail (*Anas acuta*)	**Nesting:** wide variety of pastures, grasslands, and croplands **Migration and Winter:** open water or emergent vegetation at lower (2800-5500 ft.) and middle (5000-7500 ft.) elevations	MBTA	SGCN	No	No	Roosevelt
Olive-sided Flycatcher (*Contopus cooperi*)	**Migration and Winter:** riparian and agricultural lands; prefers edge habitat between grasslands and tall, woody vegetative structures	MBTA	SGCN	No	No	Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Osprey (*Pandion haliaetus*)	**All Year:** generally found near water sources at lower elevations; utilize grasslands and forests adjacent to water sources	MBTA	SGCN	No	No	Curry
Painted Bunting (*Passerina ciris*)	**All Year:** shortgrass prairie grasslands adjacent to shrub cover for nesting	MBTA	SGCN	No	No	Curry, Roosevelt
Peregrine Falcon *(Falco peregrinus anatum)*	**Nesting:** high cliffs, bluffs, slopes, cutbanks, building ledges with nearby abundant prey **Migration and Winter:** Areas with abundant prey	MBTA SOC	T	No[3]	No	Curry, Roosevelt
Pinyon Jay (*Gymnorhinus cyanocephalus*)	**Nesting:** grasslands with nearby tall, woody vegetation **Migration and Nesting:** areas of desert/rocky slopes, woodlands, and scrub habitat	MBTA	SGCN	No	No	Curry, Roosevelt
Prairie falcon (*Falco mexicanus*)	**Nesting:** low rock outcrops to vertical cliffs (30 to 400 ft. tall, respectively); prefers cliffs with sheltered ledge with loose debris or gravel for a nest scrape; sometimes in old hawk, raven, and eagle nests **Nesting, Migration and Winter:** prairies, deserts, riverine escarpments, canyons, foothills, and mountains, generally in arid environments	MBTA, SOCC		Yes	Yes	Curry, Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	**All Year:** riparian woodlands, planted trees, anthropogenic structures; forage over grasslands and woodlands	MBTA	SGCN	No	Yes	Curry, Roosevelt
Sage Thrasher (*Oreoscoptes montanus*)	**Migration:** sagebrush shrubland; shrubby areas at lower (2800-5500 ft.) and middle (5000-7500 ft.) elevations	MBTA	SGCN	No	Yes	Roosevelt
Sagebrush Sparrow (*Artemisiospiza nevadensis*)	**All Year:** sagebrush-grassland habitat at lower (2800-5500 ft.) and middle (5000-7500 ft.) elevations	MBTA	SGCN	No	No	Curry, Roosevelt
Sandhill Crane (*Grus canadensis*)	**Migration:** irrigated pastures and agricultural fields; desert riparian marshes and other water sources	MBTA	SGCN	No	No	Roosevelt
Scaled Quail (*Callipepla squamata*)	**All Year:** desert and mixed grasslands, where there is a combinations of annual weeds, some shrubby or spiny ground cover, and available surface water; agricultural grasslands and croplands	MBTA	SGCN	No	Yes	Roosevelt
Snowy plover (*Charadrius alexandrius*)	**Migration:** Alkali flats, sandy shores, dried/wet mud flats, around lakes, reservoirs, ponds	MBTA, SOCC	SGCN	No	No	Curry, Roosevelt
Solitary sandpiper (*Tringa solitaria*)	**Migration:** woodland streams, ponds, marshes, stagnant pools, and mud flats	MBTA		No	No	Curry, Roosevelt
Spague's pipit (*Anthus spragueii*)	**Migration:** extensive grasslands that are dominated by medium height grasses; also in short-grass areas in field grazed by cattle, and grassy shorelines	MBTA C	SGCN	No	No	Curry, Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Varied Bunting (*Passerina versicolor*)	**Nesting:** desert shrublands; prefer dense stands of mesquite and associated growth in canyon bottoms	MBTA T	SGCN	No	No	Roosevelt
Whooping Crane (*Grus americanus*)	**Migration:** prairie potholes and riparian areas; forage in agricultural fields and pastures	MBTA E	E	No	No	Roosevelt
Williamson's Sapsucker (*Sphyrapicus thyroideus*)	**Nesting and Migration:** riparian areas adjacent to forested habitat		SGCN	No	No	Curry, Roosevelt
Wilson's Phalarope (*Phalaropus tricolor*)	**Migration:** riparian areas at lower (2800-5500 ft.) and middle (5000-7500 ft.) elevations	MBTA	SGCN	No	No	Curry, Roosevelt
Yellow Warbler (*Setophaga petechial*)	**Nesting and Migration:** mesic woodland habitats; riparian woodlands at lower (2800-5500 ft.) to middle (5000-7500 ft.) elevations; urban and agricultural lands	MBTA	SCGN	No	No	Roosevelt
Yellow-billed Cuckoo *(Coccyzus americanus occidentalis)*	**Nesting:** eastern subspecies nests in dense thickets near water, second growth woodland; western subspecies in cottonwood/willow riparian forest to mesquite/salt cedar **Migration:** primarily woodlands	MBTA SOC	SGCN	No	No	Curry, Roosevelt
Mammals						
American Beaver (*Castor canadensis*)	Permanent riparian habitats		SGCN	No	No	Curry
Black-tailed Prairie Dog *(Cynomys ludovicianus)*	Grassy plains and prairie ecosystem	SOC	SGCN	Yes	Yes	Curry, Roosevelt

Listed Species	Habitat[1]	Status[2]		Observed/Not Observed (2015-2016)		
		Federal	State	CAFB	MAFR	County Listed
Eastern Red Bat (*Lasiurus borealis*)	Riparian habitats with associated deciduous trees		ST	No	No	Roosevelt
Least Shrew *(Cryptotis parva)*	Dense ground cover in mesic habitats.		T	No	No	Roosevelt
Mule Deer (*Odocoileus hemionus*)	Wide variety of terrain; shrubby grasslands and brushy rangeland		SGCN	No	Yes	Cur, Roosevelt
Red Fox *(Vulpes vulpes)*	Mixed shrub, sagebrush, pinyon/juniper, juniper, and agriculture habitats interspersed with farms and pastures, and margins of urban areas		HF	No	No	Curry
Ringtail *(Bassariscus astutus)*	Usually less than one half mile from perennial water in rocky areas and cliffs in grassland and woodland		HF	No	No	Curry
Swift Fox *(Vulpes velox)*	Short to mid-grass prairie with sufficient prey availability	SOC	SGCN	No	No	Curry, Roosevelt
Western Spotted Skunk (*Spilogale gracilis*)	Semidesert shrubland; rocky and brushy areas in woodlands, grasslands, and deserts		ST	No	No	Roosevelt
White-tailed Deer (Sandhill) (*Odocoileu virginianus texana*)	Riparian communities on the eastern side of mountains; sandhills; woodland edges		ST	No	No	Roosevelt

1 DeGraaf et al. 1991; Gillihan et al 2001; BISON-M 2016

2 USFWS 2009a; USFWS 2009b; NMDGF 2009a; NMDGF 2009b, NMDGF 2016

3 Observed between 1997 and 2002

C – Candidate
E – Endangered
HF – Harvested Furbearer
MBTA- Migratory Bird Treaty Act
SGCN – Species of Greatest Conservation Need
SOC – Species of Concern
SOCC – Species of Conservation Concern
ST – Sensitive Taxa (Informal classification)
T – Threatened

One species of conservation concern is a spring/fall migrant or winter resident (prairie falcon), and three (lark bunting, burrowing owl, and Cassin's sparrow) are summer residents/nesting species and spring/fall migrants.

Melrose Air Force Range

Six studies with relevance to endangered, threatened, candidate species, species of concern, and species of conservation concern have been conducted on MAFR in 2015 and 2016:

- Bald and Golden Eagle Aerial Surveys for Melrose Air Force Range, New Mexico (IRNR 2016a),
- Federal Candidate Species and Federal Species of Management Concern Plans, Melrose Air Force Range, New Mexico (IRNR 2016b),
- Lesser Prairie Chicken Management Plan, Melrose Air Force Range and Melrose Land Gift, New Mexico (IRNR 2016c),
- Lesser Prairie-Chicken Population Monitoring Report, Melrose Air Force Range and Melrose Land Gift, Cannon Air Force Base, New Mexico (IRNR 2016d),
- Migratory and Breeding Bird Survey Report, Cannon Air Force Base and Melrose Air Force Range, New Mexico (IRNR 2016e), and
- Western Burrowing Owl and Black-tailed Prairie Dog Assessment, Cannon Air Force Base and Melrose Air Force Range, New Mexico (IRNR 2016f).

The Migratory and Breeding Bird Survey Report (IRNR 2016d) directed that the bird species survey effort emphasizes listed and birds of conservation concern breeding/nesting birds. No federally listed threatened or endangered bird species were found to be residents on MAFR during the 2015-2016 surveys. One avian state-listed sensitive species, loggerhead shrike, was found on MAFR in 2015 and 2016. Additionally, seven federal species of conservation concern were found during the 2015-2016 surveys:

- Northern harrier
- Swainson's hawk
- Ferruginous hawk
- Prairie falcon
- Long-billed curlew
- Burrowing owl
- Cassin's sparrow

To comply with the requirements stated in the Federal Candidate Species and Federal Species of Management Concern Plans (IRNR 2016b), surveys were conducted on MAFR to inventory any species listed as: endangered, threatened, candidate, sensitive, species of concern, federal avian species of conservation concern (SOCC), or species of greatest conservation (SGCN). The scope of work emphasized listed species surveys for plants, reptiles, birds (in the recently burned area), and mammals. No federally listed threatened or endangered animal species were found to be residents on MAFR during the 2015-2016 surveys. One mammal federal species of concern and state sensitive species, black-tailed prairie dog, was observed during the 2015 and 2016 surveys. In addition, the loggerhead shrike, a state sensitive avian species, and the seven previously listed federal avian species of conservation concern were found during the 2015-2016 surveys. All the listed birds plus all migratory birds that are found on MAFR are protected under the Migratory Bird Treaty Act of 1918 (MBTA 1918). Resident, non-migratory birds are fall under the protection of New Mexico Department of Game and Fish, including Scaled Quail (regulate hunting season and bag limit) and Lesser Prairie Chicken (full protection) (NMHRI 2017). No hunting is allowed on MAFR.

Two of the seven birds of conservation concern are spring/fall migrants or winter residents (northern harrier and prairie falcon), four are summer residents/nesting species and spring/fall migrants (Swainson's hawk, long-billed curlew, burrowing owl, and Cassin's sparrow), and one is a resident (ferruginous hawk). Birds of conservation concern are not protected under the ESA; however, they are protected from take under the Migratory Bird Treaty Act and could benefit from appropriate management actions.

On 04 April 2007, during the 2007 annual lesser prairie-chicken (*Tympanuchus pallidicinctus*) lek surveys conducted by the CAFB range biologist, a lesser prairie chicken lek was located in the northern section of the range. Lesser prairie chickens were, at the time of the first observation, a federal candidate species that had not been observed on-range before. A subsequent habitat assessment was conducted in July 2007. Following those surveys, a Candidate Species Management Plan was prepared, which incorporated lesser prairie chicken. A second lek was discovered in the spring of 2008. As part of the management plan, a habitat and population assessment was recommended. (Map showing known lesser prairie chicken lek sites at Melrose Air Force Range). The last confirmed sighting of lesser prairie chicken on MAFR was in 2012, however, annual monitoring efforts have continued (IRNR 2016c).

In 2015, the threatened status of the lesser prairie chicken was vacated by judicial action. The results of the lesser prairie chicken surveys as well as population and habitat management recommendations for 2015 and 2016 can be found in the reports: 1) Lesser Prairie Chicken Management Plan, Melrose Air Force Range and Melrose Land Gift, New Mexico (IRNR 2016c), and 2) Lesser Prairie-Chicken Population Monitoring Report, Melrose Air Force Range and Melrose Land Gift, Cannon Air Force Base, New Mexico (IRNR 2016d).

Bald Eagle Aerial Surveys

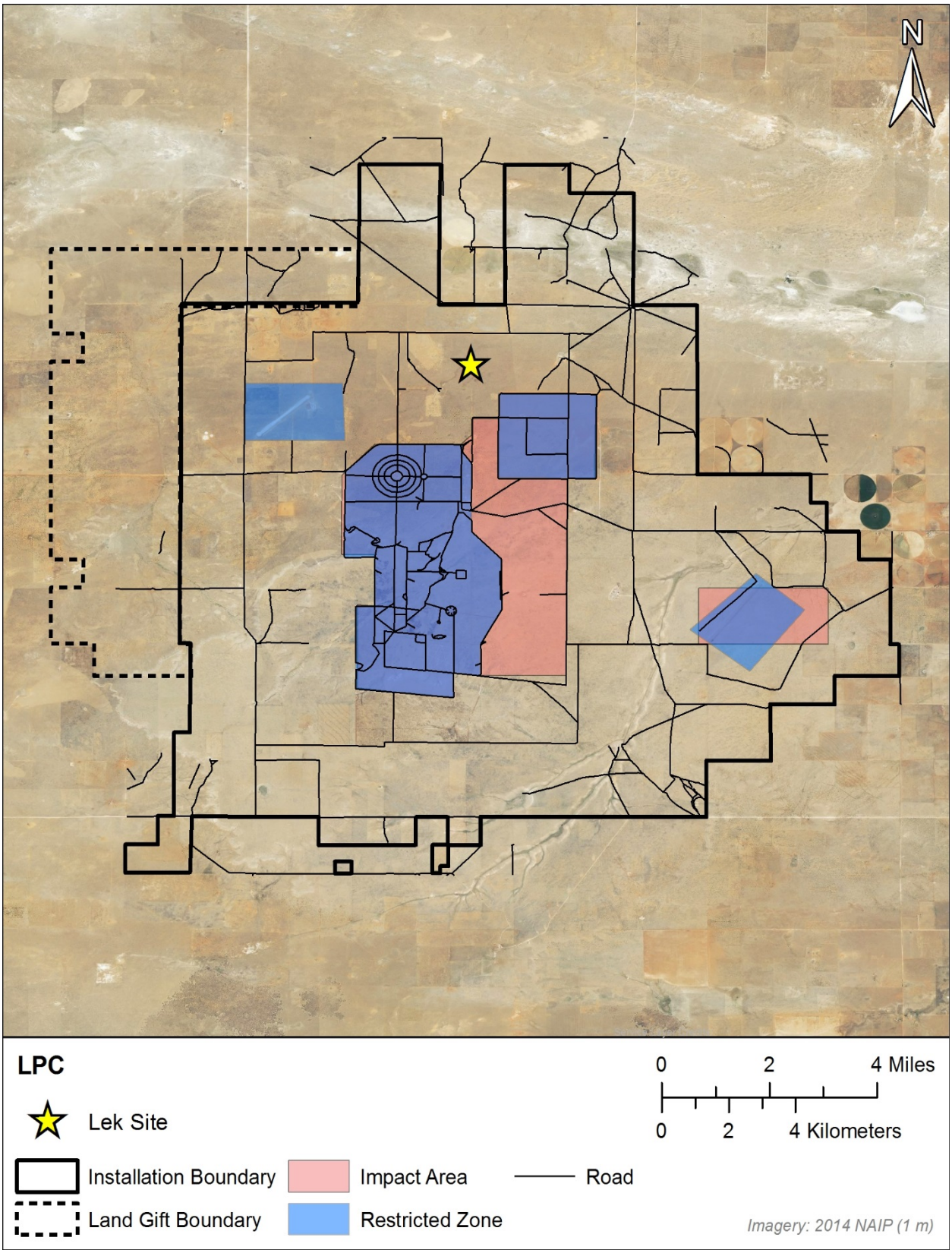
In 2015 and 2016, aerial surveys were conducted at MAFR on 26 September 2015 and 9 April 2016. No bald eagles or golden eagles were observed in 2015, but two golden eagles were observed in 2016 (IRNR 2016a). Complete aerial survey data and management implications can be found in the report "Bald and Golden Eagle Aerial Surveys for Melrose Air Force Range, New Mexico" (IRNR 2016a).

Prairie Dog Surveys

Surveys were conducted in 2015 to determine the approximate size of the prairie dog population on CAFB and MAFR.

In 2011, the number of BTPDs observed on CAFB was 86. In 2015, the number of BTPDs observed decreased to 35 (Map 13: Prairie Dog Towns at Cannon Air Force Base). BTPDs are residents on CAFB, and base personnel are currently managing the BTPD population on the installation. The BTPD population appears to be decreasing on CAFB in response to control efforts that focus around flightlines.

Sixty-two BTPD were observed at nine different colonies in 2011 on MAFR. This decreased to 49 BTPD observed at six colonies in 2015 (Map 14: Active and Inactive Prairie Dog Towns at Melrose Air Force Range). All activity was observed in pre-established towns, and three colonies from the 2011 surveys. This suggest population decline, though more information over the years are required to substantiate population trends. Numbers of BTPD and occupied area has varied greatly over years they have been surveyed, approximately 3,300 acres were surveyed as occupied by BTPDs prior to a plague event in 2005-2006. In 2009, 10 acres were be occupied by BTPDs. Additional BTPD towns were recently located with surveys of these planned and reports forthcoming. BTPD control on MAFR is directed to areas near critical areas on an as needed basis, primarily adjacent to landing strips. No additional management is conducted on MAFR in a direct attempt to manipulate BTPD populations. Surveys are ongoing and annual reports are forthcoming.



Map 12: Lesser Prairie Chicken Lek Site at Melrose Air Force Range Last Known Active 2012

Listed Species Population Trends and Threats

Lesser Prairie Chicken

- Overview – The lesser prairie chicken is found primarily in arid natural grasslands with interspersed shrubs 3 ft. tall or less; in New Mexico the species is normally found in habitat with shinnery oak. On MAFR, however, little shinnery oak occurs and sand sagebrush fills the "shrub" role. Lesser prairie-chickens do not occur on CAFB and are presently considered absent on MAFR as they have not been detected there since 2012.

- Status – Lesser prairie chickens have full protection by the NNDGF in the state of NM and are currently listed as a Species of Greatest Conservation Need and a sensitive taxa (an informal classification). Although LPC were removed from the ESA as a Threatened Species in 2015 USFWS is again reviewing the evidence concerning re-listing.

- Trend – Ongoing survey efforts have been conducted by the Western Association of Fish and Wildlife Agencies (WAFWA) across five states containing the four ecoregions inhabited by lesser prairie chickens. After a dramatic population downturn associated with historic drought in 2013, lesser prairie chicken populations have increased and stabilized at slightly over 25,000 birds across the five state regionNew Mexico LPC populations have fluctuated since 1998, but do not show an upward trend (Beauprez 2016)

- Threats - Declines in the lesser prairie chicken population are attributable to habitat loss, and habitat fragmentation. Continued evaluation and monitoring of the lesser prairie chicken and habitat needs to be conducted.

- Detections - LPC were detected on MAFR during the winter of 2012 in the southeast portion of MAFR approximately 4 miles south of the South Krider Gate near Krider Road. During the spring of 2012 LPC were observed on the Lek depicted on the previous page (Map 12: Lesser Prairie Chicken Lek Site at Melrose Air Force Range Last Known Active 2012). No other detections are recorded on MAFR since that time. Ongoing efforts are being conducted and reports produced.

- Although LPC have not been detected on MAFR since 2012, they were present in the past and could be currently and/or in the future. At the least LPC habitat is present and this habitat is utilized either on a full or part time basis. Prior to the cessation of grazing livestock were used to manage vegetation and fuels on the range. Portions of the newly acquired Land Gift Area om the extreme south appears to be LPC habitat, sandy soils, mid and tall bunch grasses, a prominent forb component, a bush component (primarily sand sage but a small amount of shinnery oak). Photographs and observation by CEIE personnel provide evidence of heavy grazing. Rest has allowed these areas to at least begin recovery. In the future fire will be the primary tool of vegetation management with herbicide application a secondary tool. Planning is ongoing to control mesquite and these activities in conjunction with prescribed fire could expand the portion of MAFR used by LPC.

- Areas of MAFR within 4.8 km (3 mi) of observed LPC (within the previous 5 years) will be managed as occupied habitat. The majority of MAFR is modeled as CHAT 3, suitable habitat, in the Southern Great Plains Crucial Habitat Assessment Tool (CHAT) (https://kars.ku.edu/geodata/maps/sgpchat/) although much of the south and east portions are dominated by short grasses and the west by honey mesquite at densities that make them unattractive to LPC. The CHAT indicates that MAFR is outside the Focal Area and Connectivity Zone, the areas of primary focus for LPC management. The most consistently occupied LPC habitat in the

area lies south of MAFR on and around the Claudel PCA. Where practical management will include: Maintain optimum habitat cover to include 40-60% grass, 15-25% forbs and 20% low growing shrubs; Burn no more than 20-30% of the LPC Habitat and to allow a 3-5 year recovery period between burns; Application of chemical control of invasive honey mesquite followed by controlled burns to allow possible expansion of LPC Habitat; Remove raptor perches such as fences, power poles, and mesquite within the LPCH habitat areas; Minimize disturbance of LPCH lek, nesting, and brood-rearing areas when birds are present; Coordinate in the planning with the Cannon AFB fire personnel to develop prescribed burning strategies to enhance or create LPC habitat and reduce the potential for wildfire; Continue to coordinate with CAFB planning personnel to minimize fragmentation of LPC Habitat with new development projects.

