DEPARTMENT OF THE AIR FORCE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

ALTUS AIR FORCE BASE

(See INRMP signature pages for plan approval date)

ABOUT THIS PLAN

This installation-specific Environmental Management Plan is based on the United States Department of the Air Force (DAF, formerly US Air Force) standardized Integrated Natural Resources Management Plan (INRMP) template. This INRMP has been developed in cooperation with applicable stakeholders, which includes Sikes Act cooperating agencies and/or local equivalents, to document how natural resources will be managed. Where applicable, external resources, including Department of the Air Force Instructions (DAFIs); Department of Defense Instructions (DoDIs); DAF Playbooks; federal, state, and local requirements; Biological Opinions; and permits are referenced.

Certain sections of this INRMP begin with standardized, DAF-wide "common text" language that addresses DAF 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 DAF-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 the approved plan owner.

NOTE: The terms "Natural Resources Manager," "NRM," and "NRM/Point of Contact (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, *Natural Resources Management*.

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DOCUMENT CONTROL

Standardized INRMP Template

In accordance with (IAW) the Air Force Civil Engineer Center (AFCEC) Environmental Directorate Business Rule 08, *Environmental Management Plan Review, Update, and Maintenance*, the standard content in this INRMP template is reviewed periodically, updated as appropriate, and approved by the Natural Resources Subject Matter Expert (SME).

This version of the template is current as of 11 October 2024 and supersedes the 2010 version.

NOTE: Installations are not required to update their INRMPs every time this template is updated. When it is time for installations to update their INRMPs, they should adopt the most recent version of this template available in the Plan Tool.

Installation INRMP

Record of Review—The INRMP is updated no less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW the Sikes Act and Department of the Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect no less than every 5 years. An INRMP is considered compliant with the Sikes Act if it has been approved in writing by the appropriate representative from each cooperating agency within the past 5 years. Approval of a new or revised INRMP is documented by signature on a signature page signed by the Installation Commander (or designee), and a designated representative of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries when applicable (DAFMAN 32-7003).

Annual reviews and updates are accomplished by the installation NRM and/or a Section 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 Section Natural Resources Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of USFWS, state fish and wildlife agency, and NOAA Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signing 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.

INRMP APPROVAL/SIGNATURE PAGES

97th AIR MOBILITY WING
CONCURRENCE WITH ALTUS AIR FORCE BASE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 USC § 670 et seq.), Altus Air Force Base has completed its 5-year update of the installation's Integrated Natural Resources Management Plan (INRMP). The 97th Air Mobility Wing has reviewed the INRMP and concurs with the findings and management recommendations therein.

_____ _____

RICHARD K. KIND, Colonel, USAF
Commander, 97th Air Mobility Wing, Altus AFB

Date

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION
CONCURRENCE WITH ALTUS AIR FORCE BASE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 USC § 670 et seq.), Altus Air Force Base has completed its 5-year update of the installation's Integrated Natural Resources Management Plan (INRMP). The Oklahoma Department of Wildlife Conservation has reviewed the INRMP and concurs with the findings and management recommendations therein.

_____ _____

WADE FREE, Director
Oklahoma Department of Wildlife Conservation

Date

US DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
CONCURRENCE WITH ALTUS AIR FORCE BASE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Pursuant to the Sikes Act (16 USC § 670 et seq.), Altus Air Force Base has completed its 5-year update of the installation's Integrated Natural Resources Management Plan (INRMP). The US Fish & Wildlife Service has reviewed the INRMP and concurs with the findings and management recommendations therein.

_____ _____

STEWART JACKS, Acting Regional Director
US Fish and Wildlife Service, Southwest Region

Date

EXECUTIVE SUMMARY

Pursuant to the Sikes Act (16 US Code §670a, *Conservation Programs on Military Installations*), as amended in 1997, the Integrated Natural Resources Management Plan (INRMP) guides the management and protection of natural resources on military installations as consistent with the military mission and federal, state, and local natural resources regulations. The INRMP describes the natural resources present on the installation and provides management actions to responsibly manage those resources. The Sikes Act is the legal driver for the INRMP.

The Altus AFB 97th Civil Engineer Squadron/Environmental Element (97 CES/CEIE) developed this INRMP guide as the responsible implementation of the Natural Resources Program at Altus Air Force Base (AFB) and the Sooner Drop Zone. The INRMP outlines the natural resources management goals of no net loss in the capability of Department of the Air Force (DAF) lands to support the military mission.

The INRMP is an integrated plan that balances natural resources management activities with military mission requirements and other land use activities. The primary objective of Natural Resources Programs on DAF installations is to sustain and restore natural infrastructure to ensure no net loss in the capability and operation capacity of DAF lands in support of the military mission using an ecosystem management approach (DAF Manual 32-7003).