- Bioacoustical digital recording devices (Song Meter 4s; Wildlife Acoustics Inc., Concord, MA, USA) will be used to survey for LPC and other birds due operational constraints at MAFR. The bioacoustical method has not been used for LPC but has been successfully used for numerous other species (Lambert and McDonald 2014, Marques et al. 2013, Rogers et al. 2013, Venier et al. 2012). We will ground truth the method off-site with standard survey methods at nearby LPC leks. The protocol will be finalized in conjunction with USFWS and NMDGF personnel. A map of current locations of monitors included in the appendix (Map 15: Location of MAFR Acoustical Monitors).

Western Burrowing Owl

- Overview – The Western burrowing owl is found in treeless areas with short vegetation (<4 in. tall) within and adjacent to prairie dog colonies; nests only in prairie dog, badger, fox burrows (Gillihan et al. 2001). Burrowing owls are fairly common residents to CAFB and MAFR.

- Status – Western burrowing owl is a species of concern.

- Trend – Current population estimates are not well known but trend data suggests significant declines across their range. Last official estimated place them at less than 10,000 breeding pairs (DoW 2009). All BUOW observed on CAFB and MAFR were on current of former BTPD towns. During 2011, 34 BUOW were observed on CAFB and 22 on MAFR. In 2015, 43 BUOW were observed on CAFB and 27 on MAFR. Additional surveys ongoing and reports forthcoming.

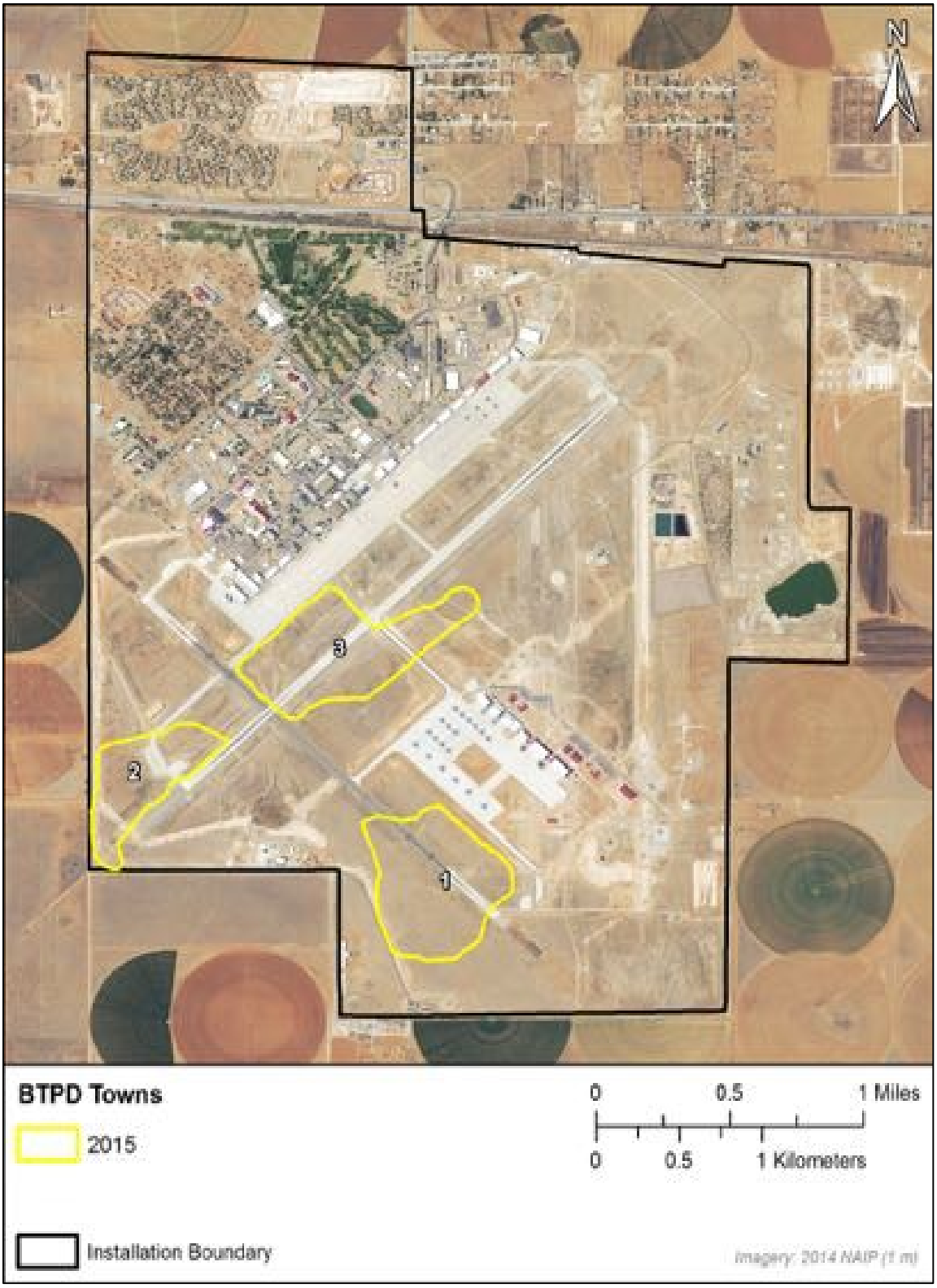
- Threats – Decline in western burrowing owls are attributed to habitat loss. As the black-tailed prairie dog population declines, so will the burrowing owl. Prairie dogs create burrows which the burrowing owls use to nest. Poisoning and nest site loss resulting from human efforts to control ground squirrels and prairie dogs are the biggest threat (Erlich et al. 1988). Every effort is made to insure BUOW are not poisoned on CAFB and MAFR.

Black-tailed Prairie Dog

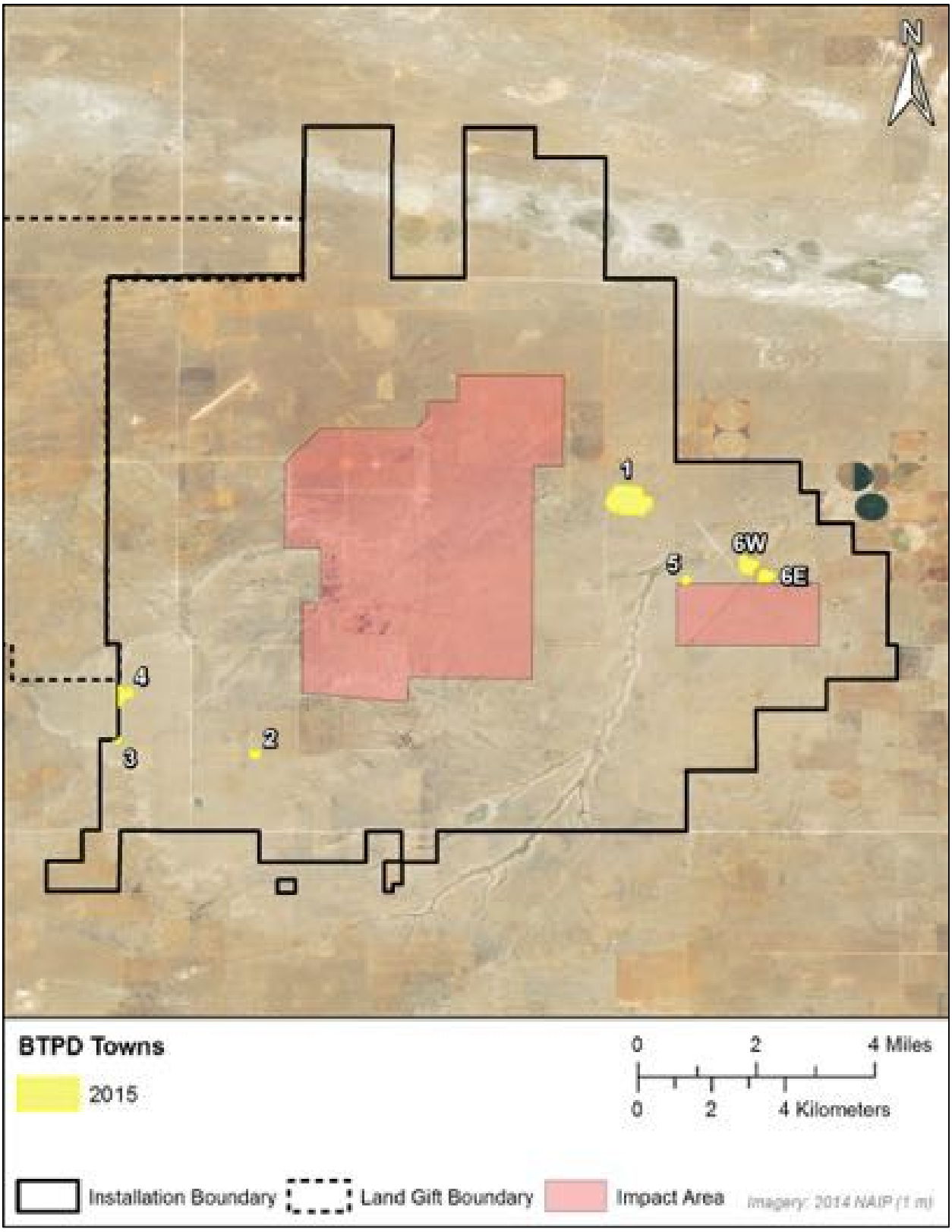
- Overview – The black-tailed prairie dogs are found primarily in grassy plains and prairie ecosystems. They are a very social animal living in colonies made up of extensive burrows. Many other animals use these burrows to escape the extreme conditions found in a prairie environment making them a “keystone species.” Black-tailed prairie dogs are common to CAFB less common on MAFR. Additional BTPD towns were recently located on MAFR.

- Status – Black-tailed prairie dog are a federal species of concern and state-listed Species of Greatest Conservation Need in the state of New Mexico. However, regulation of this species falls under the New Mexico Department of Agriculture within the New Mexico.

- Trend – Although prairie dogs still locally are common, today less than one percent of the prairie dog population and habitat remain in their entire historical range.
- Threats – Prairie dogs have been pushed out of their native habitat by ranching and farming activities for the past 50 years or more (TPWD 2009). Sylvatic plague (*Yersinia pestis*) can extirpate entire colonies, in turn, reducing the genetic variability of the species.



Map 13: Prairie Dog Towns at Cannon Air Force Base



Map 14: Active and Inactive Prairie Dog Towns at Melrose Air Force Range

2.3.5 Wetlands and Floodplains

A wetland delineation was completed for CAFB and MAFR in 2005. No waters of the U.S. were found on MAFR; however, several areas on CAFB, including the golf course ponds and North Playa Lake, required a determination. It was determined that all water bodies and drainages within the CAFB are isolated and not subject to regulation under the CWA. In 2006, the U.S. Army Corps of Engineers (USACE) concurred with a 2005 delineation report that concurred that none of the water bodies on CAFB are waters of the U.S. (Appendix C: Fauna of CAFB and MAFR). CAFB's NRME recently requested concurrence from CAFB's Judge Advocate (JA) on this position due to the change from ACC to Air Force Special Operations Command (AFSOC).

Playas

Playa habitats are natural depressions in the landscape that support seasonal amounts of free- standing water from seasonal rains. Playas form with intermittent flooding followed by evaporation. Playas have no surface outlet, and any water they collect is eventually lost to evaporation, infiltration, and/or use by plants and animals (ACC 1995). The vegetation in this habitat varies in a parallel manner with moisture cycles excluding man-made disturbances and fire. Grass species mainly grow in the depressions and sparse forbs and sometimes shrubs grow around the margins of the playas.

On MAFR these habitats are predominantly located in the northeast and southwest portions of the range. There are also several ephemeral channels on MAFR including the Canada del Tule, Sheep Canyon, and Chapman Draw.

The habitat on CAFB includes playa lakes and the associated ephemeral channels or ditches. The channels are concentrated around the playas and carry runoff to the north and south playa lakes and to the golf course ponds. CAFB historically contained four significant natural ephemeral playas which have been impacted to varying degrees by past and current human activities. The golf course ponds are now lined and intensely maintained. The North Playa Lake is the most significant playa and is currently receiving effluent wastewater. This created a permanently inundated and extremely nutrient rich aquatic environment. The southern playa has also been impacted by human activity. Past dumping activities in the southern playa have created a steep bank around the edge of the playa and several concrete piles in the center of the playa. Connected to this playa are a couple of ephemeral channels that collect flows from the surrounding uplands.

Playas are an important part of the prairie ecosystem. They provide the majority of the standing water and most of the animal's native to the shortgrass prairies will use playas as a water source and foraging area. Migrating waterfowl and shorebirds utilize this habitat during migration.

Most playas on CAFB have been converted to intensely maintained, lined golf course ponds. Runoff from the golf course and adjacent housing area has created a permanently inundated, nutrient rich aquatic environment. Algal problems (i.e., extensive blooms) resulted and sterile grass carp (*Ctenopharyngodon idella*) were stocked to alleviate the problem. Canada geese (*Branta canadensis*) and Mississippi kite (*Ictinia mississippiensis*) are often seen around the golf course ponds.

The North Playa Lake is the most significant playa for wildlife habitat and is currently receiving effluent wastewater. The effluent discharge has resulted in the creation of a permanently inundated and extremely nutrient rich aquatic environment. Barred tiger salamanders (*Ambystoma tigrinum*) and plains leopard frog (*Rana blairi*) are common amphibian residents. The most common reptile is yellow mud turtle (*Kinosternon flavescens*). Ducks, waders, and shorebirds are observed regularly. Some of the more common bird species include Double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodias)*, black-

crowned night heron (*Nycticorax nycticorax*) during the summer, and mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), green-winged teal (*Anas crecca*), northern shoveler (*Anas clypeata*), and ruddy duck (*Oxyura jamaicensis*) during migration and winter seasons.

The South Playa Lake has also been impacted by human activity, although not as drastically as the golf course ponds or the North Playa Lake. Modern agricultural practices (e.g., contour tilling), and construction of the runways, perimeter road, and public road on the west side of the base, have altered the natural hydrology of the southern playa; however, drainage from the surrounding uplands still flows into the playa. This has resulted in a more natural playa system with fluctuating wet and dry periods, creating a wetland plant community on the floor of the playa. Past dumping activities in the southern playa have created a steep bank around the edge of the playa and several concrete piles in the center of the playa. Coyote, desert cottontail, striped skunk, deer mouse, hispid cotton rat (*Sigmodon hispidus*) and southern plains woodrat are found utilizing the concrete structures.

The thicker vegetation and intermittent water supply of the ephemeral streams on MAFR attracts the New Mexico spadefoot toad (*Spea multiplicata*), which in turn attracts the plains hognose snake (*Heterodon nasicus*), which feeds on these toads.

2.3.6 Other Natural Resource Information

Several other natural resources projects and surveys have been conducted over the last few years at CAFB and MAFR. A summary of those projects are below.

Land Condition Trend Analysis

Given the nature of the training and testing activities on military installations, the potential for disturbance to the landscape is high. As the soil surface becomes increasingly disturbed and protective vegetation is lost, soil erosion accelerates. If allowed to continue unchecked, extensive damage from soil loss, gullying, sedimentation and flooding can occur. Land Condition Trend Analysis (LCTA) plots allow NRME to accurately and precisely monitor the health of the land thereby enabling MAFR quickly identify an issue before it escalates. This is beneficial because periodic land maintenance is often much more cost- effective than extensive repair of severely degraded lands. LCTA is a critical land management component that is needed to determine cattle stocking rates for the agricultural outlease program (AOP) on MAFR and to maintain the ecosystem communities necessary to support the wildlife that utilize the land.

A total of 171 LCTA plots have been established on MAFR. An additional 30 new plots were established on the Land Gift Area. With the recent 2016 surveys, all 141 original plots have been surveyed as well as the 30 newly established plots. Surveys consist of 1) 100-meter (m) line-intercept sample used to determine ground cover, canopy cover, and surface disturbance, 2) a belt transect for surveying all woody species, and 3) a biomass estimation was used to calculate the available forage (yield) on a site.

Aerial Surveys

Since 2007, CAFB has been conducting aerial surveys to determine the occurrence status (presence/absence) of the protected golden eagle (Aquila chrysaetos) and the New Mexico state-listed bald eagle (Haliaeetus leucocephalus). Aerial surveys allow comprehensive coverage of MAFR, and area searches provide coverage of potential feedings areas (i.e. carcasses). Aerial surveys were completed by flying a standardized grid pattern over the entire range. Although primarily looking for the bald and golden eagle, other ancillary sightings of large mammals were recorded. This information has helped CAFB natural

resources staff to determine which species are present, their abundance, and what portion of the range they are utilizing.

The aerial surveys were conducted three times for this project: 26 September 2015, 9 April 2016, and 30 October 2016. We recorded 76 detections of 150 animals during the 26 September 2015 survey. Conditions were somewhat rough, causing air sickness in one crew member. During the 9 April 2016 survey we recorded 114 detections of 309 animals, including 4 detections of 4 Golden Eagles. Similarly, during the most recent 30 October 2016 aerial survey we recorded 129 detections of 439 animals, including 2 detections of 2 Golden Eagles and 4 additional observations that were likely 1 or more additional Golden Eagles (noted as "unknown large raptor" during flight; subsequent discussions post flight revealed unanimous agreement that these detections were likely Golden Eagles based upon size).

Several other natural resources projects and surveys have been conducted over the last few years at CAFB and MAFR. A summary of those projects are below.

Table 2: Results of the Aerial Surveys Conducted on Melrose Air Force Range

September 2015

Species	Detections	Number	
Black-tailed Prairie Dog	3	1	
Mule Deer	1	3	
Northern Harrier	7	7	
Pronghorn Antelope	45	105	
Raptor-Unknown	4	4	
Raven/Crow	11	23	
Scaled Quail			Coveys were too numerous to count.
Swainson’s Hawk	1	2	
Turkey Vulture	2	3	
White-tailed Kite	2	2	
Totals	76	150	

April 2016

Species	Detections	Number	
Badger	2	2	
Black-tailed Prairie Dog	4	0	
Coyote	8	10	
Golden Eagle	4	4	
Kestrel	1	1	
Mule Deer	5	18	
Northern Harrier	5	8	
Pronghorn Antelope	48	218	
Raptor-Unknown	3	4	
Raven/Crow	24	34	
Scaled Quail			Coveys were too numerous to count.
Swainson’s Hawk	7	7	
Turkey Vulture	3	3	
Totals	114	309	

October 2016

Species	Detections	Number	
BTPD town	1		
Chihuahuan Raven	3	3	
Coyotes	12	21	
Deer	2	3	
Ferruginous Hawk	2	2	
Golden Eagle	2	2	
Mule Deer	3	5	
Northern Harrier	22	27	
Prairie Falcon	2	2	
Pronghorn Antelope	65	358	
Red-tailed Hawk	2	2	
Scaled Quail			Coveys were too numerous to count.
Turkey Vulture	1	1	
unknown raptors	11	12	4 observations of a "large raptor" on the north side along Charlie firebreak. These may all be the same bird. All seen at a distance. Possibly a Golden Eagle.
White-tailed Kite	1	1	
Totals	129	439	

2.4 Mission Impacts on Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

The soils of MAFR and CAFB are primarily of a sandy or sandy-loam nature with moderate to high permeability. Although these soils are suited to construction due to a lack of shrink-swell potential, they are highly susceptible to the effects of wind and water erosion during both construction and ground forces training exercises. Construction on these types of soils requires extensive erosion control during and after project completion.

At times bird activity over the airfield at CAFB, over MAFR and/or along flight training routes result in bird-aircraft strikes. Bird strikes result in hazards to flight crews and damage to aircraft. The removal of aircraft from the schedule for repairs negatively impacts flight training and wing budget because of the repair costs.

No resident listed threatened or endangered species are known at CAFB or MAFR.

2.4.2 Land Use

Cannon Air Force Base

Since its establishment in 1942, CAFB has greatly influenced land use patterns and development in its vicinity. The Base contains a variety of land use activities including runways, industrial facilities, housing areas, and administrative, training, and support facilities. Airfield and open space comprise the greatest percentage of total land area at the Base. The existing land use categories and acreage are presented in (Map 5: Land Types at Cannon Air Force Base).

Table 3: Existing Land Use at Cannon Air Force Base

Land Use Category	Acreage
Airfield (includes 239 acres of airfield pavement)	1,469
Airfield Operations and Maintenance	111
Industrial	287
Administrative	30
Community (Commercial)	57
Community (Service)	13
Medical	7
Housing (Accompanied)	986
Housing (Unaccompanied)	45
Outdoor Recreation	224
Open Space	1,138
Water	30
Total	**4,397**

Safety and noise influence land use planning on Base and in its vicinity. The Air Installation Compatible Use Zone (AICUZ) program is one program designed to provide AF bases and surrounding communities with guidelines to address safety and noise issues in land use planning. As part of its AICUZ program, the county and state purchased easements to allow CAFB to establish a Clear Zone (CZ) and two Accident Potential Zones (APZs) at the end of each runway. Within the CZs, only limited agriculture uses are permitted. Within the APZs, residential development or other land uses that promote public assembly are discouraged. Land uses allowed within APZ I include a variety of industrial, open space, and agricultural uses whereas APZ II include those uses as in APZ I but also some commercial uses and services. The AF holds property rights to off-base portions of CZs to prevent incompatible land uses.

From a natural resources standpoint, the presence of munitions on CAFB is beneficial in that munitions storage areas are surrounded by safety clearance zones where no uses unrelated to munitions are permitted. These Quantity-Distance safety zones effectively restrict facility development in the eastern part of the base. Therefore, these areas are not developed providing habitat for a variety of wildlife.

Current direct land use impacts on CAFB are similar to that described from the previous mission at CAFB. Changes in land use impacts are expected to occur periodically as the base is developed to accommodate the AFSOC mission; however, the magnitude and timing of the changes is unknown since funding has not yet been acquired for all AFSOC infrastructure changes.

Melrose Air Force Range

Of the more than 70,978 ac comprising the range, approximately 10,126 ac comprise the impact area. Around eleven acres of the range supports facilities including a fire station, maintenance areas, and a camera station for monitoring ordnance practice.

Table 4: Land Use at Melrose Air Force Range

Land Use Category	Acreage
Support Facilities	11
Impact Area	10,126
Training Range	60,841
Total	**70,978**

Surrounding the range is restricted airspace comprising approximately 294,918 ac (Map 6: Land Types at Melrose Air Force Range). The land underlying these areas is generally used for cattle grazing and crop production. Crops consist of wheat, grain, sorghum, corn, barley, cotton, hay, peanuts, and potatoes. Residential uses are few and scattered. Approximately 73 percent of all land within the restricted areas is held in private ownership, 19 percent is state-owned, and 8 percent is owned by the AF. Neither Curry nor Roosevelt County has enacted zoning ordnances which would regulate land use surrounding MAFR.

Table 5: Land Use Under Restricted Airspace Surrounding Melrose Air Force Range

Land use Category	Acreage	Percent of Restricted Area
Rangeland	245,325	83
Cropland	48,294	16
Water/Wetland	767	<1
Urban/Built-up Land	577	<1
Total	**294,918**	**100**

Since 2010 MAFR has expanded to the east by more than 10,000 ac. Lands previously owned by the State and administered for grazing have been deeded to the Air Force for military training. This further limits impacts to surrounding land owners.

2.4.3 Current Major Impacts

Current impacts to the environment at CAFB result primarily from training and operation activities. Typical impacts at CAFB are noise from flight training and base operations, air emissions from flight training and base operations, disturbance to soils from construction activities, water releases, and generation of hazardous wastes during base operations.

Current AFSOC impacts principally result from electronic combat flight training, ordnance training, supply drops, and live fire training for C-130 gunships at MAFR. In addition, aircraft from other commands would continue to train at MAFR including B-1B bombers from Dyess AFB, the 150th New Mexico Air National Guard, and other transient aircraft (A-10, F-15s, F/A-18s, F-22As, German Air Force Tornados, B-52s, C-130s, and various helicopters; AFSOC 2007). Typical impacts include: noise from training flights and training ordnance use, air emissions from flight training and fire resulting from ordnance use, and disturbance of soil resulting from range maintenance activities such as target placement, ordnance clearing and road repair.

Air Resources

Cannon Air Force Base

CAFB is in an attainment area relative to the National Ambient Air Quality Standards (AFSOC 2007). Emission impacts to air resources at CAFB result from aircraft training, base operations, and vehicular traffic. Emission sources of concern from facilities at CAFB have been identified and permitted. CAFB is permitted under a Title V permit (P119-R1M2) issued by the New Mexico Environmental Department Air Quality Bureau; 28 April 2016 which permits operation of 95 stationary emission sources throughout the base. Many of these sources are a result of the 2007 mission change which brought the 27th Special Operations Wing to CAFB. In comparison to the previous mission, current impacts to air resources have decreased with the transfer of aircraft, decrease in the number of flights, and the change in the type of aircraft flown.

Melrose Air Force Range

The Air Quality Control Region (AQCR) in which MAFR is located is currently in attainment of National Ambient Air Quality Standards (AFSOC 2007). Current impacts to air resources at MAFR primarily result from aircraft training, fugitive dust, use of portable generators to supply electrical power to remote areas, and vehicles associated with maintenance of targets and roads on the range. Live fire training at MAFR and additional construction activities may result in temporary increases in fugitive dust emission. Overall, air quality is not expected to change the attainment status of the AQCR.

Water Resources

Cannon Air Force Base

CAFB is in compliance with all water resources permits. Surface and groundwater resources at CAFB can be impacted by wastewater and other discharges from base operations. Wastewater effluent is discharged under a National Pollutant Discharge Elimination System (NPDES) permit; other ground discharges are covered under a Ground Water Discharge Permit (DP-873). The NPDES permit (NM0030236) covers discharges from CAFB's on-base wastewater treatment plant (WWTP) into the North Playa Lake and a golf course pond. The Environmental Protection Agency (EPA) issued the permit with an effective date of 01 September 2011 with an expiration date of 31 August 2016. EPA is in the process of reissuing this permit. The storm water program (NPDES permit coverage) is not applicable to CAFB, as jurisdictional waters of the US do not exist. DP-873 covers a number of sources that could contribute to ground water pollution (e.g., WWTP, septic systems, fertilizer use, etc.). The New Mexico Environment Department (NMED) last issued DP-873 on 31 March 2014. The permit expires on 31 March 2019.

Melrose Air Force Range

At MAFR, water resources are currently impacted primarily through erosion of topsoil caused by impacts from fires associated with flight training missions and maintenance of roads. These factors affect the shortgrass prairie ecosystem that is naturally dominant at the range.

Noise

Cannon Air Force Base

Noise issues for CAFB are summarized in the "AFSOC Assets Beddown at Cannon Air Force Base, New Mexico Environmental Impact Statement" (AFSOC 2007). The primary noise source is aircraft. Secondary sources are from vehicular traffic and base construction activities. Noise contours are generated that are used to restrict types of development near the runways. For example, residential land uses are not permitted where noise would be expected to exceed 65 decibels Day-Night Average A-Weighted sound levels (USAF 2003). The 2016 AICUZ Study identifies current noise contours. Noise levels are lower under the new AFSOC mission than during the past CAFB mission.

Melrose Air Force Range

Noise impacts at MAFR result from aircraft training, ordnance drops, and C-130 live-fire target training. Noise levels could increase within the range as a result of the proposed C-130 live fire training.

Traffic

Vehicular and pedestrian traffic at the installation is consistent with the current mission which involves operational activities at the existing facilities. Therefore, vehicular traffic is predominantly comprised of personal vehicles, and pedestrian traffic primarily involves walking between facilities with some recreational walking. Aircraft traffic affects natural resources through noise, limited air pollution, and bird-aircraft strikes.

Biological Resources

Cannon Air Force Base

At CAFB, potential impacts to biological resources are limited by the small size of the remaining habitats and the lack of undisturbed, native habitat remaining on Base. Currently, development associated with the new mission is not negatively impacting biological resources. All proposed actions are evaluated under EIAP.

Wildlife is responsible for impacts to military training. Wildlife that collide with aircraft cause aircraft damage and pose a threat to the safety of the aircrew. Wildlife also cause damage to base and range infrastructure.

BASH is defined as the threat of aircraft collision with birds during flight operations. Although most bird strikes do not result in aircraft damage, some strikes have led to major damage and/or serious aircraft accidents. According to Bird Strike Committee USA, bird and other wildlife (primarily mammals) strikes result in over $600 million in damage to U.S. and civilian air traffic every year. To date, more than half of the strikes are reported at low flight altitudes (<100 ft.); however, strikes have occurred up to 37,000 ft. (AirSafe 2009). Military aircraft used by AFSOC are more vulnerable than other DoD aircraft because many AFSOC missions require flying at low altitudes.

Historic bird aircraft strike records are very limited for the previous missions conducted from CAFB. Although aircraft types and mission profiles used previously at CAFB are not similar to AFSOC training missions, BASH data is provided from the previous mission to provide background data relating to the potential for bird strikes in the region surrounding CAFB and MAFR.

At CAFB, there were 341 strikes from 1991 through 1996, with damage exceeding $1.9 million. Birds of prey accounted for 263 of these strikes. The months of May, September, and October recorded the most strikes (USAF 1996a). A BASH program was initiated for the CAFB mission in 1997. For management of wildlife associated with wildlife-aircraft strikes, CAFB maintains a depredation permit from the USFWS **(Appendix E. Federal Fish and Wildlife Permit)**.

Over the period from fiscal year (FY) 1997 through FY 2002, there were 98 BASH strikes at CAFB and three at MAFR, representing a substantial reduction in the number of strikes with implementation of the BASH program at the installation. The top three bird species struck were the horned lark (20), mourning dove (18), and the Western kingbird (8). Overall, July, August, and September were the months with the most strikes (Swaby 2003). This period coincides with the fledgling of young, inexperienced juvenile birds from nest sites.

Collection of bird strike data from current AFSOC mission training activities over Florida and New Mexico has been initiated; however, results for the New Mexico training missions are limited because of the low number of missions conducted from CAFB.

In 2016 the total damage value for Cannon and Melrose was $146,631. There were only ten (10) damaging strikes out of 143 total bird strikes. This occurred to 112 planes, but some strikes happen with multiple birds and even sometimes multiple species. Planes have hit up to six different birds in one flight. The most costly strike (2016) was caused by a Chipping Sparrow (very small) hitting a CV-22B; the total for that one strike was $75,039.

The highest number of strikes usually occurs in August and September. Sparrows, doves, and cowbirds are the most common birds struck. Most of the sparrow species struck are species are more common in the western U.S. and were likely struck on training routes from CAFB. Mourning doves and cowbirds are ubiquitous throughout the U.S.

Melrose Air Force Range

Current impacts to biological resources are very limited on MAFR as approximately 17 percent of the land on MAFR (70,978 ac) is used as an impact area (10,126 ac). Live fire targets for training C-130 aircrews may have temporarily or permanently displaced some animals during construction and/or training activities (e.g., noise).

Historic bird aircraft strikes have been documented at MAFR. From 1991 through 1996, eight bird strikes were documented. The most significant bird strike hazard is associated with raptors and/or waterfowl during their migration due to their large size. After implementation of the BASH program, only three bird strikes were reported from 1997 through 2002. However, it is extremely difficult to determine if a bird has been struck over MAFR unless the pilot sees the strike. Otherwise, it is impossible to determine at what point the aircraft and the bird collided. Therefore, the number of strikes reported between 1997 and 2002 may be inaccurate. Known bird species struck over MAFR include lesser nighthawk and lark bunting.

Hazardous and Solid Wastes

Cannon Air Force Base

Potential impacts include spills and seepage of hazardous waste from dump sites on base. Hazardous wastes are generated during base operations (i.e., oils, heavy metals, etc.), stored on base, and consumed during training. Aircraft flight operations and maintenance, as well as installation maintenance, require the storage and use of many types of hazardous materials. These materials, such as flammable and combustible liquids, include acids, corrosives, caustics, glycols, compressed gases, aerosols, batteries, hydraulic fluids, solvents, paints, pesticides, herbicides, lubricants, fire retardants, photographic chemicals, alcohols, and sealants. The major contaminants identified on CAFB have been petroleum constituents, pesticides, herbicides, polychlorinated biphenyls (PCBs), and heavy metals. CAFB has an active spill prevention plan, an Environmental Restoration Program (ERP) for hazardous wastes, a hazardous and solid waste management program, and an active recycling program.

There are 61 aboveground storage tanks (AST) located at CAFB. The tanks range in size and function from a 250-gallon diesel fuel tank used for a pump engine to 840,000-gallon fuel storage tanks for JP-8 fuel. All ASTs are provided with secondary containment which will protect natural resources from all but a catastrophic release of fuel. Most fuel transfers occur on paved surfaces. There are no underground storage tanks. Spill prevention and cleanup are actively practiced in accordance with the Cannon Spill Prevention, Control, and Countermeasures plan (USAF 2003).

CAFB began its Environmental Restoration Program (ERP) in 1983, and in 1987 the base underwent a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) as the result of an application for a RCRA Part B Permit to store hazardous waste. A total of 179 Solid Waste Management Units (SWMU) and Areas of Concern (AOC) were identified as a result of the RFA. As CAFB is no longer a designated Treatment, Storage, and Disposal facility for hazardous wastes, the permit is a “Corrective Action Only” permit for the investigation and potential remediation of the identified SWMUs and AOCs; permit designation #NM7572124454. The permit is divided into three designated Tables; Table 1 – sites requiring corrective action, Table 2 – sites that are closed to Response Complete (closed with controls), and Table 3 – sites that are closed to Site Closure (unrestricted use/unrestricted exposure). As of FY17, a total of 15 sites remain on Table 1 (three of which are in “deferred” status), 141 sites remain on Table 2 closed to Response Complete, and 23 sites are found within Table 3 closed to Site Closure. Seven landfills closed to Response Complete undergo yearly inspections and maintenance as required; they include Landfills 1, 2, 3, 4, 5, 25, and SWMU 101. In addition as part of the permit requirements, CAFB conducts a biennial groundwater monitoring program consisting of a total of 18 groundwater monitoring wells, 11 of which are included in the “optimized” sampling strategy. The groundwater monitoring program is predicated on the “Conceptual Site Model” approach. Results from the sampling efforts are reported to NMED on a biennial basis. CAFB anticipates closure of an additional 7 Restoration sites that remain on Table 1 in FY17. The

remaining 5 sites will undergo investigation and remediation as required to bring the sites to closure through the "Permit Modification Process" as stipulated in 40 CFR 270.42. In addition, CAFB will work to move numerous sites by further investigation and remediation as required.

Hazardous waste at CAFB is managed under the installation hazardous waste management plan at 75 Initial Accumulation Points (IAP), one 90-day accumulation point, and 120 collection points. All RCRA hazardous waste is shipped offsite on a Hazardous Waste Manifest through the local DRMO disposal contract (Wood 2008). Asbestos-containing debris is manifested off-base by contract (Madril 2009).

Base generated construction and demolition debris is disposed in a small landfill in the southeast corner of the base. Solid waste is transported to the Clovis regional landfill by a contracted waste hauler (Madril 2016).

Melrose Air Force Range

MAFR is operated by a contractor who monitors and maintains the televised ordnance scoring system, bombing and gunnery targets, and access roads. Five ASTs are present on MAFR. Only small quantities of petroleum products are used and stored at the range.

MAFR contains approximately 7,000 ac where live bombs were used from 1952 through 1969. The historical impact area is scheduled for investigation. The object of the investigation will be to discover and detonate or remove any live ordnance remaining from this period.

Current munitions related wastes (metal fragments from inert ordnance, targets, training ammunition) are cleared regularly from MAFR impact areas in accordance with AFI 13-212 (Section 7.4). Tactical and conventional targets are cleared every 75 use days to a radius of 100 m and annually to a radius of 300m. Every 5 years, all impact areas are cleared to their boundaries.

The CAFB Explosive Ordnance Demolition team inspects all munitions debris and renders them safe before collection. Prior to initiation of high-explosives training at MAFR, hazardous munitions waste has consisted solely of a reactive material used in spotting charges.

Melrose Air Force Range operates under a RCRA "Corrective Action Only" permit for 7 identified SWMUs; permit designation #NM7572124454-1. The SWMUs include SWMU 114, SWMU 115, SWMU 117, SWMU 130, SWMU 131, and SWMU 133. The permit was granted "deferred" status by the New Mexico Environment Department in 2007 until the Range is closed, transferring, or transferred at which time the SWMUs will undergo investigation and remediation as necessary. An active groundwater monitoring program is in place at MAFR. Groundwater sampling occurs biannually with a fall and spring sampling event. A total of 30 groundwater monitoring wells comprise the groundwater monitoring well array at MAFR, 18 of which are sampled during the fall or spring event. The remaining wells are employed to measure groundwater static water levels. Information obtained during the groundwater sampling events is reported to NMED on a yearly basis.

Scrap munitions are disposed in accordance with DRMO regulations and a Memorandum of Agreement (MOA) with DRMO, or through an option for direct commercial sales. Defensive chaff and flares are used over MAFR. Based on the findings of a 1997 Headquarters (HQ) ACC study, residual chaff and flares are not expected to release chemicals in potentially dangerous concentrations under the conditions found at MAFR (ACC 1997).

2.4.4 Potential Future Impacts

Based on the "*AFSOC Assets Beddown at Cannon Air Force Base, EIS*", future impacts to land use would be expected at both CAFB and MAFR; however, the impacts cannot be identified until facility construction

is completed, training missions are finalized, and funding is appropriated. This process is expected to occur over the 5-year interval of this INRMP. Future impacts will be identified in yearly updates to this plan.

2.4.5 Natural Resources Needed to Support the Military Mission

Properties of the land and other natural resources which restrict military training are often termed Environmental Constraints. Constraints may be direct from the resources themselves or indirect from laws, regulations, and policies that protect resources. The only constraint on CAFB is the consistent cost of bird strikes.

At MAFR large areas of open space are needed to support air to ground training activities. Additionally, some on-the-ground training occurs at MAFR for which DZs, vegetative cover, and topographic variability are needed. Land at MAFR that is currently needed support the mission includes the impact area (10,126 ac); the remaining land (60,841 ac) at MAFR is used to encompass the safety footprints, and to provide various training options (e.g., DZs, landing zones, areas for ground training). DZs and landing zones require flat terrain without hazards. Suitable terrain is present for this training on the eastern half of the range. Ground training (e.g., Survival, Evasion, Resistance, and Escape [SERE] training) requires varied topography. The southwestern portion of the range has the topography necessary for this training

Soils

The soils of MAFR and CAFB are primarily of a sandy or sandy-loam nature with moderate to high permeability. Although these soils are suited to construction due to a lack of shrink-swell potential, they are highly susceptible to the effects of wind and water erosion during both construction and ground forces training exercises. Construction on these types of soils requires extensive erosion control during and after project completion.

Wetlands

No jurisdictional waters are found on CAFB or MAFR. The necessary SWPPP and permits are in place to control water runoff or discharge into the ponds and lakes found on CAFB.

Floodplains

One hundred-year floodplains do not occur on either CAFB or MAFR. Therefore, floodplains are not a constraint on development in support of the mission at either installation.

Listed Species and Species of Concern

No resident listed threatened or endangered species are known at CAFB or MAFR; however, the lesser prairie chicken, a delisted species, was last sighted on MAFR in 2012. When practical, the habitat for this species should be avoided during training and/or expansion. No critical habitat exists on either installation.

Bird Aircraft Strike Hazard

At times bird activity over the airfield at CAFB, over MAFR and/or along flight training routes result in bird- aircraft strikes. Bird strikes result in hazards to flight crews and damage to aircraft. The removal of aircraft from the schedule for repairs negatively impacts flight training and wing budget because of the repair costs.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The AF environmental program adheres to the Environmental Management System (EMS) framework and it's Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*, U.S. Department of Defense Instruction (DoDI) 4715.17, *Environmental Management Systems*, AFI 32-7001, *Environmental Management*, and international standard, ISO 14001:2004, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

The natural resources program employs EMS-based processes to achieve compliance with all legal obligations and current policy drivers, effectively managing associated risks, and instilling a culture of continuous improvement. The INRMP serves as an administrative operational control that defines compliance-related activities and processes.

4.0 GENERAL ROLES AND RESPONSIBILITIES

General roles and responsibilities that are necessary to implement and support the natural resources program are listed in the table below. Specific natural resources management-related roles and responsibilities are described in appropriate sections of this plan.

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander	The Wing Commander (WC) is responsible for insuring that installation and tenant units comply with laws and requirements associated with the management of natural resources. The WC approves the INRMP and any necessary revisions, provides appropriate funding and staffing to ensure implementation of the INRMP, controls access to and use of installation natural resources, and signs cooperative agreements entered into between the installation and other entities pursuant to the Sikes Act.
AFCEC Natural Resources Media Manager/Subject Matter Expert (SME)/ Subject Matter Specialist (SMS)	Provides natural resources management support to Air Force headquarters, major commands, and installations. Subject Matter Experts utilize their knowledge in natural resources policy, ecosystem management, and land use planning principles to help conserve and enhance the natural infrastructure that is necessary to sustain Air Force operations.
Installation Natural Resources Manager/POC	Ensures studies are done in a timely manner, and in conformance with protocol. Verifies that current data in INRMP, surveys and integrated plans is correct and complete.
Installation Security Forces	Involved with reporting of and security at hazardous materials spills. Serve as Conservation Law Enforcement Officers (CLEO).
Installation Unit Environmental Coordinators (UECs); see AFI 32-7001 for role description	Serve as the EMS conduit between installation environmental function and their unit. Attend CFT and other working group meetings as requested. Advise the work area supervisor on any EMS and environmental policies. Manage and monitor the EMS requirements for the unit. (T-1). Provide any information

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
	required for installation environmental and sustainability performance measures. Participate and support EMS and compliance assessments. (T-1). Assist with developing corrective actions to address identified findings.
Installation Wildland Fire Program Manager	Vacant position. Coordinates and manages controlled burn prescriptions and planning. Maintains installation Wildfire Management Plan. Obtains all necessary permits. Advises and coordinates with contracted firefighters. Administers fire ecology studies and reports as warranted.
Pest Manager	Sustain Government property, preventing pests from causing damage. Control of noxious vegetation, and nuisance wildlife (Prairie dogs on airfield). Removal of road kill on base, and removal of hazardous (poisonous) wildlife.
Range Operating Agency	The WC is the Range Operating Authority of MAFR. The Range Management Office (RMO) under the WC oversees all management of access, maintenance, training scheduling, and facilities infrastructure at MAFR. RMO manages brush with controlled burns prescribed and implemented by contract. RMO coordinates with CEIE to update the Wildfire Management Plan and to provide access to the range for contract biologists.
Conservation Law Enforcement Officer (CLEO)	None specific to conservation.
NEPA/Environmental Impact Analysis Process (EIAP) Manager	The NEPA Manager oversees and executes all installation activities pertaining to the Environmental Impact Analysis Process to ensure environmental considerations are factored into proposed activities.
National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)	N/A
US Forest Service	N/A
US Fish and Wildlife Service	Collaborates to ensure accuracy of natural resources data presented in the INRMP. Provides guidance for natural resource management goals and objectives. Reviews and concurs with 5-year revisions of the INRMP. Reviews and concurs with the effectiveness and implementation of the INRMP annually.
Base Civil Engineer (BCE)	Is responsible for the preparation, maintenance, and day-to-day implementation of the INRMP, and is the focal point for all plan actions and issues. The BCE also establishes mechanisms to review and analyze the impacts using the Environmental Impact Analysis Process (EIAP) for all proposed actions of the INRMP, and makes recommendations based on the analysis to the Natural Resources Management Element (NRME) for approval or disapproval.

5.0 TRAINING

AF installation NRMs/POCs and other natural resources support personnel require specific education, training and work experience to adequately perform their jobs. Section 107 of the Sikes Act requires that professionally trained personnel perform the tasks necessary to update and carry out certain actions required within this INRMP. Specific training and certification may be necessary to maintain a level of competence in relevant areas as installation needs change, or to fulfill a permitting requirement.

Installation Supplement – Training

- NRMs at Category I installations must take the course, DoD Natural Resources Compliance, endorsed by the DoD Underservice Environmental Education Review Board and offered for all DoD Components by the Naval School, Civil Engineer Corps Officers School (CECOS). See http://www.netc.navy.mil/centers/csfe/cecos/ for CECOS course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (http://www.afit.edu), the National Conservation Training Center managed by the USFWS (http://www.training.fws.gov), and the Bureau of Land Management Training Center (http://training.fws.gov).
- Natural resource management personnel shall attain professional registration, certification, or licensing for their related fields, and may be allowed to attend appropriate national, regional, and state conferences and training courses.
- All individuals who will be enforcing fish, wildlife and natural resources laws on AF lands must receive specialized, professional training on the enforcement of fish, wildlife and natural resources in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (http://www.fletc.gov/).
- Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, to include training that is mandatory to attain any required permits.
- The DoD supported publication Conserving Biodiversity on Military Lands -- A Handbook for Natural Resources Managers (http://dodbiodiversity.org) provides guidance, case studies and other information regarding the management of natural resources on DoD installations.

Natural resources management training is provided to ensure that base personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Per AFI 32-7064 professionally trained staff are to be maintained at all times to comply with Sikes Act mandates. Training for all natural resource management personnel is to be attained no less than annually. Training records are maintained IAW the Recordkeeping and Reporting section of this plan. Below are key NR management-related training requirements and programs:

- Personnel involved with pesticide use in support of the BASH program shall receive pesticide use training and certification to comply with federal and state laws or regulations.
- Use of utility terrain vehicles UTV's requires training to comply with federal and DoD instructions.
- Personnel driving on MAFR or leading other parties shall obtain Range Lead Training.
- Personnel supporting the BASH program at CAFB airfield must receive flight line drivers training, and specialized training in the use of firearms and pyrotechnics.

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

The installation maintains required records IAW Air Force Manual 33-363, *Management of Records*, and disposes of records IAW the Air Force Records Management System (AFRIMS) records disposition schedule (RDS). Numerous types of records must be maintained to support implementation of the natural resources program. Specific records are identified in applicable sections of this plan, in the Natural Resources Playbook and in referenced documents.

Installation Supplement – Recordkeeping

Physical records are filed in Bldg. 102 CAFB accordance with the most recent Air Force Records Information Management System (AFRIMS) file system and categories prescribed by AFRIMS. Electronic records are being saved in AFRIMS and in the Air Force-Wide Environmental Management System (eDASH). Additionally, some electronic files are saved to the Squadron's SharePoint site.

6.2 Reporting

The installation NRM is responsible for responding to natural resources-related data calls and reporting requirements. The NRM and supporting AFCEC Media Manager and Subject Matter Specialists should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

Installation Supplement –Reporting

An annual report of depredation activities is submitted to the USFWS Migratory Bird Office. The report details species taken, location, month taken, the amount (number), and final disposition of the birds. Additionally, a report is sent to USDA Wildlife Services documenting the same activities and requesting concurrence with proposed depredation activities for the next year. Participation in Arbor Day Foundation's Tree City USA program requires documentation of compliance with their standards. This is done annually in March. Updates to the INRMP are ongoing. Reporting of changes is done annually for concurrence by the USFWS, and the NMDGF.

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

This section describes the current status of the installation's natural resources management program and program areas of interest. Current management practices, including common day-to-day management practices and ongoing special initiatives, are described for each applicable program area used to manage existing resources. Program elements in this outline that do not exist on the installation are identified as not applicable and include a justification, as necessary.

Installation Supplement –Natural Resources Program Management

The Natural Resources Program Manager (NRM) prepares, maintains, and implements the INRMP as required by the Sikes Act. The NRM provides natural resources policy guidance, technical support, and advice. She/he identifies policy deficiencies and coordinates corrections as necessary, and performs planning, programming, budgeting, and execution of natural resource requirements. The NRM assesses natural resource impacts from mission activity and proposes remedial actions. NRMs must locate, identify, and evaluate natural resource assets, participate in ESOHCAMP and EMS audits/inspections, and maintain good relations with NR stakeholders (regulators). The NRM performs information and records management, and provides training as needed. She/he serves as a key member of the BASH working group, the Wildland Fire working group, and the IPMP development team. Additionally, the Cannon AFB NRM coordinates Earth Day / Arbor Day activities and maintains the Base status as "Tree City USA".

7.1 Fish and Wildlife Management

Applicability Statement

This section applies to AF installations that manage fish and wildlife on AF property. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

CAFB and MAFR are category I installations. Category I installations are defined as having suitable habitat for conserving and managing fish and wildlife (AFI 32-7064). The development of new habitat and management of existing habitat is limited by mission activities. Fish and wildlife species commonly found at CAFB and MAFR are representative of the species diversity common to the regional ecosystem. Aquatic habitat and large prairie dog populations at CAFB provide sources of food and habitat for migrating waterfowl and raptors, thereby increasing the bird aircraft strike hazard at CAFB, which negatively impact mission requirements. At MAFR nearly all of the range is undeveloped and supports small and large mammal populations. Additionally, MAFR provides habitat for a variety of migratory and breeding birds. MAFR is contiguous with other surrounding undeveloped range thus serving as a wildlife corridor.

CAFB works cooperatively with other agencies on an as-needed basis such as the Animal and Plant Health Inspection Service (APHIS), USFWS, NMDGF, and Natural Resources Conservation Service (NRCS) to manage wildlife resources.

Cannon Air Force Base

Fish and wildlife management on CAFB primarily involves BASH reduction efforts, monitoring and surveying for listed species, protection of migratory birds, nuisance wildlife issues, pick-up of dead or injured wildlife, and other cooperative conservation efforts. In recent years, CAFB has participated in a Legacy project, which is conducted jointly between the DoD and regional conservation groups, to study burrowing owl migration throughout the southwestern U.S. and Mexico. CAFB also assisted with a Legacy project, which is occurring on various installations throughout the U.S., to study amphibian diseases. A list of all wildlife species observed during surveys and monitoring programs from 2014 to present at CAFB can be found in Appendix Fauna of CAFB and MAFR.

The only known fish population are in the golf course ponds which were stocked with sterile grass carp (*Ctenopharyngodon idella*) to control algal blooms in 1996.

The North Playa provides the best overall wildlife habitat on CAFB and is an important site for migrating and wintering waterfowl and migratory shorebirds. It also provides habitat for several amphibian, reptile, and small mammal species.

The disturbed grassland habitats in and adjacent to the airfield provide habitat for a variety of wildlife, such as harvest mice, coyote, thirteen line ground squirrel, burrowing owl, long-billed curlew, and various other small mammals. Landscaped areas (e.g., the golf course and base housing area) also provide important habitat for neotropical migratory birds. Past and current demands on fish/wildlife habitat are related primarily to fulfilling CAFB mission requirements. No hunting is allowed on CAFB.

As previously discussed, several important wildlife habitats are present on CAFB. Multiple- use management techniques can accommodate wildlife populations that are compatible with base operations.

Primary Issues	Management Strategies
Limited habitat may decrease with the development of additional infrastructure associated with the AFSOC beddown. This would cause greater competition between species for remaining natural resources.	Manage remaining natural habitat to prevent impacts to the mission while promoting conservation where practical.
Large prairie dog population**.**	Implement the prairie dog management plan.
Bird airstrike hazards.	Update the existing 27 SOW, BASH Plan for the AFSOC mission.
Protection of migratory birds in accordance with the MBTA.	Conduct waterfowl and other migratory bird surveys at 3- to 5-year intervals.

Melrose Air Force Range

Habitat exists for a wide variety of wildlife on MAFR, and more than 100 species have been observed and documented since 2014. Many of these species are game species, such as American pronghorn and mule and white-tailed deer; however, hunting is not allowed due to safety and security restrictions.

Future demands for additional land for ground training on MAFR could impact wildlife populations depending on the type and intensity of training. If training activities continue to expand, more land on MAFR will become disturbed, which will increase the opportunity for invasive plant encroachment and establishment. Erosion may also become a factor if training causes a decrease in vegetative cover. Both of these factors could negatively impact wildlife populations. In addition, as military training intensifies, a vegetation shift could occur that would affect wildlife as more frequent fire intervals may cause a shift from brush to grassland. It should be noted, however, that the invasive shrub mesquite is currently a predominant species, and that shortgrass prairies in pristine state should not sustain such a predominance of any woody species. The impacts of future foreseen training enhancements including utilization of the 10,000 acre Land Gift has been analyzed in the Environmental Assessment for Utilization Enhancements at Melrose Air Force Range, New Mexico.

Primary Issues	Management Strategies
Potential effects of increased training demands.	Monitor breeding bird and large mammal populations to determine abundance and population changes as range use changes.
Wildfires.	Mowing, firebreaks and prescribed fire are the primary tools to reduce fuel loads and manage vegetation communities.
Non-native, invasive, and toxic plants.	Complete and implement plans to manage non-native, invasive, and toxic plants.

7.2 Outdoor Recreation and Public Access to Natural Resources

Applicability Statement

This section applies to all AF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

The Sikes Act requires military installations to promote public use of outdoor recreational resources when it does not conflict with the installation mission. Outdoor recreational areas are classified as:

- Class I – General Outdoor Recreation Areas: Areas appropriate for activities such as camping, winter sports, and water sports.
- Class II – Natural Environmental Areas: Areas which support diverse activities such as hunting, fishing, bird watching, walking, running, cycling, climbing, and riding.
- Class III – Special Interest Areas: Areas with valuable archaeological, ecological, geological, historical, or scenic uses.

Cannon Air Force Base

CAFB is very limited in natural areas favorable to outdoor recreational opportunities. Class I areas do not exist at CAFB. Areas considered as Class II are limited to walking paths around the housing areas and cycling on the perimeter road. It is important to note that use of off-road vehicles, including mountain bikes are prohibited (AFI 32-7064, paragraph 10.3). Prior to allowing use of off-road vehicles of any sort, the installation must thoroughly analyze the impact of such use on soils, archeological sites, wildlife, water quality, and other ecosystem attributes. Class III areas accessible to the public do not exist at CAFB. A golf course which military personnel and their families can use is located on CAFB.

Primary Issues

- None

Melrose Air Force Range

As an active range, MAFR presents serious safety concerns which prohibit the development of outdoor recreational programs on the installation. Outdoor recreational opportunities at MAFR do not exist given safety issues associated with the mission of the range.

Primary Issues ~ none

7.3 Conservation Law Enforcement

Applicability Statement

This section applies to all AF installations that maintain an INRMP, as all installations are required to provide a method for enforcement of conservation laws. The installation is required to implement this element.

Program Overview/Current Management Practices

Currently, there are no law enforcement personnel specific to the natural resources on CAFB and MAFR. With the lack of a hunting or fishing program or public access, and with the absence of any threatened or endangered species, no specialized natural resources law enforcement is currently needed. Natural resources personnel monitor range boundaries during local hunting seasons with the understanding that illegal activities will be reported to the proper authorities for enforcement. This includes the New Mexico Department of Game and Fish for wildlife violations and Security Forces for trespassing violations.

Primary Issues

- None

7.4 Management of Threatened and Endangered Species, Species of Concern and Habitats

Applicability Statement

This section applies to AF installations that have threatened and endangered species on AF property. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

Threatened and endangered species inventories at both CAFB and MAFR are up-to-date. An on-going monitoring program for listed species and federal species of concern is in place, and surveys have been completed as scheduled through 2016. CAFB and MAFR have no current terms and conditions relating to Biological Opinions for threatened and endangered or current consultations under the ESA (Section 7). No critical or habitat of concern is designated for either CAFB or MAFR. There is an existing program to monitor and manage lesser prairie chicken vegetation communities on MAFR. The existing vegetation community is within the suitable range for lesser prairie chicken.

Cannon Air Force Base

Based on the surveys conducted in 2015-2016, no resident threatened or endangered species have been documented on CAFB. Five federal species of concern (one mammal and four avian) were documented on CAFB, two of which were documented as resident/nesting species, two as winter residents, and one as a summer resident.

Primary Issues	Management Strategies
Limited size of suitable habitat for species of concern.	Manage remaining natural habitat to prevent impacts to the mission while promoting conservation where practical.
Species of concern bird aircraft strikes.	Complete and implement a wildlife hazard management plan to decrease the potential of species of concern bird-aircraft strikes.
Maintaining current presence/absence lists of endangered, threatened, and candidate species, and species of concern known to occur on CAFB.	Conduct surveys for federal endangered, threatened, candidate and species of concern at three to five year intervals. Develop management strategies when necessary.

Melrose Air Force Range

Previous surveys at MAFR have not identified any resident threatened or endangered species; however, one federal candidate species, lesser prairie chicken, was documented on MAFR in 2012 and is still actively managed for (see section Threatened and Endangered Species). The bald eagle, a state-listed threatened species that is also protected federally by the BGEPA and MBTA, was documented once in 2012 on MAFR. Five federal species of concern (one mammal, four avian) were found during 2015-2016 threatened and endangered surveys, all of which were documented as resident/nesting species (see section Threatened and Endangered Species). Additionally, six federal species of conservation concern (all avian) were recorded on MAFR, two of which were documented as winter residents and four as summer residents/nesting species.

Primary Issues	Management Strategies
Maintaining breeding and brood-rearing habitat for lesser prairie chicken.	Conduct yearly lesser prairie chicken habitat monitoring; use results to manage vegetation communities for lesser prairie chicken.
Potential effects of live ordnance training on lesser prairie chicken.	Conduct yearly lek monitoring surveys to determine any population changes.
Maintaining current presence/absence lists of endangered, threatened, and candidate species, and species of concern on MAFR.	Conduct presence/absence and monitoring surveys for federal endangered, threatened, candidate, and species of concern known at occur on MAFR at two year intervals to determine population trends. Obtain funding to implement candidate species management programs when necessary.

7.5 Water Resource Protection

Applicability Statement

This section applies to AF installations that have water resources. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

The historic watersheds of CAFB consist primarily of closed drainage systems from the upland areas into the natural playa basins. The playa basins are the primary hydrologic feature of the High Plains region of New Mexico and Texas (Haukos and Smith 1994). The runoff from surrounding uplands aids in playa development through dissolution of calcium carbonate in the subsoil, while also carrying small clay-sized soil particles into the basins. This serves to eventually create an almost impermeable soil layer, thereby increasing the duration of flooding. This interaction of hydrogeologic processes makes playas important for the recharge of the Ogallala Aquifer, wildlife habitat, and sites of diverse plant communities in areas once dominated by short and mid-grass prairies and now by intense agriculture. These natural characteristics have also led to the wide use of playas for storm water storage, irrigation supply, livestock watering, and recreation, as are exemplified by the playas on CAFB and MAFR.

Cannon Air Force Base

The historic playa watershed system of CAFB has been impacted by the construction of roads, flight lines, and industrial and residential buildings. The playa lake basins have all been impacted by past excavation or fill activities. Additionally, the playas now receive large quantities of water from channelized drainage systems from the cantonment area and Chavez West housing area (golf course ponds), the flight line (South Playa), and the Munitions Storage area. Although it is impossible to restore the playa watershed systems, it is important to maintain compliance with regulations for discharges, enhance the natural functions of watersheds, and decrease erosion and sedimentation on CAFB. The Base maintains a current Storm Water Pollution Prevention Plan (SWPPP) to minimize the effects of Base infrastructure on water quality.

Primary Issues

- None

Melrose Air Force Range

The watershed systems of MAFR include closed-basin playa watersheds and intermittent drainages. The playa basin watersheds are scattered throughout MAFR in areas with relatively level topography on the eastern portion and canyon type topography on the western portion. Intermittent drainages include Canada del Tule, Sheep Canyon, Chapmans Draw, and several other small, associated channels. The Canada del Tule carries runoff from the southeastern half of MAFR, beginning off of the southern boundary, and flows northeastward through the range. The Canada del Tule ephemeral draw is the longest drainage on MAFR and contains several on-channel earthen impoundments. Sheep Canyon flows from the Mesa (eastern half of range) in a northeasterly direction to the impact area. Most of the runoff from the land adjacent to the canyon is captured on one of the several on-channel impoundments. The Mesa drainages include Sheep Canyon which flows easterly across the Target Area. Most of the ephemeral drainages on MAFR have been impounded (historically) to provide water sources for livestock.

Primary Issues	Management Strategies
Decreased watershed values. Large areas dominated by mesquite and cholla are decreasing ecosystem diversity effectively degrading native shortgrass prairie. This leads to decreased infiltration, and increased sediment transport.	Continue long-term vegetation monitoring through the LCTA surveys to identify areas of concern When necessary, develop management plans to decrease erosion and sedimentation
Potential sedimentation deposition at the mouths of Sheep Canyon and Canada del Tule.	Continue control of mesquite and other invasive species

7.6 Wetland Protection

Applicability Statement

This section applies to AF installations that have existing wetlands on AF property. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

CAFB and MAFR are current and in compliance with all jurisdictional determinations and permits associated with water bodies and waterways found on Base and at the Range. Because installation waters are isolated/non-jurisdictional, and current permits will expire without need for renewal, it will be imperative for CAFB be proactive in maintaining a current SWPPP and wastewater management plan. All plans are currently up-to-date, but annual review will occur to ensure that any changes to current operations are reflected and managed.

In accordance with the federal policy of "no net loss of wetlands", maximum avoidance and minimization of impacts to wetlands is being practiced both in training and construction activities. Any unavoidable impacts will be documented and mitigated for regardless of jurisdiction.

7.7 Grounds Maintenance

Applicability Statement

This section applies to AF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

Grounds maintenance is conducted on a regular basis at CAFB (**Appendix F. Suggested Landscape Plants**). As of 2016, CAFB has received the Tree City USA Award for 18 consecutive years and has received four Tree City USA Growth Awards. The urban areas, as well as the airfield and safety zones, are maintained with mowers, trimmers, and other standard equipment. On MAFR, the use of tractors with shredders, mowers, and other power equipment are used to maintain fire breaks, roadways, and other used areas. The impact area is "maintained" through constant use of munitions and subsequent fires. Other areas of the range are left as natural habitat. (**Environmental Assessment for Utilization Enhancements at Melrose Air Force Range, New Mexico, January 2016**)

Primary Issues

- None

7.8 Forest Management

Applicability Statement

This section applies to AF installations that have forested lands on AF property. This section **IS NOT** applicable to Cannon AFB.

Program Overview/Current Management Practices

N/A

7.9 Wildland Fire Management

Applicability Statement

This section applies to AF installations with unimproved lands that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

CAFB completed a Wildland Fire Management Plan (WFMP) in 2012. The overall goals of the plan are below:

- To ensure the safety of the installation residence, the public, adjacent land owners, and firefighters is the first priority of all fire management activities on USAF lands.
- To provide an acceptable level of wildfire protection for all USAF lands, reducing potential threats to life, property, natural and cultural resources.
- To coordinate and cooperate with other federal, state, and local suppression agencies; effectively providing mutual support across jurisdictional boundaries to the best extent possible.
- To convene the Wildland Fire Working Group (WFWG) on a quarterly basis to review range operation, assess fuel management objectives, and determine action items.

Wildland fires are an important consideration, especially on MAFR. CAFB personnel are committed to mitigating the risk of devastating wildfire to USAF and surrounding property. Goals for prescribed fire and fuel treatment which were not covered in the 2010 INRMP that are detailed in the WFMP are below.

- To reduce wildland fuel loads, minimize the risk of catastrophic wildfire, and create zones of defensible space for firefighters utilizing firebreaks for suppression.
- To minimize the potential impacts of smoke to air quality.
- To provide experience and training for USAF firefighters in fuels reduction, fire behavior, and fire weather so that they are better prepared to suppress wildland fires.

The goals for both CAFB and MAFR outlined above will be met through the following objectives:

- To use prescribed fire or other treatments such as mowing and to treat fuels and reinforce firebreaks.
- To monitor fuel conditions such as level of curing and fuel depth to determine the best applicable fuel treatment.
- To use herbicides and/or mechanical treatment to control exotic invasive or nuisance species. (Mowing is currently the primary method for grass control around MAFR.)
- To effectively use all available options for wildland fire management at MAFR, with prescribed fire, and mowing as the primary tools for treating wildland fuels.

Currently, prescribed burning is done by a contract with Glacier Technical Solutions (GTI). GTI developed their own prescribed fire operations burn plan in 2014 as approved by USFWS, US Park Service, USFWS, and the Bureau of Land Management. The increase in the use of prescribed fire warrants a more thorough analysis of prescribed fire effects.

Primary Issues	Management Strategies
The current WFMP addresses the laws, regulations, responsibilities, and appropriate training and responses for CAFB, and it must be implemented, as well as updated to address changing conditions or mission requirements.	Continue to implement and update the WFMP. Work closely with state and local officials to determine the most advantageous strategies for prescribed fire to enhance habitat and reduce fuel load risks.
Vegetation change as a result of terminating grazing leases	Continue the LCTA monitoring program to assess the effects of fire on MAFR.

7.10 Agricultural Outleasing

Applicability Statement

This section applies to AF installations that have arable or pastoral lands on AF property. This section **IS NOT** applicable to Cannon AFB

Program Overview/Current Management Practices

N/A

7.11 Integrated Pest Management Program

Applicability Statement

This section applies to all AF installations that maintain an INRMP, as all installations are required to develop an Integrated Pest Management Plan (IPMP). The installation is required to implement this element

Program Overview/Current Management Practices

Insure INRMP is cited in other plans and reference IPMP Pest management at CAFB currently focuses on the control of pest species such as pigeons, mosquitoes, flies, and crawling insects (i.e., cockroaches). These species must be controlled to protect AF property and personnel and, in the case of pigeons, to lower the probability for BASH incidents.

Another problematic species that is being addressed by the pest management group at CAFB is the black-tailed prairie dog. At one time there were seventeen very active populations on MAFR and limited numbers on CAFB. Today, a much small number of prairie dogs are found on MAFR and the population on CAFB are relatively static throughout the airfield. Prairie dogs are attractive prey to many raptor species, and their burrows facilitate burrowing owl occupation. Controlling this species is complicated as it is listed by New Mexico as a sensitive taxa.

Invasive species, particularly plants, are under the purview of the integrated pest management program; however, invasive plant species are also of particular interest to natural resources personnel due to erosion, and degradation of important, natural habitats.

Cannon Air Force Base

CAFB's current Pest Management Program provides a self-help program that provides roach bait stations, mouse traps, fly swatters, ant bait stations, rodent glue boards, and Round-Up herbicide. The Pest Management Plan provides strategies to address six categories of pests:

1. *Disease Vectors*. These are insects that transmit diseases to man and animals. The plan addresses houseflies, blowflies, arthropods, and mosquitoes (carrying West Nile virus). Fly strips and fly swatters are issued by the self-help store, and larvicides are used to control mosquito larva.
2. *General Household and Nuisance Pests*. These pests include cockroaches, ants, spiders, wasps, hornets, bees, gophers, and mice. Building occupants are encouraged to use good sanitation practices to minimize pests, and the Pest Management Section addresses infestations beyond the capabilities of the occupants. Non-chemical control methods are generally utilized to control these pests.
3. *Structural Pests*. Annual building inspections have found no termites on the base to date. Preventive methods such as pre-construction treatment and use of pre-treated wood are encouraged.
4. *Weed Control*. Priority areas for weed control include the flight line and fence lines. Non-selective herbicides such as Round-Up are used along with grading, trimming, and mowing.
5. *Birds*. Two bird species addressed in the plan include pigeons and burrowing owls. Trapping to remove pigeons inside hangars has proven ineffective, and selective shooting with a pellet gun is used for control. Hangar doors are required to be closed when aircraft are not being moved in or out. Burrowing owls occupy abandoned prairie dog burrows. After assuring that burrowing owls are not present, abandoned prairie dog burrows are filled. Burrowing owls are protected under the MBTA. The base will implement procedures to protect burrowing owls. Burrowing owls pose a problem only from the standpoint of potential BASH issues.
6. *Miscellaneous Pests*. These include ticks, fleas, mosquitoes, prairie dogs, ornamental defoliators, and snakes. Chemical treatment and mosquito larvicide is utilized for ticks, fleas, and mosquitoes. Non-chemical methods are encouraged for the other pests.

One current concern on CAFB is the presence of prairie dogs near the flight line area. This is potentially significant because these species may attract birds of prey such as hawks, falcons, and eagles which increase the potential for BASH incidents. A prairie dog control plan was implemented in 2005; however, the current control efforts being implemented do not appear to be working. Based on 2015 survey data new control methods need to be implemented.

Another associated concern is the presence of burrowing owls along the flight line. Burrowing owls use abandoned prairie dog burrows for nesting. The burrowing owl is considered a species of concern by the USFWS (Service) and is protected by both the MBTA and by New Mexico statute 17-2-14 (NMSA 1978). The MBTA provides for a year-round closed season for non-game birds and prohibits the taking of migratory birds, nests, and eggs, except as permitted by the Service.

Burrowing owls generally maintain a series of burrows, forming a complex, one of which is the nest burrow used for incubation. Other holes are utilized as auxiliary burrows. USFWS guidance regarding protection of burrowing owls is as follows. Complexes can be identified by first locating sentry owls adjacent to the entrances of nest burrows. Nest burrows are indicated by the presence of duff or divots. Once the nest burrows are identified and marked, adult owls can be flushed to their auxiliary burrows. Using this method the minimum number of burrows utilized by a breeding pair in their home range can be located. All burrows comprising the complex should be marked and protected from destruction. The CAFB Natural Resources biologist has in the past and will continue in the future to follow USFWS guidance for protection of burrowing owls.

CAFB is also taking active steps to reduce the use of chemical pesticides, herbicides to manage pest problems. Non-chemical solutions (predatory insects, owl decoys, water drawdowns, elimination of non-jurisdictional "puddles", etc.) to pest management problems are considered and utilized whenever possible to avoid exposure of humans and wildlife to poisonous or toxic chemicals.

Primary Issues	Management Strategies
Prairie dogs may provide food sources to raptors and their towns attract burrowing owls that use unoccupied holes for shelter and nesting, causing increased bird/aircraft strike incidents.	Adequately assess the populations of prairie dogs and burrowing owls on CAFB Implement the prairie dog control plan directed at key critical areas.
Use USFWS guidance to protect burrowing owls prior to pest management treatment of prairie dogs in the vicinity of the flight line.	Conduct a thorough wildlife hazard assessment to determine where the highest burrowing owl-aircraft strike risks occur and if necessary, develop mitigation measures.
Invasive species exist on CAFB.	Conduct a comprehensive invasive species survey on CAFB. Develop and implement an invasive species control plan.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Applicability Statement

This section applies to AF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

The existing BASH plan has been revised to address the new AFSOC mission. The *AFSOC Assets Beddown at Cannon AFB, New Mexico EIS* (AFSOC 2007) states that the number of aircraft to be transferred to CAFB is estimated to be 108. As outlined in the EIS, the 27 FW was deactivated and the F- 16 aircraft were relocated; however, the Air National Guard F-16s, transient active-duty F-16s, and other aircraft would continue to use MAFR for training. An annual estimate of 200 F-16 airfield operations (i.e., a landing or takeoff) at CAFB are projected to continue in support of F-16 training after an AFSOC beddown. New aircraft potentially using and/or transferring to CAFB include AC-130 Gunships, MC-130H Combat Talon II, MC-130P Combat Shadow, MC-130W Combat Knife, C-130E Hercules, C-47 Skytrain, UH-1 Huey helicopters, CV-22 Osprey, MQ-1 Predator, and other non-standard aircraft. Annual airfield operations if transfers are made will go from the current 48,348 operations to 55,696. Although the number of operations will not significantly increase, many operations will be flown at low altitudes or during nighttime (10:00 p.m. to 7:00 a.m.) hours. Most bird strikes (75 percent) occur below 500 ft. (FAA 2009) and avoidance is more difficult at night when species of birds cannot be seen (IBSC 2005).

Currently, CAFB has a BASH program for which the primary focus is to determine the wildlife hazards present on CAFB and MAFR and how to mitigate them. Unfortunately, historic strike data is lacking for the current mission, and as a result, good data is not available to develop sound management and mitigation practices.

Cannon Air Force Base

Bird strikes at CAFB may be more probable than at MAFR due to aircraft take-off and landings. In addition, urban pest species, such as pigeons, dove, and blackbirds, which flock in high numbers and are susceptible to collisions, are found throughout the airfield and surrounding area. Raptors are also present at CAFB, often over the runway or approach/departure zones hunting for prey. The prairie dog population discussed in Section 7.11 is a major attractant for these birds.

Primary Issues	Management Strategies
Bird aircraft strikes have been documented on aircraft involved in the AFSOC mission at CAFB. A new wildlife hazard management plan is needed to address and manage changes in aircraft types and flight levels associated with the new AFSOC mission.	Develop a wildlife hazard management plan for CAFB.
A large prairie dog population within the airfield has the potential to attract foraging hawks and vultures to the airfield resulting in a potential increase in bird-aircraft strike hazard.	Evaluate current wildlife deterrent measures in use and implement new strategies where possible.
Prairie dogs have altered airfield habitats to benefit and potentially increase the population of ground foraging birds (killdeer, mourning doves, horned larks).	Improve bird strike reporting and data maintenance.
Prairie dog burrows attract burrowing owls, creating another potential hazard for aircraft.	Conduct a thorough wildlife hazard assessment to determine where the highest risks occur and develop mitigation measures. Prairie dog control and removal should focus near runways and other critical areas.

Melrose Air Force Range

MAFR is much more challenging in terms of wildlife hazard management than CAFB. Not only is the area much larger but wildlife deterrent techniques such as cracker shells and air cannons, cannot be used due to safety restrictions within the impact area. In addition, bird strikes that may occur in the area are at an altitude that human intervention with deterrent devices is not possible or effective. The Avian Hazard Advisory System (AHAS) or specifically dedicated avian radar devices may be the only viable option for bird detection and avoidance over the range.

Primary Issues	Management Strategies
Bird aircraft strikes have been documented on aircraft involved in the AFSOC mission at CAFB. A new wildlife hazard management plan is needed to address and manage changes in aircraft types and flight levels associated with the new AFSOC mission.	Conduct a thorough wildlife hazard assessment to determine where the highest risks occur and develop necessary mitigation measures.
Detecting and controlling wildlife at MAFR is difficult due to size and safety limitations.	Evaluate current wildlife deterrent measures in use and implement new strategies where possible including use of avian radar systems or other remote sensing technologies.

7.13 Coastal Zone and Marine Resources Management

Applicability Statement

This section applies to AF installations that are located along coasts and/or within coastal management zones. This section **IS NOT** applicable to Cannon AFB.

Program Overview/Current Management Practices

N/A

7.14 Cultural Resources Protection

Applicability Statement

This section applies to AF installations that have cultural resources that may be impacted by natural resource management activities. This section **IS** applicable to Cannon AFB.

Program Overview/Current Management Practices

There are four eras of human activity in the vicinity of CAFB: Paleo-Indian (ca. 10,500 - 5,500 BC); Archaic (5,500 BC - AD 200); Ceramic (AD 200 - 1800); and Historic (1800 – present; USAF 1996d).

The Paleo-Indian Era is characterized by tool assembly, large, frequently fluted lance points associated with a hunting culture dependent on Pleistocene mammals. Blackwater Draw, located only a few miles south of the installation, is a significant site for the Paleo-Indian Era (USAF 1996d).

Relics of the Archaic Period indicate prehistoric groups that practiced more extensive utilization of resources. Archaic people developed more diverse tools and smaller projectile points (USAF 1996d). The Ceramic Era is distinguished by the occurrence of brownware pottery, small projectile points, and a more stationary lifestyle with limited horticulture. The land surrounding Melrose AFR is within the eastern edge of Puebloan Culture in New Mexico (USAF 1996).

The Historic Era introduced manufactured goods and domestic animals. A variety of cultures were active in the area including Querecho, Comanche, Kiowa, Lipan Apache, Spanish, Mexican, and Anglo-American. Intensive settlement by European based cultures did not begin until the late 19th century (USAF 1996).

Surveys for cultural resources have been conducted at CAFB and MAFR since 1981. Much of CAFB is developed and extensively disturbed. A basic cultural resource survey is complete for MAFR. Some 238 sites were identified, primarily lithic scatters and old homesteader ranches. About half of these sites are not significant. The remainder are either eligible for *National Register of Historic Places* (NRHP) listing or require further study (USAF 1996).

Several buildings at CAFB are more than 50 years old. Most of these facilities were built during or immediately following World War II. One is considered potentially eligible for the NRHP (ICRMP 2008).

A number of buildings from this period have been demolished and replaced with new facilities following consultation with the New Mexico State Historic Preservation Officer (SHPO). As older buildings become potentially eligible for the NRHP, the installation will continue to consider their significance, consult with the New Mexico SHPO, and take actions to preserve any facilities determined to be exemplary.

The Natural Resources programs have no known adverse effects on identified Cultural Resources. Prescribed burns for vegetation control and fuels reduction are accomplished under the wildland fire program. These areas are evaluated for the presence of known cultural resources prior to burning. Mechanical means of fuel reduction (shredding) are also used and preferred to burning to prevent any adverse effects to potential unidentified cultural resources. Mechanical means of plant removal (i.e., grubbing) are utilized for invasive species control with project areas being evaluated for the presence of identified archeological sites prior to the accomplishment of the project Cropland areas have the biggest disturbance factor but were previously evaluated for the presence of cultural resources with none being identified. In the event future mission changes impact the Natural Resources program, the changes will be evaluated for effects on cultural resources and mitigated appropriately to provide minimal mission effect while also protecting the cultural resources. The Integrated Cultural Resources Management Plan (ICRMP) is developed and implemented to protect and preserve known cultural resources.

Implementation of natural resources program activities are monitored to ensure protection of existing and newly discovered archaeological resources and historic sites.

The ICRMP should be consulted prior to implementation of mission or natural resources management activities.

Primary Issues

None

7.15 Public Outreach

Applicability Statement

This section applies to all AF installations that maintain an INRMP. The installation is required to implement this element.

Program Overview/Current Management Practices

A number of public outreach events are conducted by various members of CAFB's Asset Management Flight. These outreach events primarily occur in association with the installation's Arbor Day/Earth Day celebration. These activities typically involve educational activities at the local schools and libraries, tours of the waste water treatment plant, and information booths on subjects such as recycling, responsible energy use, and local wildlife. The Environmental Element procures various promotional items such as reusable shopping bags, coloring books, and t-shirts promoting environmental awareness. The items are given out to the public by staff. Trees are planted for Arbor Day and for promotion of Earth Day. Public outreach at CAFB for natural resources also includes cattle and crop outleasing programs. Natural resources personnel deal directly with local farmers and ranchers to develop leasing contracts, establish stocking rates, and terms of each contract. The public outreach that is mentioned is provided by various members of Cannon AFB's Asset Management Flight in respect to their respective programs.

Primary Issues

None

7.16 Geographic Information Systems (GIS)

Applicability Statement

This section applies to all AF installations that maintain an INRMP, since all geospatial information must be maintained within the AF GeoBase system. The installation is required to implement this element.

Program Overview/Current Management Practices

GIS is a computer-based system designed to capture, store, manipulate, analyze, and display geo-referenced map data on a computer. GIS differs from Computer Aided Drafting Design (CADD) systems by the fact that a GIS can also correlate non-spatial data with spatial map data for analysis purposes. In a GIS system, an unlimited array of tabular data can be correlated with map features for analysis purposes. GIS is a multi-use tool that supports the INRMP, General Plan (GP), Comprehensive Range Plan (CRP), Cultural Resources Management Plan (CRMP), BASH plan, project site selection, and other decision making actions. ESRI's ArcGIS is used at CAFB for planning, engineering, and natural resource management. Current layers include buildings, roads, utilities, water bodies, airfield pavements, land use, vegetation, wetlands, and prairie dog towns for both CAFB and MAFR. The vegetation and prairie dog layers constantly change so updates are made to reflect these changes.

Primary Issues

- GIS provides for cost effective monitoring of ecosystem changes and enhances management capabilities, but has not been fully implemented at the base.
- Vegetation layers have not been created for CAFB and those developed for MAFR were created in approximately the mid-1990s.

Management Strategy

- Complete the necessary review of GIS data to determine data gaps and complete surveys and/or acquire information to fulfill GIS needs.

8.0 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize AF missions, this section may list specific goals and objectives aimed at eliminating, reducing or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire natural resources program.

The installation goals and objectives are displayed in the 'Installation Supplement' section below in a format that facilitates an integrated approach to natural resource management. By using this approach, measurable objectives can be used to assess the attainment of goals. Individual work tasks support INRMP objectives. The projects are key elements of the annual work plans and are programmed into the conservation budget, as applicable.

Installation Supplement – Management Goals and Objectives

GEOGRAPHIC INFORMATION SYSTEMS

Goal 1: Update GIS Database with Current Natural Resources Information

Objective 1.1: Identify and fill data gaps in GIS coverage for CAFB and MAFR as needed.

Project 1.1.1: Conduct surveys when necessary, to update natural resources, GIS coverage.

Objective 1.2: Achieve access to GIS software and data for NR staff, and provide training.

FISH AND WILDLIFE MANAGEMENT

Goal 2: Monitor Population Trends of Neotropical Breeding Birds on MAFR

Objective 2.1: Continue data collection and conduct a trend analysis for all data on Neotropical Breeding Birds on MAFR.

Project 2.1.1: Conduct breeding bird surveys on established routes the first week of June during each fiscal year.

Project 2.1.2: Prepare annual reports summarizing the findings of the surveys with comparisons year over year to determine trends and fluctuations of bird populations as well as recommendations for management.

THREATENED AND ENDANGERED SPECIES AND HABITAT MANAGEMENT

Goal 3: Monitor and manage primary breeding, nesting, and brood-rearing lesser prairie chicken habitat and population on MAFR

Objective 3.1: Monitor habitat and population of lesser prairie chicken on MAFR.

Project 3.1.1: Conduct population and habitat assessments for lesser prairie chicken by September of each fiscal year (2017-2021).

Project 3.1.2: Prepare annual reports summarizing the data collected and make recommendations for species management.

Objective 3.2: Implement management strategies that support training missions as well as improve habitat for lesser prairie chickens.

Goal 4: Monitor Endangered, Threatened, Candidate, and Sensitive Species at MAFR and CAFB

Objective 4.1 Continue long-term monitoring efforts for listed and sensitive species on MAFR and CAFB. Monitoring data will be used data to manage listed and sensitive species habitat.

Project 4.1.1: Conduct biennial status species surveys on MAFR and every five years on CAFB.

Project 4.1.2: Prepare a final report summarizing the data collected and make recommendations for future management.

WILDLAND FIRE MANAGEMENT

Goal 5: Optimize the wildland fire management program for MAFR to reduce the potential for wildfires to escape MAFR and to benefit LPC habitat

Objective 5.1: Continue operations as identified in the 2014 Wildland Fire Management Plan

Project 5.1.1: Conduct surveys and use LCTA information to determine fuel loads throughout MAFR. Data will be analyzed for fire hazard vulnerability determination.

Project 5.1.2: Update the Wildland Fire Management Plan every five years or as needed to compensate for mission changes.

Project 5.1.3: Continue the established LCTA monitoring program for assessing the effect of fire on MAFR.

Project 5.1.4: Establish a fire ecology program within 27 SOCES.

BIRD AIRCRAFT STRIKE HAZARD

Goal 6: Reduce Wildlife Aircraft Strike Hazards for Cannon Air Force Base

Objective 6.1: Reassess the wildlife hazard management plan for CAFB and MAFR.

Project 6.1.2: Develop a wildlife hazard management plan that mitigates wildlife hazards to the maximum extent.

Objective 6.2: Implement the new wildlife hazard management plan for CAFB and MAFR.

Project 6.2.1: Increase staffing to include a BASH Program Manager.

INTEGRATED PEST MANAGEMENT

Goal 7: Reduce Prairie Dog Populations on Cannon AFB

Objective 7.1: Improve the Prairie Dog Control Plan for the CAFB Airfield by September 2017.

Project 7.1.1: Conduct Prairie Dog and Burrowing Owl Population Assessments for CAFB with an annual report due in September.

Project 7.1.2: Update the Prairie Dog Control Plan for CAFB biennially based on the results of population assessments.

Project 7.1.3: Coordinate with federal and state agencies regarding assessments, and plan updates.

Goal 8: Control of Invasive and Exotic Plant Species on CAFB and MAFR

Objective 8.1: Develop and implement invasive species control plans.

Project 8.1.1: Inventory the invasive and noxious plants present on MAFR and CAFB.

Project 8.1.2: Using data acquired from the inventory to develop a Weed Management Plan for CAFB and an Invasive Species Management Plan for MAFR. Plans should provide metrics for evaluation of success.

Project 8.1.3: Implement the most effective management strategies to the maximum extent practical.

Project 8.1.4: Survey and report successful progress using the metrics in the Plans.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

The INRMP is prepared in cooperation with and is signed by the Regional Director of the USFWS and the Director of the NMDGF. The coordination and approval process for INRMP implementation and revision is summarized as follows.

The Sikes Act also requires that INRMPs be implemented. “Implementation” anticipates the execution of all “must fund” projects and activities in accordance with specific timeframes identified in the INRMP. “Must fund” projects and activities are those that are required to meet recurring natural resources conservation management requirements or current compliance needs. Not all projects listed in an INRMP are necessarily “must funds.” INRMPs also include projects and actions that, based upon the availability of funding, also would (further) enhance an installation’s natural resources.
As defined in the OSD Policy memo, dated 10/10/2002 (*Updated Guidance for Implementation of the Sikes Act Improvement Act),* an INRMP is considered implemented if an installation:

- Actively requests, receives, and uses funds for “must fund” projects and activities;
- Ensures that sufficient numbers of professionally trained natural resources management staff are available to perform all of the tasks required by the INRMP;

- Coordinates annually with all cooperating Resource Agency offices; and
- Documents specific INRMP action accomplishments undertaken each year.

The INRMP for CAFB/MAFR requires approval of the WC (27 Special Operations Wing Commander [SOW/CC]). The INRMP is coordinated through the Special Operations Mission Support Group Commander (SOMSG/CC), BCE (Special Operations Civil Engineer Squadron Commander [SOCES/CC]), the Environmental Program Managers (SOCES/CEIE), the Special Operations Support Squadron (SOSS), Wing Plans and Programs (SOW/XP), the Judge Advocate (SOW/JA), and Public Affairs (SOW/PA). Headquarters, Air Force Special Operations Command, Environmental (AFSOC/A7AV) and the Judge Advocate (AFSOC/JA) review the document. Prior to the implementation of specific projects or actions in the INRMP, the appropriate environmental impact analysis (i.e., Environmental Impact Statement [EIS], Environmental Assessment [EA], or Categorical Exclusion [CATEX]) is performed, as required by NEPA.

The USFWS and the Director of the NMDGF review and sign the INRMP. The wing commander subsequently signs and implements the INRMP. The CAFB Natural Resources Program Management involves implementation of projects in this INRMP and the integration of mission specific management plans. A list of the management plans related to the CAFB natural resources program along with the office of primary responsibility and contact information is provided in the following table.

Plan	Date	Person	Office	Phone
BASH Plan	Aug. 2017	Maj Michael Murphy	27 SOW SE/SE	575-784-4075
Installation Development Plan	April 2016	Ron Lancaster	27 SOCES/CEI	575-784-1146
CAFB GEOBASE Strategic Plan	Oct. 2017	Sean Sinclair	27 SOCES/CE	575-784-2829
Comprehensive Range Plan	Oct. 2014	Scott Daggett	27 SOAOS/RMO	575-784-1122
Cultural Resources Management Plan	Aug. 2017	Charles Dixon	27 SOCES/CEIE	575-904-6731
Facility Response Plan	March 2013	Gene Smith	27 SOCES/CEIE	575-904-6735
Golf Course Env. Management Plan	Feb. 2015	Craig Brooks	27 SOFSS/FSCG	575-784-2800
Integrated Pest Management Plan	June 2017	Jonathan Roland	27 SOCES/CEOIE	575-784-2882
Wildland Fire Management Plan	Aug 2014	Scott Daggett	27 SOAOS/RMO	575-784-1122

9.2 Monitoring INRMP Implementation

The 27th Special Operations Wing is the main organization at Cannon Air Force Base. Within the Mission Support Group (under the Wing) there are several Squadrons, one of which is the Civil Engineer Squadron. The Environmental Element falls under Installation Management of the Squadron. Qualified subject matter experts are employed sufficient to manage the various environmental disciplines that the Environmental Element is responsible for. A qualified natural resources staff is maintained.

The Natural Resources (NR) Program maintains a qualified Natural Resources Management Specialist augmented by the civilian interdisciplinary team within the Environmental Element. Additionally, private contractors with expert specialties are used to support the NR program. For the foreseeable future Texas A&M is contracted to support CAFB / MAFR with myriad natural resources support activities.

The onus of INRMP compliance is upon the Natural Resources Program Manager. Staffing is currently adequate with one Natural Resources Program Manager, a team of 2-4 field biologists and 1-3 senior research biologists from Texas A&M. Additionally, there are other subject matter experts within the Environmental Element who routinely contribute to the NR program. Charles Dixon, Ph.D. has over 30 years in the field with expertise in botany, ecology, rangeland science, ornithology, wildlife biology, land management, and studied (15 yrs.) the lesser prairie-chicken in NM as part of a long-term, manipulative study of their life history and habitat use.

9.3 Annual INRMP Review and Update Requirements

According to AFI 32-7064, INRMPs are to be "living documents," incorporating all aspects of natural resources management and ensuring that they are compatible with each other and with the CAFB mission. Periodic assessment is a necessary part of the natural resources process that evaluates program status, measures progress, and identifies new management issues, concerns, goals, and objectives.

Section 101(b)(2) of the Sikes Act (16 U.S.C. 670a[b][2]) states that each INRMP "must be reviewed as to operation and effect by the parties thereto on a regular basis, but not less often than every 5 years." The requirement to "review" the INRMPs "on a regular basis, but not less often than every 5 years" does not mean that the INRMP necessarily needs to be revised and republished every 5 years. The Sikes Act specifically directs that the INRMPs be reviewed "as to operation and effect," emphasizing that the review is intended to determine whether existing INRMPs are current and are being implemented to meet the requirements of the Sikes Act and contribute to the conservation and rehabilitation of natural resources on military installations.

These reviews must be performed by the Base, NMDGF, and the USFWS. This means that no less frequently than every 5 years, all three parties to the INRMP must complete a review of the INRMP. Although not expressly required by the Sikes Act, the outcome of this joint review should be documented in a memorandum or letter summarizing the rationale for the conclusions the parties have reached.

Although the Sikes Act specifies that a formal review must be completed no less often than every 5 years, DoD guidance specifies that INRMPs shall be reviewed annually with the cooperation of the USFWS and state fish and wildlife agencies. These annual reviews will facilitate "adaptive management" by providing an opportunity for the parties to review the goals and objectives of the plan and management programs, as well as the schedule for undertaking proposed actions. These annual reviews are required to ensure the INRMP (1) accommodates changes in the military mission and natural resources management objectives; (2) incorporates lessons learned from Base projects, regional activities, or scientific studies; (3) incorporates agreements with regulatory agencies; and (4) ensures the continued usefulness of this plan. Additionally, the annual review is required to verify that:

- All "must fund" projects and activities have been budgeted for and implementation is on schedule;
- All required professionally-trained natural resources positions are filled or are in the process of being filled;
- Projects and activities for the upcoming year have been identified and included in the INRMP;
- All required federal, state and installation coordination have occurred; and
- All significant changes to the installation's mission requirements or its natural resources have been identified.

10.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable), as well as the appropriate funding source, and priority for implementation. The work plans provide all the necessary information for building a budget within the AF framework. Priorities are defined as follows:

- High: The INRMP signatories assert that if the project is not funded the INRMP is not being implemented and the Air Force is non-compliant with the Sikes Act; or that it is specifically tied to

an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption.

- Medium: Project supports a specific INRMP goal and objective, and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112 on Invasive Species. However, the INRMP signatories would not contend that the INRMP is not be implemented if not accomplished within programmed year due to other priorities.
- Low: Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or support long-term compliance with specific requirements within natural resources law; but is not directly tied to specific compliance within the proposed year of execution.

Annual Work Plans	OPR	Funding Source	Priority Level
Geographic Information Systems			
Conduct surveys when necessary, to update natural resources, GIS coverage	27 SOCES/CEIE	Base	M
Fish and Wildlife			
Conduct breeding bird surveys on established routes the first week of June during each fiscal year	27 SOCES/CEIE	AFCEC	M
Prepare annual reports summarizing the findings of the surveys with comparisons year over year to determine trends and fluctuations of bird populations as well as recommendations for management	27 SOCES/CEIE	Base	M
Threatened and Endangered Species			
Conduct population and habitat assessments for lesser prairie chicken by September of each year (2017-2021)	27 SOCES/CEIE	AFCEC	H
Prepare annual reports summarizing the data collected and make recommendations for species management	27 SOCES/CEIE	Base	H
Conduct biennial status species surveys on MAFR and every five years on CAFB	27 SOCES/CEIE	AFCEC	H
Prepare a final report summarizing the data collected and make recommendations for future management	27 SOCES/CEIE	Base	M
Wildland Fire Management			
Conduct surveys and use LCTA information to determine fuel loads throughout MAFR. Data will be analyzed for fire hazard vulnerability determination	27 SOCES/CEIE	Base	M
Update the Wildland Fire Management Plan every five years or	27 SOCES/CEIE	Base	M

as needed to compensate for mission changes			
Continue the established LCTA monitoring program for assessing the effect of fire on MAFR	27 SOCES/CEIE	Base	M
Establish a fire ecology program within 27 SOCES	27 SOCES/CEIE	Base	L
BASH			
Develop a wildlife hazard management plan that mitigates wildlife hazards to the maximum extent	27 SOCES/CEIE	Base	H
Increase staffing to include a BASH Program Manager	27 SOCES/CEIE	Base	L
Integrated Pest Management Plan			
Conduct Prairie Dog and Burrowing Owl population assessments for CAFB with an annual report due in September AFBs Prairie Dog Management Plan	27 SOCES/CEIE	AFCEC	H
Update the Prairie Dog Control Plan for CAFB biennially based on the results of population assessments	27 SOCES/CEIE	Base	M
Coordinate with federal and state agencies regarding assessments, and plan updates	27 SOCES/CEIE	Base	M
Inventory the invasive and noxious plants present on MAFR and CAFB	27 SOCES/CEIE	AFCEC	M
Using data acquired from the inventory to develop a Weed Management Plan for CAFB and an Invasive Species Management Plan for MAFR. Plans should provide metrics for evaluation of success	27 SOCES/CEIE	Base	M
Implement the most effective management strategies to the maximum extent practical	27 SOCES/CEIE	Base	M
Survey and report successful progress using the metrics in the Plans	27 SOCES/CEIE	Base	M

11.0 REFERENCES

11.1 Standard References *(Applicable to all AF installations)*

- AFI 32-7064, *Integrated Natural Resources Management*
- Sikes Act
- eDASH Natural Resources Program Page
- Natural Resources Playbook – a Internal AF reference available at https://cs1.eis.af.mil/sites/ceportal/CEPlaybooks/NRM2/Pages/

11.2 Installation References

- **2017-2018 New Mexico Hunting Rules and Information (NMHRI 2017). 2017.** http://www.wildlife.state.nm.us/download/publications/rib/2017/hunting/2017_18-New-Mexico-

Hunting-Rules-and-Info.pdfAir Combat Command (ACC). 1995. Biological Survey Report, North Playa Lake, Cannon Air Force Base, New Mexico. U.S. Air Force, Cannon Air Force Base, New Mexico.

- AF132-7064. Setember 2009.
- Air Combat Command (ACC). 1996. Delineations of Jurisdictional Waters of the United States, Including Wetlands, on Cannon Air Force Base and Melrose Air Force Range, New Mexico. Biological Survey Report, North Playa Lake, Cannon Air Force Base, New Mexico. U.S. Air Force, Cannon Air Force Base, New Mexico. Final Report. 23 p.
- Air Combat Command (ACC). (2005). Endangered, Threatened, Candidate, and Sensitive Bird Species and Birds of Conservation Concern Survey Report, Cannon Air Force Base, New Mexico.
- Air Combat Command (ACC). 2007. Update on Endangered, Threatened, Candidate, Sensitive, and Conservation Concern Species, Melrose Air Force Range, New Mexico.
- Air Force Special Operations Command (AFSOC). 2007. AFSOC Assets Beddown at Cannon Air Force Base, New Mexico Environmental Impact Statement.
- Air Force Special Operations Command (AFSOC). 2008a. Update on Endangered, Threatened, Candidate, Sensitive and Conservation Concern Species, Cannon Air Force Base, New Mexico.
- Air Force Special Operations Command (AFSOC). 2008b. Lesser Prairie Chicken Candidate Species Management Plan for Melrose Air Force Range, New Mexico.
- Air Force Special Operations Command (AFSOC) 2008c. Federal Candidate Species and Federal Species of Management Concern Plans for Melrose Air Force Range, New Mexico.
- Air Force Special Operations Command (AFSOC) 2008d. Bald and Golden Eagle Aerial Surveys for Melrose Air Force Range, New Mexico.
- Air Force Special Operations Command (AFSOC) 2008e. Habitat Monitoring for Lesser Prairie Chicken (*Tymanuchus pallidicinctus*) on Melrose Air Force Range.
- Air Force Special Operations Command (AFSOC) 2009. Bald and Golden Eagle Aerial Surveys for Melrose Air Force Range, New Mexico.
- AirSafe. 2009. Bird Aircraft Strikes. www.airsafe.com. Accessed 09 February 2009.
- Beauprez, G. M. 2016. Survey for Active Lesser Prairie-Chicken Leks: Spring 2016. Federal Aid in Wildlife Restoration Project Report, W-138- R-13. 17pp.
- Buchanan, D.E. and W.J. Ross. Soil Survey of Curry County, New Mexico. U.S. Department of Agriculture, Soil Conservation Service. Washington, D.C.
- Defenders of Wildlife (DoW). 2009. Burrowing Owl fact sheet. http://www.defenders.org/wildlife_and_habitat/wildlife/burrowing_owl.php. Accessed: 18 February 2009.
- DeGraaf, R.M., V.E. Scott, R.H. Hamre, L. Ernst, and S.H. Anderson. 1991. Forest and Rangeland Birds of the United States: Natural History and Habitat Use. U.S. Department of Agriculture, Forest Service, Agricultural Handbook.
- Department of Defense (DoD). 1996. Urban forestry Manual. Urban Forest Program,

http://www.denix.osd.mil/denix/public/libtary/forestry/two.html.

- Dick-Petty, W. A., 1993. New Mexico Vegetation, past, present, and future. 244 pp.
- Erlich, Dobkin, and Wheye, The Birder's Handbook: A Field Guide to the Natural History of North American Birds, New York: Simon and Schuster 1988; Preliminary List of Migrants for Partners in Flight Neotropical Migratory Bird Program (PIF Newsletter, Vol. 2, No. 1).
- Finch, Deborah M. August 1992. Threatened, Endangered, and Vulnerable Species of Terrestrial Vertebrates in the Rocky Mountain Region. USDA Forest Service General Technical Report RM- 215.
- Gillihan, S.W., D.J. Hanni, S.A. Hutchings, T. Toombs, and T. Vercauteren. 2001. Sharing Your Land with Short-grass Prairie Birds. Rocky Mountain Bird Observatory, Brighton, CO.
- Haukos, D.A. and L.M. Smith. 1994. The Importance of Playa Wetlands to Biodiversity of the Southern Great Plains. Landscape and Urban Planning 28: 83-98. Elsevier Science. Amsterdam.
- Howe, William H. 22 December 1986. Status of the Yellow-Billed Cuckoo (*Coccyzus americanus*) in New Mexico. New Mexico Department of Game and Fish.
- International Union for Conservation of Nature (IUCN). 2009. Red Fox (*Vulpes vulpes)*. http://www.canids.org/species/Vulpes_vulpes.htm. Accessed: 18 February 2009.
- Lambert, K. T. A. and P. G. Mcdonald. 2014. A low-cost, yet simple and highly repeatable system for acoustically surveying cryptic species. Austral ecology 39:779–785.
- Marcy, R. B. 1850. Report of a reconnaissance of the route from Ft. Smith to Santa Fe. Senate Exec. Doc. 64, 31st Cong., 1st Session.
- Madril, J. 2009. Personal communication between Mr. Joaquin Madril, Cannon Air Force Base, and Mr. Brian Essex, Range Biologist, SOCES/CEAN. Cannon Air Force Base and Melrose Air Force Range. Solid and Hazardous Waste Overview for INRMP.
- Marques, T. A., L. Thomas, S. W. Martin, D. K. Mellinger, J. A. Ward, D. J. Moretti, D. Harris and P. L. Tyack. 2013. Estimating animal population density using passive acoustics. Biological Reviews 88:287–309.
- Migratory Bird Treaty Act of 1918 (MBTA 1918). https://www.fws.gov/laws/lawsdigest/migtrea.html. Accessed. 20 June 2017
- New Mexico Department of Game and Fish (NMDGF). 2009a. Report on County Federal/State Species Status for Curry County, New Mexico. Conservation Services Division, Biota Information System of New Mexico (Bison-M). http://www.bison-m.org/speciesreports.aspx.
- New Mexico Department of Game and Fish (NMDGF). 2009b. Report on County Federal/State Species Status for Roosevelt, County, New Mexico. Conservation Services Division, Biota Information System of New Mexico (Bison-M). http://www.bison-m.org/speciesreports.aspx.
- Pelfrey, G. 2009. Personal communication between Mr. Gerald Pelfrey, Environmental Restoration Program Manager, Cannon Air Force Base and Mr. Brian Essex, Range Biologist, SOCES/CEAN. Cannon Air Force Base and Melrose Air Force Range. Environmental Restoration Plan Overview for INRMP.
- Rebman, J. K. 2016. Personal communication with Mr. John Rebman, Water Quality Expert,

CAFB, NM.

- Rickard, J. A. 1927. The ranch industry of the Texas South Plains. Unpbl. M.A. Thesis. Univ. of Texas.
- Rogers, T. L., M. B. Ciaglia, H. Klinck and C. Southwell. 2013. Density can be misleading for low-density species: benefits of passive acoustic monitoring. PloS one 8:e52542.
- Sikes Act as amended Public Law 108-136 Sec. 101. 2010.
- Swaby, Lt. Donovan. BASH data for FY 1997 to 2002. HQ AFSC/SEFW.
- Texas A&M Institute of Renewable Natural Resources (IRNR). 2016a. Bald and Golden Eagle Aerial Surveys. Cannon Air Force Base and Melrose Air Force Range, NM.
- Texas A&M Institute of Renewable Natural Resources (IRNR). 2016b. Federal Candidate Species and Federal Species of Management Concern Plans. Cannon Air Force Base and Melrose Air Force Range, NM.
- Texas A&M Institute of Renewable Natural Resources (IRNR). 2016c. Lesser Prairie Chicken Management Plan. Cannon Air Force Base and Melrose Air Force Range, NM.
- Texas A&M Institute of Renewable Natural Resources (IRNR). 2016d. Lesser Prairie Chicken Population Monitoring Report. Cannon Air Force Base and Melrose Air Force Range, NM.
- Texas A&M Institute of Renewable Natural Resources (IRNR). 2016e. Migratory and Breeding Bird Survey Report. Cannon Air Force Base and Melrose Air Force Range, NM.
- Texas A&M Institute of Renewable Natural Resources (IRNR). 2016f. Western Burrowing Owl and Black-tailed Prairie Dog Assessment. Cannon Air Force Base and Melrose Air Force Range, NM.
- Texas Parks and Wildlife Department (TPWD). 2009 Black-tailed Prairie Dog Wildlife Factsheet. http://www.tpwd.state.tx.us/huntwild/wild/species/prairie/. Accessed: 18 February 2009.
- U.S. Air Force (USAF). 1996. Bird Aircraft Strike Hazard Report for Cannon Air Force Base, New Mexico.
- U.S. Air Force (USAF). 2000a. Bird Aircraft Strike Hazard (BASH) Procedures Plan 91-212. 27th Fighter Wing, Cannon Air Force Base, New Mexico.
- U.S. Air Force (USAF). 2000b. Force Structure Change Environmental Assessment for Cannon Air Force Base, New Mexico. United States Air Force Air Combat Command. February 2000.
- U.S. Air Force (USAF). 2001. Defensive Training Initiative Environmental Assessment. Cannon Air Force Base, New Mexico. September 2001.
- U.S. Air Force (USAF) 2002. General Plan. Cannon Air Force Base, New Mexico.
- U.S. Air Force (USAF) 2003. Integrated Natural Resource Management Plan for Cannon Air Force Base and Melrose Air Force Range, New Mexico. U.S. Air Force 27th Fighter Wing.
- U.S. Air Force (USAF). 2007. AFSOC Assets Beddown at Cannon Air Force Base, New

Mexico; Environmental Impact Statement.

- U.S. Army Corps of Engineers. 1996. Guidelines and Methodologies for Establishing Monitoring Plots on Melrose Air Force Range. U.S. Army Corps of Engineers, Fort Worth District.
- U.S. Census Bureau. 2000. Population Finder: Melrose, New Mexico. http://factfinder.census.Gov/servlet/SAFFPopulation? Melrose, New Mexico. Accessed on 18 February 2009.
- U.S. Census Bureau. 2009. Population Finder: Clovis and Curry County New Mexico. http://factfinder.census.Gov/servlet/SAFFPopulation?_event=Search&geo_id=01000US. Accessed on 18 February 2009.
- U.S. Department of Agriculture (USDA). 1967. Soil Survey of Roosevelt County, New Mexico.
- U.S. Department of Agriculture (USDA). Soil Conservation Service. Washington, D.C.
- U.S. Department of Agriculture (USDA). 2009. Invasive and Noxious Weeds of New Mexico. http://plants.usda.gov/java/noxious?rptType=State& statefips=35w. Accessed: 19 March 2009.
- U.S. Department of Agriculture (USDA) a, Natural Resources Conservation Services Ecological Site Description, Gravelley. https://esis.sc.egov.usda.gov/ESDReport/fsReport.aspx?id=R070BY065NM&rptLevel=all&approved=yes&repType=regular&scrns=&comm=. Accessed: 20 April 2017.
- U.S. Department of Agriculture (USDA) b, Natural Resources Conservation Services Ecological Site Description, Shallow. https://esis.sc.egov.usda.gov/ESDReport/fsReport.aspx?id=R070BY062NM&rptLevel=all&approved=yes&repType=regular&scrns=&comm=. Accessed: 20 April 2017.
- U.S. Department of Agriculture (USDA) c, Natural Resources Conservation Services Ecological Site Description, Shallow Plains. https://esis.sc.egov.usda.gov/ESDReport/fsReportPrt.aspx?id=R070BY069NM&rptLevel=all&approved=yes&repType=regular&scrns=&comm=. Accessed: 20 April 2017.
- U.S. Department of Agriculture (USDA) d, Natural Resources Conservation Services Ecological Site Description, Very Shallow. https://esis.sc.egov.usda.gov/ESDReport/fsReportPrt.aspx?id=R070BY070NM&rptLevel=all&approved=yes&repType=regular&scrns=&comm=. Accessed: 20 April 2017.
- U.S. Fish and Wildlife Service (USFWS). 2009a. Listed and Sensitive Species in Curry County. New Mexico Ecological Services Field Office. http://www.fws.gov/southwest/es/NewMexico/ SBC_view.cfm?spcnty=Curry. Accessed 10 February 2009.
- U.S. Fish and Wildlife Service (USFWS) 2009b. Listed and Sensitive Species in Roosevelt County. New Mexico Ecological Services Field Office. http://www.fws.gov/southwest/es/NewMexico/ SBC_view.cfm?spcnty=Roosevelt. Accessed 10 February 2009.
- Venier, L. A., S. B. Holmes, G. W. Holborn, K. A. Mcilwrick and G. Brown. 2012. Evaluation of an automated recording device for monitoring forest birds. Wildlife Society Bulletin 36:30–39.
- Voigt, D. R. 1987. Red fox. Wild furbearer management and conservation in North America. Ontario Ministry of Natural Resources, Toronto, Canada. Pp. 379–392.
- Western Region Climate Center. 2009. Weather Summary for Clovis, New Mexico (1910-2008).

http://www.wrcc.dri.edu/cgi-bin/cliRECtm.pl?nm1939.

- Whitford WG, de Soyza AG, Van Zee JW, Herrick JE & Havstad KM 1998. Vegetation, soil, and animal indicators of rangeland health. Environmental Monitoring and Assessment 51: 179-200.
- Williams, S. O., and James R. Travis. 2003. History, distribution, and status of the yellow-billed cuckoo in New Mexico. Abstract, in proceedings, Cooper Ornithological Society Annual meeting. Flagstaff, Arizona.
- Wood, V. 2008. Solid Waste Overview. Personal communication between Ms. Vera Wood and Mr. Brian Essex, Range Biologist, SOCES/CEAN. Cannon Air Force Base and Melrose Air Force Range. Solid Waste Overview.

12.0 ACRONYMS

12.1 Standard Acronyms *(Applicable to all AF installations)*

- eDASH Acronym Library
- Natural Resources Playbook – Acronym Section
- U.S. EPA Terms & Acronyms

12.2 Installation Acronyms

CAFB	Cannon Air Force Base
MAFR	Melrose Air Force Range
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
SHPO	State Historic Preservation Officer
SOCES/CC	Special Operations Civil Engineer Squadron Commander
SOCES/CEIE	Environmental Program Managers
SOF	Special Operations Forces
SOMSG/CC	Special Operations Mission Support Group Commander
SOSS	Special Operations Support Squadron
SOW/CC	Special Operations Wing Commander
SOW/JA	Special Operations Wing Judge Advocate
SOW/PA	Special Operations Wing Public Affairs
SOW/XP	Special Operations Wing Plans and Programs
ST	Sensitive Taxa

13.0 DEFINITIONS

13.1 Standard Definitions *(Applicable to all AF installations)*

(3) Natural Resources Playbook – Definitions Section

13.2 Installation Definitions

(4) N/A

14.0 APPENDICES

Appendix A. Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP

Federal Public Laws and Executive Orders	
National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program	Amends two Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program	Establishes the "Legacy Resource Management Program" for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats.
EO 11514, Protection and Enhancement of Environmental Quality	Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall monitor, evaluate, and control agency activities to protect and enhance the quality of the environment.
EO 11593, Protection and Enhancement of the Cultural Environment	All Federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
EO 11987, Exotic Organisms	Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters which they administer.
EO 11988, Floodplain Management	Provides direction regarding actions of Federal agencies in floodplains, and requires permits from state, territory and Federal review agencies for any construction within a 100-year floodplain and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for acquiring, managing and disposing of Federal lands and facilities.
EO 11989, Off-Road vehicles on Public Lands	Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed.
EO 11990, Protection of Wetlands	Requires Federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative, and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
EO 12088, Federal Compliance With Pollution Control Standards	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (US EPA) authority to conduct

Federal Public Laws and Executive Orders	
	reviews and inspections to monitor Federal facility compliance with pollution control standards.
EO 12898, Environmental Justice	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13112, Exotic and Invasive Species	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	The U.S. Fish and Wildlife Service (USFWS) has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement.
United States Code	
Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468)	Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects.
Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c	This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Clean Air Act, (42 U.S.C. § 7401– 7671q, July 14, 1955, as amended)	This Act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country which do not meet Federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.
Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq.	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no Federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological

Federal Public Laws and Executive Orders	
	assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669i; 50 Stat. 917) (Pittman-Robertson Act)	Provides Federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering.
Federal Noxious Weed Act of 1974, 7 U.S.C. § 2801–2814	The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.
Federal Water Pollution Control Act (Clean Water Act [CWA]), 33 U.S.C. §1251–1387	The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the US EPA.
Fish and Wildlife Conservation Act (16 U.S.C. § 2901–2911; 94 Stat. 1322, PL 96-366)	Installations encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	Directs installations to consult with the USFWS, or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting.
Lacey Act of 1900 (16 U.S.C. § 701, 702, 32 Stat. 187, 32 Stat. 285)	Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife related Acts or regulations.
Leases: Non-excess Property of Military Departments, 10 U.S.C. § 2667, as amended	Authorizes DoD to lease to commercial enterprises Federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act 16 U.S.C. § 703–712	The Act implements various treaties for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful without a valid permit.
National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. § 4321 et seq.	Requires Federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment. The Council of Environmental Quality (CEQ) created Regulations for Implementing the National Environmental Policy Act [40 Code of

Federal Public Laws and Executive Orders	
	Federal Regulations (CFR) Parts 1500– 1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended.
National Historic Preservation Act, 16 U.S.C. § 470 et seq.	Requires Federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 U.S.C. § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.
Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)	Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a Federal Permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land, 10 U.S.C. § 2665	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other Federal and local programs.
Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an Integrated Natural Resources Management Plan and public access to natural resources, and allows collection of nominal hunting and fishing fees. NOTE: AFI 32-7064 sec 3.9. Staffing. As defined in DoDI 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.9.1. Outsourcing Natural Resources Management. As

Federal Public Laws and Executive Orders	
	stipulated in the Sikes Act, 16 U.S.C. § 670 et. seq., the Office of Management and Budget Circular No. A-76, Performance of Commercial Activities, August 4, 1983 (Revised May 29, 2003) does not apply to the development, implementation and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources.
DoD Policy, Directives, and Instructions	
DoD Instruction 4150.07 DoD Pest Management Program dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoD Instruction 4715.1, Environmental Security	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment, and are given appropriate consideration along with other relevant factors.
DoD Instruction (DODI) 4715.03, Natural Resources Conservation Program	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.
OSD Policy Memorandum – 17 May 2005 – Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands	Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.
OSD Policy Memorandum – 1 November 2004 – Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews	Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review, and public comment on INRMP review.
OSD Policy Memorandum – 10 October 2002 – Implementation of Sikes Act Improvement Act: Updated Guidance	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation,

Federal Public Laws and Executive Orders	
	supporting military training and testing needs, and facilitating the INRMP review process.
USAF Instructions and Directives	
32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process	Provides guidance and responsibilities in the EIAP for implementing INRMPs. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement.
AFI 32-7062, Air Force Comprehensive Planning	Provides guidance and responsibilities related to the USAF comprehensive planning process on all USAF-controlled lands.
AFI 32-7064, Integrated Natural Resources Management	Implements AFPD 32-70, Environmental Quality; DODI 4715.03, Natural Resources Conservation Program; and DODI 7310.5, Accounting for Sale of Forest Products. It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFI 32-7065, Cultural Resources Management	This instruction implements AFPD 32-70 and DoDI 4710.1, Archaeological and Historic Resources Management. It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFPD 32-70, Environmental Quality	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

Appendix B. Common Fauna and Habitat Associations

Class	Species	Scientific	Short Grass Prairie	Mesquite scrubland	Sandsage/ Soapweed Yucca	Sand hill	Canyon	Prairie dog town	Former prairie dog town	Woodland	Former homestead	HMA	Cropland	Managed	Disturbed	Urban	Playas	Ephemeral Streams	Habitats Used
Amphibian	New Mexico spadefoot toad	Spea multiplicata	x					x	x								x	x	5
Amphibian	barred tiger salamander	Ambystoma tigrinum															x	x	2
Amphibian	green toad	Bufo debilis															x	x	2
Amphibian	Woodhouse toad	Bufo woodhousei								x							x	x	3
Bird	common nighthawk	Chordeiles minor	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	15
Bird	mourning dove	Zenaida macroura	x	x	x	x	x	x	x	x	x	x	x	x	x	x			14
Bird	Swainson's hawk	Buteo swainsoni	x	x	x	x	x	x	x		x	x	x	x	x			x	13
Bird	northern harrier	Circus Cyaneus	x	x	x	x	x	x	x		x	x	x				x	x	12
Bird	raven	Corvus spp.	x	x	x	x	x	x	x		x	x	x					x	11
Bird	meadowlark	Sturnella spp.	x	x	x	x		x	x			x	x	x	x				10
Bird	scaled quail	Callipepla squamata	x	x	x	x	x					x	x		x			x	10
Bird	Cassin's sparrow	Aimophila cassinii	x	x	x	x		x	x								x		7
Bird	horned lark	Eremophila alpestris	x					x	x			x	x	x	x				7
Bird	lark bunting	Calamospiza melanocorys	x	x	x	x		x	x										6
Bird	killdeer	Charadrius vociferus	x					x	x				x	x			x		6
Bird	long-billed curlew	Numenius americanus	x					x	x				x	x			x		6
Bird	burrowing owl	Athene cunicularia	x					x	x										3
Bird	red-winged blackbird	Agelaius phoeniceus								x	x	x					x	x	5
Bird	barn swallow	Hirundo rustica									x					x	x	x	4
Bird	American robin	Turdus migratorius								x		x		x		x			4
Bird	great horned owl	Bubo virginianus					x			x	x			x					4
Bird	great-tailed grackle	Quiscalus mexicanus								x	x			x		x			4
Bird	ladder-backed woodpecker	Picoides scalaris								x	x			x		x			4
Bird	northern flicker	Colaptes auratus								x	x			x		x			4
Bird	western kingbird	Tyrannus verticalis								x	x		x	x					4
Bird	Mississippi kite	Ictinia mississippiensis												x		x	x		3
Bird	lark sparrow	Chondestes grammacus		x								x							2
Bird	white-crowned sparrow	Zonotrichia leucophrys								x		x		x					3
Bird	American avocet	Recurvirostra americana															x	x	2
Bird	Canada goose	Branta canadensis												x			x		2
Bird	Eurasian collared doves	Streptopelia decaocto								x				x		x			3
Bird	house sparrows	Passer domesticus												x		x			2
Bird	ring-necked pheasants	Phasianus colchicus											x		x				2
Bird	American coot	Fulica americana															x		1
Bird	American widgeon	Anas americana															x		1
Bird	black-crowned night heron	Nycticorax nycticorax															x		1
Bird	blue-winged teal	Anas discors															x		1

Class	Species	Scientific	Short Grass Prairie	Mesquite scrubland	Sandsage/ Soapweed Yucca	Sand hill	Canyon	Prairie dog town	Former prairie dog town	Woodland	Former homestead	HMA	Cropland	Managed	Disturbed	Urban	Playas	Ephemeral Streams	Habitats Used
Bird	double-crested cormorant	*Phalacrocorax auritus*															x		1
Bird	eared grebe	*Podiceps nigricollis*															x		1
Bird	great blue heron	*Ardea herodias*															x		1
Bird	green-winged teal	*Anas crecca*															x		1
Bird	mallard	*Anas platyrhynchos*															x		1
Bird	northern shoveler	*Anas clypeata*															x		1
Bird	ring-necked duck	*Aythya collaris*															x		1
Bird	ruddy duck	*Oxyura jamaicensis*															x		1
Bird	rock wren	*Salpinctes obsoletus*					x												0
Mammal	coyote	*Canis latrans*	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	16
Mammal	mule deer	*Odocoileus hemionus*	x	x	x	x	x	x	x			x	x	x	x		x	x	14
Mammal	white footed mice	*Peromyscus leucopus*	x	x	x		x	x	x	x	x	x	x	x	x	x		x	14
Mammal	desert cottontail	*Sylvilagus audubonii*	x	x	x	x		x	x	x	x	1	x	x	x			x	14
Mammal	black-tailed jackrabbit	*Lepus californicus*	x	x	x	x		x	x			x		x	x			x	10
Mammal	deer mouse	*Peromyscus maniculatur*	x	x			x	x	x	x	x		x		x			x	10
Mammal	western harvest mouse	*Reithrodontomys montanus*	x	x	x			x	x	x			x					x	9
Mammal	thirteen-lined ground squirrel	*Spermophilus tridecumlineatus*	x			x		x	x					x				x	7
Mammal	pronghorn antelope	*Antilocapra americana*	x	x				x	x				x					x	6
Mammal	hispid pocket mouse	*Chaetodipus hispidus*	x	x				x	x	x								x	6
Mammal	plains pocket gopher	*Geomys bursarius*	x					x	x					x					4
Mammal	plains pocket mouse	*Perognathus flavescens*	x				x	x	x										4
Mammal	silky pocket mouse	*Perognathus flavus*	x			x		x	x										4
Mammal	northern grasshopper mouse	*Onychomys leucogaster*	x					x	x	x									4
Mammal	black-tailed prairie dog	*Cynomys ludovicianus*	x					x											2
Mammal	common raccoon	*Procyon lotor*					x			x	x	x	x		x	x	x	x	9
Mammal	hispid cotton rat	*Sigmodon hispidus*					x			x	x			x	x			x	6
Mammal	striped skunk	*Mephitis mephitis*								x	x	x						x	4
Mammal	house mouse	*Mus musculus*											x	x		x			3
Mammal	southern plains woodrat	*Neotoma micropus*		x			x			x	x								4
Mammal	porcupine	*Erethizon dorsatum*								x	x								2
Mammal	Ord's kangaroo rat	*Dipodomys ordii*				x													1
Reptile	bullsnake	*Pituophis melanoleucas*	x	x	x	x	x	x	x	x	x	x			x			x	13
Reptile	prairie rattlesnake	*Crotalus viridis*	x	x	x	x	x	x	x	x	x	x			x			x	12
Reptile	western coachwhip	*Masticophis flagellum*	x	x	x	x	x	x	x	x	x	x			x			x	12
Reptile	ornate box turtle	*Terrapene ornata*	x	x	x	x	x	x	x	x		x			x			x	11
Reptile	six-lined racerunner	*Cnemidophorus sexlineatus*	x	x	x	x	x	x	x					x				x	9
Reptile	plains hognose	*Heterodon nasicus*	x	x	x		x	x	x		x	x					x	x	10
Reptile	many-lined skink	*Eumeces multivirgatus*	x	x	x	x	x	x	x	x								x	9
Reptile	Texas horned lizard	*Phrynosoma cornutum*	x	x	x	x		x	x									x	7
Reptile	side-blotched lizard	*Uta stansburiana*	x		x	x	x	x	x									x	7
Reptile	prairie lizard	*Sceloporus undulatus*	x	x	x		x	x	x										6
Reptile	mud turtle	*Kinosternon flavescens*															x		1
		# using habitat	**39**	**29**	**26**	**24**	**24**	**38**	**37**	**29**	**25**	**24**	**21**	**28**	**19**	**14**	**31**	**34**	
		% using habitat	50.00	37.18	33.33	30.77	30.77	48.72	47.44	37.18	32.05	30.77	26.92	35.90	24.36	17.95	39.74	43.59	

Appendix C. Fauna of CAFB and MAFR

Fauna Observed During Surveys and Monitoring Programs from 2014-2016
Cannon Air Force Base and Melrose Air Force Range

Class	Species	Common Name
Amphibia	*Ambystoma mavortium*	Barred Tiger Salamander
Amphibia	*Spea multiplicata*	New Mexico Spadefoot Toad
Amphibia	*Anaxyrus woodhousii*	Woodhouse Toad
Aves	*Recurvirostra americana*	American Avocet
Aves	*Falco sparverius*	American Kestrel
Aves	*Turdus migratorius*	American Robin
Aves	*Spizelloides arborea*	American Tree Sparrow
Aves	*Myiarchus cinerascens*	Ash-throated Flycatcher
Aves	*Hirundo rustica*	Barn Swallow
Aves	*Tyto alba*	Barn Owl
Aves	*Himantopus mexicanus*	Black-necked stilt
Aves	*Passerina caerulea*	Blue Grosbeak
Aves	*Anas discors*	Blue-winged Teal
Aves	*Icterus bullockii*	Bullock's Oriole
Aves	*Campylorhynchus brunneicapillus*	Cactus Wren
Aves	*Peucaea cassinii*	Cassin's Sparrow
Aves	*Corvus cryptolecucus*	Chihuahuan Raven
Aves	*Spizella passerina*	Chipping Sparrow
Aves	*Chordeiles minor*	Common Nighthawk
Aves	*Toxostoma curvirostre*	Curved-billed Thrasher
Aves	*Junco hyemalis*	Dark-eyed Junco
Aves	*Streptophelia decaocto*	Eurasian Collared Dove
Aves	*Buteo regalis*	Ferruginous Hawk
Aves	*Aquila chrysaetos*	Golden Eagle
Aves	*Bubo virginianus*	Great Horned Owl
Aves	*Quiscalus mexicanus*	Great-tailed Grackle
Aves	*Geococcyx californianus*	Greater Roadrunner
Aves	*Eremophila alpestris*	Horned Lark
Aves	*Charadrius vociferus*	Killdeer
Aves	*Dryobates scalaris*	Ladder-backed Woodpecker
Aves	*Calamospiza melanocorys*	Lark Bunting
Aves	*Chondestes grammacus*	Lark Sparrow
Aves	*Spinus psaltria*	Lesser Goldfinch
Aves	*Tringa flavipes*	Lesser Yellowlegs

Class	Species	Common Name
Aves	*Lanius lodovicianus*	Loggerhead Shrike
Aves	*Anas platyrhynchos*	Mallard
Aves	*Ictinia mississippiensis*	Mississippi Kite
Aves	*Zenaida macroura*	Mourning Dove
Aves	*Colinus virginianus*	Northern Bobwhite Quail
Aves	*Circus cyaneus*	Northern Harrier
Aves	*Mimus polyglottos*	Northern Mocking Bird
Aves	*Falco mexicanus*	Prairie Falcon
Aves	*Melanerpes erythrocephalus*	Red-headed Woodpecker
Aves	*Agelaius phoeniceus*	Red-winged Blackbird
Aves	*Salpinctes obsoletus*	Rock Wren
Aves	*Regulus calendula*	Ruby-crowned Kinglet
Aves	*Aimophila ruficeps*	Rufous-crowned Sparrow
Aves	*Oreoscoptes montanus*	Sage Thrasher
Aves	*Passerculus sandwichensis*	Savannah Sparrow
Aves	*Sayornis saya*	Say's Phoebe
Aves	*Callipepla squamata*	Scaled Quail
Aves	*Tyrannus forficatus*	Scissor-tailed Flycatcher
Aves	*Pipilo maculatus*	Spotted Towhee
Aves	*Buteo swainsoni*	Swainson's Hawk
Aves	*Cathartes aura*	Turkey Vulture
Aves	*Pooecetes gramineus*	Vesper Sparrow
Aves	*Athene cunicularia hypugaea*	Western Burrowing Owl
Aves	*Tyrannus verticalis*	Western Kingbird
Aves	*Sturnella neglecta*	Western Meadowlark
Aves	*Znotrichia leucophrys*	White Crowned Sparrow
Aves	*Zenaida asiatica*	White-winged Dove
Aves	*Cardellina pusilla*	Wilson's Warbler
Aves	*Xanthocephalus*	Yellow-headed Blackbird
Aves	*Setophaga coronata*	Yellow-rumped Warbler
Mammalia	*Taxidea taxus*	American Badger
Mammalia	*Lepus californicus*	Black-tailed Jackrabbit
Mammalia	*Cynomys ludovicianus*	Black-tailed Prairie Dog
Mammalia	*Lynx rufus*	Bobcat
Mammalia	*Canis latrans*	Coyote
Mammalia	*Sylvilagus audubonii*	Desert Cottontail
Mammalia	*Urocyon cinereoargenteus*	Gray Fox
Mammalia	*Sigmodon hispidus*	Hispid Cotton Rat

Class	Species	Common Name
Mammalia	*Chaetodipus hispidus*	Hispid Pocket Mouse
Mammalia	*Mus musculus*	House Mouse[1]
Mammalia	*Odocoileus hemionus*	Mule Deer
Mammalia	*Peromyscus manicualtus*	North American Deer Mouse [1]
Mammalia	*Onychomys leucogaster*	Northern Grasshopper Mouse [1]
Mammalia	*Dipodomys ordii*	Ord's Kangaroo Rat[1]
Mammalia	*Reithrodontomys montanus*	Plains Harvest Mouse[1]
Mammalia	*Geomys bursarius*	Plains Pocket Gopher
Mammalia	*Perognathus flavescens*	Plains Pocket Mouse [1]
Mammalia	*Antilocapra americanus*	Pronghorn
Mammalia	*Perognathus flavus*	Silky Pocket Mouse[1]
Mammalia	*Neotoma micropus*	Southern plains woodrat [1]
Mammalia	*Spermophilus spilosoma*	Spotted Ground Squirrel [1]
Mammalia	*Mephitis*	Striped Skunk
Mammalia	*Spermophilus tridecemlinatus*	Thirteen-lined ground squirrel
Mammalia	*Reithrodontomys megalotis*	Western Harvest Mouse[1]
Mammalia	*Peromyscus leucopus*	White-footed Mouse[1]
Mammalia	*Neotoma albigula*	White-throated Woodrat[1]
Reptilia	*Pituophis catenifer*	Bullsnake
Reptilia	*Aspidoscelis exsanguis*	Chihuahuan Spotted Whiptail
Reptilia	*Crotaphytus collaris*	Common Collared lizard
Reptilia	*Uta stansburiana*	Common Side-blotched Lizard
Reptilia	*Terrepene ornata luteola*	Desert box turtle
Reptilia	*Plestiodon obsoletus*	Great Plains Skink
Reptilia	*Holbrookia maculate*	Lesser Earless Lizard
Reptilia	*Sistrurus catenatus*	Massasauga
Reptilia	*Crotalus viridis*	Prairie Rattlesnake
Reptilia	*Phrynosoma cornutum*	Texas Horned Lizard
Reptilia	*Masticophis flagellum*	Western Coachwhip
Reptilia	*Crotalus atrox*	Western Diamondback Rattlesnake
Reptilia	*Kinosternon flavescens*	Yellow Mud Turtle

Appendix D. Invasive and Noxious Plants of East-Central New Mexico

Invasive and Noxious Plants of East-Central New Mexico

Common Name	***Scientific Name***	**County of Occurrence**		
		Roosevelt	**Curry**	**Bordering County**
Russian knapweed	*Acroptilon repens (L.) DC.*	No	No	Yes
tree of heaven	*Ailanthus altissima*	Yes	Yes	No
Camelthorn	*Alhagi maurorum Medik.*	No	No	Yes
Cheatgrass	*Bromus tectorum*	No	No	Yes
hoary cress	*Cardaria draba (L.) Desv.*	No	No	Yes
musk thistle	*Carduus nutans L.*	No	No	Yes
purple starthistle	*Centaurea calcitrapa L.*	No	No	Yes
Malta starthistle	*Centaurea melitensis L.*	No	No	Yes
yellow starthistle	*Centaurea solstitialis L.*	No	No	Yes
Canada thistle	*Cirsium arvense (L.) Scop.*	No	No	Yes
bull thistle	*Cirsium vulgare (Savi) Ten.*	Yes	No	Yes
field bindweed*****	*Convolvulus arvensis L.*	Yes	Yes	No
Russian olive	*Elaeagnus angustifolia L.*	Yes	No	Yes
Halogeton	*Halogeton glomeratus (M. Bieb.) C.A. Mey*	No	No	Yes
perennial pepperweed	*Lepidium latifolium L.*	No	No	Yes
oxeye daisy	*Leucanthemum vulgare*	Yes	No	Yes
Scotch thistle	*Onopordum acanthium L.*	Yes	No	Yes
African rue	*Peganum harmala L.*	No	No	Yes
saltcedar*****	*Tamarix L.*	Yes	Yes	Yes
Siberian elm*****	*Ulmus pumila L.*	Yes	Yes	Yes

* Known to occur on CAFB or MAFR

Appendix E. Federal Fish and Wildlife Permit

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE
Migratory Bird Permit Office
P.O. Box 709 - Albuquerque, NM 87103
Tel: 505-248-7882 Fax: 505-248-7885
Email: permitsR2MB@fws.gov

FEDERAL FISH AND WILDLIFE PERMIT

1. PERMITTEE

U. S. AIR FORCE - CANNON AFB
27 SOCES/CEIEA
506 N. AIR COMMANDO WAY
CANNON AFB, NM 88103
U.S.A.

2. AUTHORITY-STATUTES
16 USD 703-712

REGULATIONS
50 CFR Part 13
50 CFR 21.41

3. NUMBER
MB820992-1 AMENDMENT

4. RENEWABLE ☐ YES ☒ NO

5. MAY COPY ☒ YES ☐ NO

6. EFFECTIVE 11/16/2015

7. EXPIRES 08/31/2016

8. NAME AND TITLE OF PRINCIPAL OFFICER *(If #1 is a business)*
JOEL A. SLOAN, LT. COL
COMMANDER

9. TYPE OF PERMIT
DEPREDATION AT AIRPORTS

10. LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED
NEW MEXICO
BOUNDARIES OF CANNON AFB
CURRY & ROOSEVELT COUNTIES
CANNON AFB NM

11. CONDITIONS AND AUTHORIZATIONS:

A. GENERAL CONDITIONS SET OUT IN SUBPART D OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN FEDERAL REGULATIONS CITED IN BLOCK #2 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS SUBJECT TO COMPLETE AND TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REQUIRED INFORMATION AND REPORTS.

B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBSERVANCE OF ALL APPLICABLE FOREIGN, STATE, LOCAL, TRIBAL, OR OTHER FEDERAL LAW.

C. VALID FOR USE BY PERMITTEE NAMED ABOVE.

D. You are authorized to take, temporarily possess, and transport the migratory birds specified below to relieve or prevent injurious situations impacting public safety. All take must be done as part of an integrated wildlife damage management program that emphasizes nonlethal management techniques. You may not use this authority for situations in which migratory birds are merely causing a nuisance.

(1) The following may be lethally taken:

Barn Swallow - 5	Chipping Sparrow - 5	Lark Bunting - 50	Savannah Sparrow - 5
Brewer's Sparrow - 5	Dark-eyed Junco - 5	Meadowlark - 100	Swainson Hawk - 5
Burrowing Owls - 5	Double- crested Cormorants - 24	Mourning Dove - 500	Vesper Sparrow - 5
Cassin's Sparrow - 5	Grasshopper Sparrow - 5	Northern Harrier - 5	waterfowl - 200 (total)
Chestnut-collared Longspur - 5	Horned Lark - 500	Red-tailed Hawk - 5	

Except for emergency situations, no more than **ten of each species listed on Bird of Conservation Concern** (BCR 18 listed below) may be taken without first contacting and receiving approval from the MB Permits Office.

Lesser Prairie-Chicken	Upland Sandpiper	Willow Flycatcher	McCown's Longspur
Prairie Falcon	Long-billed Curlew	Bell's Vireo	Chestnut-collared Longspur
Snowy Plover	Burrowing Owl	Sprague's Pipit	
Mountain Plover	Lewis's Woodpecker	Lark Bunting	**LIMIT to 10 of each**

Species covered under Federal Depredation Orders, such as some blackbird, grackle, cowbird, crow, and magpie species, may be taken without an individual federal permit **(see Title 50 Code of Federal Regulations part 21.43, http://www.ecfr.gov).** Any activity conducted under a Depredation Order must be followed according to its specific regulations. Check these regulations carefully before taking any federally-protected migratory bird.

(2) The following may be live-trapped and relocated: **Unlimited raptors and owls, other than Burrowing Owls, in accordance with the methods and requirements stated below. See number (3) and Condition H.**

☒ ADDITIONAL CONDITIONS AND AUTHORIZATIONS ALSO APPLY

12. REPORTING REQUIREMENTS
ANNUAL REPORT DUE: 9/10
You must submit a report to your Regional Migratory Bird Permit Office, even if you had no activity. Report form is at: www.fws.gov/forms/3-202-9.pdf

ISSUED BY
ELVIRA HUNT
Digitally signed by ELVIRA HUNT
DN: c=US, o=U.S. Government, ou=Department of the Interior, ou=U.S. Fish and Wildlife Service, cn=ELVIRA HUNT, 0.9.2342.19200300.100.1.1=14001000354768
Date: 2015.11.16 09:43:19 -07'00'

TITLE
ADMINISTRATOR, MIGRATORY BIRD PERMIT OFFICE - REGION 2

DATE
11/16/2015

Appendix F. Suggested Landscape Plants

Botanical Name	**Common Name**	**Native / Indigenous**	**Evergreen / deciduous**	**Mature height (feet)**	**Mature width (feet)**	**Min. panting size**	**Irrigation requirements**	**Barrier**	**Screen**	**Accent**	**Street tree**	**AT/FP**	**Golf course**
Trees													
Acacia farnesiana	Huisache	N	ED	25	25	15	L			♦		♦	
Acer glabrum 'Neomexicanum"	Rocky Mtn. maple	N	D	35	30	3"	M				♦	♦	♦
Cercis canadensis	Eastern redbud	I	D	20	20	15	ML			♦		♦	♦
Chilopsis linearis	Desert willow	N	D	20	15	15	ML				♦	♦	
Cupressus arizonica	Arizona cypress	N	E	65	45	15	L		♦				♦
Fraxinus velutina 'Modesto'	Modesto Ash	N	D	50	40	5	M				♦	♦	♦
Juniperus deppeana	Alligator juniper	N	E	20	15	15	L	♦	♦				♦
Juniperus scopulorum	Rocky Mtn. juniper	N	E	35	15	15	L	♦	♦				♦
Magnolia grandiflora	Southern magnolia	I	E	50	30	15	M		♦				
Picea pungens	Blue spruce	N	E										
Pinus edulis	Pinon pine	N	E	15	10	15	L		♦			♦	
Pinus eldarica	Afghan pine	I	E	45	25	15	L	♦	♦		♦		♦
Pinus thunbergiana	Japanese black pine	I	E	20	15	15	M			♦		♦	
Platanus acerifolia	London plane tree	I	D	65	65	5	M				♦	♦	♦
Prunus cerasifera	Purpleleaf plum	I	D	25	25	15	M					♦	
Quercus shumardii	Shumard red oak	I	D	50	40	15	L					♦	♦
Quercus texanum	Texas oak	I	D	25	25	15	L				♦	♦	
Salix matsudana 'Navaho'	Globe Navajo Willow	I	D	20	20	5	M						♦

Botanical Name	**Common Name**	**Native / Indigenous**	**Evergreen / deciduous**	**Mature height (feet)**	**Mature width (feet)**	**Min. panting size**	**Irrigation requirements**	**Barrier**	**Screen**	**Accent**	**Street tree**	**AT/FP**	**Golf course**
Shrubs													
Aucuba japonica	Aucuba	I	E	4	5	1	M		♦	♦			
Berberis fendleri	Colorado barberry	N	E	6	6	5	M	♦			♦		
Berberis thunbergerii	Japanese barberry	I	ED	3	4	5	M	♦			♦	♦	
Buxus japonicum	Japanese boxwood	I	E	4	4	1	L		♦		♦		
Cercocarpus montanus	Mountain Mahogany	N	D	12	12	5	L		♦				
Cotoneaster spp.	Cotoneaster	I	ED	V	V	5	M				♦		
Dasylirion wheeleri	Sotol/Desert Spoon	N	E	12	8	5g	L	♦	♦	♦	♦	♦	♦
Ericameria laricifolia	Turpentine bush	N	E	3	2	1	L					♦	
Fouquieria splendens	Ocotillo	N	D	15	15	7	L			♦	♦	♦	
Gaura coccinea	Scarlet gaura	N	E	3	2	1	L					♦	
Hesperaloe parviflora	Red yucca	I	E	3	4	1	L				♦	♦	
Ilex vomitoria	Yaupon holly	N	E	15	15	5	L		♦		♦		♦
Juniperus chinensis 'Armstrong'	Armstrong juniper	I	E	5	5	5	L	♦	♦		♦		
Juniperus chinensis 'Pfitzerana'	Pfitzer juniper	I	E	5	6	5	L	♦	♦		♦		
Juniperus chinensis 'Sea Green'	Sea green juniper	I	E	6	8	5	L	♦	♦		♦		
Mahonia haematocarpa	Algerita	N	E	5	5	5	L	♦	♦	♦	♦		
Mahonia repens	Creeping mahonia	N	E	1	1.5	5	L			♦		♦	

Botanical Name	Common Name	Native / Indigenous	Evergreen / deciduous	Mature height (feet)	Mature width (feet)	Min. panting size	Irrigation requirements	Barrier	Screen	Accent	Street tree	AT/FP	Golf course
Shrubs (continued)													
Nandina domestica spp.	Heavenly bamboo	I	E	V	V	1	L	♦	♦	♦	♦		
Raphiolepis indica spp.	Indian hawthorn	I	E	V		5	M						
Rosa banksiae	Tombstone rose	I	ED	12	V	1	L			♦			
Salvia greggii	Autumn sage	N	E	3	3	1	L			♦		♦	
Salvia spp.	Sage varieties	NI	E	3	3	1	L			♦	♦	♦	
Sophora secundiflora	Texas mntn laurel	N	E	15	15	15	L		♦			♦	♦
Spirea spp.	Bridal wreath, etc.	I	ED	V	V	5	M		♦	♦			
Viburnum opulus 'Roseum'	Snowball	I	D	10	12	5	M		♦				
Yucca elata	Soaptree	N	E			1	L	♦		♦		♦	
Yucca recurvifolia	Pendulous yucca	I	E			1	L	♦		♦		♦	
Perennials													
Baileya multiradiata	Desert marigold	N				1							
Aquilegia spp.	Colorado columbine	N				1							
Ratibida columnifera	Coneflower	N				1							
Hemerocallis spp.	Daylily	I				1							
Castilleja integra	Indian paintbrush	N				1							
Psilostrophe tagetina	Paperflower	N				1							
Penstemon spp.	Penstemon	N				1							

Botanical Name	Common Name	Native / Indigenous	Evergreen / deciduous	Mature height (feet)	Mature width (feet)	Min. panting size	Irrigation requirements	Barrier	Screen	Accent	Street tree	AT/FP	Golf course
Groundcovers													
Dalea greggii	Gregg Dalea	N	E	.75	3	1	L			♦		♦	
Euonymus fortunei	Creeping euonymus	I	E	.75	2	1	L			♦		♦	
Juniperus horizontalis 'Bar Harbor'	Bar Harbor juniper	I	E	1.5	3	3	L				♦		
Juniperus horizontalis 'Wiltonii'	Wilton carpet juniper	I	E	1	3	3	M					♦	
Juniperus sabina 'Broadmoor'	Broadmoor juniper	I	E	2	5	5	M	♦			♦		
Juniperus sabina 'Tamariscifolia'	Tam juniper	I	E	3	5	5	M	♦			♦		
Sedum spp.	Stonecrop	NI	E	.75	2	1	L			♦		♦	
Grasses													
Bouteloua gracilis	Blue grama	N										♦	♦
Buchloe dactyloides	Buffalo grass	N									♦	♦	♦
Cynodon dactylon	Bermuda grass	I	D								♦	♦	♦
Cynodon spp. hybrids	Tifdwarf, Tifsport, etc.	I	D								♦	♦	♦
Festuca caesia	Blue fescue	I	E									♦	♦
Aristida longiseta	Purple threeawn	N	ED									♦	♦
Festuca caesia	Blue fescue	I	E							♦		♦	♦
Aristida longiseta	Purple threeawn	N	ED							♦		♦	♦

Appendix G. Melrose Air Force Range Plant List 2015 & 2016

Scientific Name	**Common Name**
Agropyron spp.	Wheatgrass
Ambrosia psilostachya	Western ragweed
Amphiachyris dracunculoides	Prairie broomweed
Andropogon gerardii	Big bluestem
Andropogon hallii	Sand bluestem
Aristida oligantha	Prairie threeawn
Aristida purpurea	Purple threeawn
Artemisia bigelovii	Bigelow sage
Artemisia filifolia	Sand sagebrush
Artemisia ludoviciana	White sagebrush
Aster spp.	Undifferentiated aster species
Astragalus spp.	Milkvetch/locoweed spp.
Baccharis pteronioides	Yerba de pasmo
Bassia scoparia	Kochia
Berlandiera lyrata	Chocolate daisy
Bothriochloa ischaemum var songarica	Yellow bluestem/King Ranch bluestem
Bouteloua curtipendula	Side oats grama
Bouteloua eriopoda	Black grama
Bouteloua gracilis	Blue grama
Bouteloua hirsuta	Hairy grama
Bouteloua laguroides	Silver bluestem
Buchloe dactyloides	Buffalograss
Chaetopappa ericoides	Rose heath
Chamaecrista leptadenia	Sensitive partridge pea
Chamaesyce geyeri (Euphorbia geyeri)	Geyer's sandmat
Chamaesyce lata (Euphorbia lata)	Hoary sandmat
Chenopodium berlandieri	Pitseed goosefoot
Chenopodium spp.	Goosefoot
Chloacantha spinosa	Spiny cloracantha
Chloris barbata (Chloris inflata)	Swollen fingergrass
Chloris cucullata	Hooded windmill grass
Chloris verticillata	Tumble windmill grass
Chysopis villosa	Hoary false goldenaster
Cirsium ochrocentrum	Yellowspine thistle
Commelina erecta	Whitemouth dayflower
Conyza coulteri	Coulter horseweed
Crepis occidentalis	Largeflower hawksbeard
Croton pottsii	Leatherweed
Croton texensis	Texas croton
Cryptantha crassisepala	Thicksepal catseye
Curcubita foetidissima	Buffalo gourd/Missouri gourd
Cylindropuntia davisii	Thistle cholla
Cylindropuntia imbricata	Tree cholla
Cyperus esculentus	Yellow nutsedge

Cyperus spp.	Undifferentiated sedge species
Dalea aurea	Golden prairie clover
Dalea formosa	Featherplume
Descurainia pinnata	Tansymustard
Desmanthus cooleyi	Cooley's bundleflower
Digitaria cognata	Fall witchgrass
Dysphania spp.	Dysphania (Mexican tea/wormseed)
Echinocereus reichenbachii	Lace hedgehog cactus
Echinocereus rigidissimus	Rainbow hedgehog cactus
Echinocereus spp.	Hedgehog cactus
Engelmannia peristenia	Englemann's daisy
Ephedra torreyana	Torry's jointfir/mormon-tea
Eriogonum abertianum	Abert's buckwheat
Eriogonum annuum	Annual buckwheat
Eriogonum havardii	Havard's buckwheat
Eriogonum spp.	Undifferentiated buckwheat species
Erioneuron pilosum	Hairy tridens
Evolvulus sericeus	Silver dwarf morning-glory
Evolvus nuttallianus	Shaggy dwarf-morning-glory
Frankenia jamesii	James' seaheath
Gaillardia multiceps	Onion blanketflower
Gaillardia pulchella	Indian blanket
Gaillardia spp.	Blanketflower
Gaura coccinea	Scarlet gaura
Glandularia wrightii/ Glandularia bipinnatifida	Davis Mountain mock vervain
Grindellia sqarrosa	Curly-cup gumweed
Gutierrezia sarothrae	Broom snakeweed
Helianthus annuus	Common sunflower
Helianthus petiolaris	Prairie sunflower
Heliotropium convolvulaceum	Wide-flower heliotrope
Hesperostipa neomexicana	New Mexico needlegrass
Hoffmannseggia glauca	Hog potato
Hymenopappus filifolius	Fine-leaf woolywhite
Hymenopappus flavescens	Yellow woolywhite
Hymenoxys odorata	Bitter rubberweed
Krameria lanceolata	Trailing rhatany
Lepidium spp.	Undifferentiated pepperweed species
Lesquerella fendleri	Fendler's bladderpod
Leucelene ericoides	Rose heath
Linum aristatum	Bristle flax
Lycurus phleoides	Wolfstail
Machaeranthera pinnatifida	Spiny aster
Machaeranthera tanacetifolia	Tahoka daisy
Melampodium leucanthum	Plain blackfoot
Mentzelia strictissima	Grassland blazingstar
Mimosa borealis	Fragrant mimiosa
Monroa squarrosa	False buffalograss
Muhlenbergia arenicola	Sand muhly
Muhlenbergia torreyi	Ringed muhley

Muhlenbergia sp.	Undifferentiated muhly species
Opuntia sp.	Undifferentiated prickly-pear cactus species
Panicum capillare	Witchgrass
Panicum halli	Hall's panicum
Panicum obtusum	Vine mesquite
Panicum virgatum	Switchgrass
Plantago spp.	Undifferentiated plantain species
Pleuraphis mutica (Hilaria mutica)	Tobosagrass
Prosopis glandulosa	Honey mesquite
Psilostrophe tagetinae	Wooly paper flower
Ratibida columnaris	Prairie coneflower
Salsola kali	Russian thistle
Schizachyrium scoparium	Little bluestem
Scleropogon brevifolius	Burrograss
Senecio douglasii	Smooth threadleaf ragwort
Senecio flaccidus	Threadleaf ragwort
Senecio spartoides	Broom groundsel
Setaria leucopila	Plains bristlegrass
Solanum elaeagnifolium	Silverleaf nightshade
Solanum rostratum	Buffalobur nightshade
Solanum sp.	Undifferentiated nightshade species
Spergularia sparsiflora	Salt sandspurry
Sphaeralcea coccinea	Scarlet globemallow
Sporobolus cryptandrus	Sand dropseed
Stillingia sylvatica	Queen's delight
Tetraneuris scaposa	Stemmy four-nerve daisy
Teucrium lacinatum	Lacy germander
Thelesperma megapotamicum	Hopi-tea
Tridens albescens	White tridens
Yucca glauca	Soapweed yucca
Zinna grandiflora	Plains zinnia

15.0 ASSOCIATED PLANS

Tab 1 - Wildland Fire Management Plan

Tab 2 - Bird/Wildlife Aircraft Strike Hazard (BASH) Plan

Tab 3 - Golf Environmental Management (GEM) Plan

Tab 4 - Integrated Cultural Resources Management Plan (ICRMP)

Tab 5 - Installation Development Plan (IDP)

Tab 6 - Integrated Pest Management Plan (IPMP)

Tab 7 - Environmental Assessment for Utilization Enhancements at Melrose Air Force Range, New Mexico