This INRMP details goals, objectives, and methods for managing all natural resources within Altus AFB to support mission operations. 97 CES/CEIE is responsible for the development, maintenance, and implementation of the goals of this INRMP. The primary natural resources management goals at Altus AFB include the following.

- Support military mission sustainability through ecological stewardship and regulatory compliance.
- Conserve native biodiversity by restoring and maintaining native habitat, wildlife populations, and ecological processes
- Provide for and promote the sustainable multi-purpose use of natural resources to improve morale and overall wellbeing of the base populace.

Implementation of the goals and objectives of this INRMP will not be a significant change in the management direction for natural resources on the installation. The implementation of these natural resources management objectives assists in mitigating regulatory burden to the mission by proactively supporting vulnerable resources. Additionally, implementation of the Natural Resources Program helps maintain functional training lands and ensures that the environment will support the military mission for generations to come.

The 97th Air Mobility Wing, Information Protection (97 AMW/IP) have verified that figures in the INRMP are Controlled Classified Information (CUI). Tab 7 contains the CUI INRMP figures, available upon request to the Natural Resources Manager (NRM).

1.0 OVERVIEW AND SCOPE

This Integrated Natural Resources Management Plan (INRMP) provides effective management and protection of natural resources. The plan summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the Department of the Air Force (DAF, formerly US Air Force [USAF]). 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 DAF adaptability in all environments. The DAF has stewardship responsibility for 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 DAF Natural Resources Program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of DAF 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. All installation personnel should use the INRMP. The Sikes Act is the legal driver for the INRMP.

1.1 Purpose and Scope

The purpose of this INRMP is to provide a framework for the sustainable and interdisciplinary management of natural resources on Altus Air Force Base (AFB) and the installation's geographically separated unit (GSU), the Sooner Drop Zone (SDZ). In accordance with (IAW) Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Management*, Altus AFB manages its natural resources to facilitate testing and training, mission readiness, and range sustainability in a long-term, comprehensive, coordinated, and cost-effective manner.

Implementation of this INRMP will conserve the land, water, and air resources needed to sustain the military mission. Natural resources present on the installation include fish and wildlife species, Species of Greatest Conservation Need (SGCN) listed by the Oklahoma Department of Wildlife Conservation (ODWC), proposed threatened and endangered (T&E) species, urban forests, grassland habitats, and water resources including wetlands. The plan outlines the multipurpose use of natural resources through adequate environmental management actions that ensure the long-term sustainability of natural resources for the installation. The INRMP supports the mission by identifying the natural resources present on Altus AFB, developing management objectives for these resources, and integrating these management objectives into military mission requirements to minimize natural resource constraints on the mission.

This INRMP ensures that natural resource conservation measures and mission activities are consistent with federal stewardship requirements. The plan is prepared in cooperation with the ODWC and the US Fish and Wildlife Service (USFWS) to ensure that natural resources management activities comply with state and federal environmental laws and regulations. INRMP review and coordination with applicable stakeholders ensures compatibility with other installation programs and activities.

1.2 Management Philosophy

This INRMP follows a unified management philosophy that integrates natural resources management with the diverse needs, interests, and visions of the Altus AFB community. The INRMP integrates natural resources planning and decision-making with other installation plans to ensure compatibility with the mission (DAF Instruction [DAFI] 32-1015, *Integrated Installation Planning*). The INRMP serves as a key component of installation planning and development, as it provides background and rationale for the policies and programming decisions related to land use, resource conservation, facilities and infrastructure

development, operations, and maintenance to ensure all actions meet current requirements and provide for future growth.

This INRMP outlines the steps needed to fulfill compliance requirements related to natural resources management and fosters environmental stewardship. The plan follows the organizational structure outlined below:

- An overview of the current status and potential future conditions of the natural resources (Section 2.2, Section 2.3).
- Identification of potential impacts to or from natural resources (Section 2.4).
- The key natural resource management areas addressed (Section 7.0).
- Management recommendations that incorporate the installation's goals and objectives for natural resource management areas (Section 8.0).
- Specific work plans for effective implementation of the INRMP (Section 10.0).

The Altus AFB 97th Civil Engineer Squadron/Environmental Element (97 CES/CEIE) developed the INRMP using an interdisciplinary approach and is based on existing information of the physical and biotic environments, mission activities, and environmental management practices at Altus AFB. 97 CES/CEIE personnel involved with or responsible for various aspects of natural resources management developed the INRMP's management issues and concerns, as well as goals and objectives, from analysis of all the gathered information. 97 CES/CEIE obtained information from a variety of documents, interviews with installation personnel, on-site observations, and communications with both internal and external stakeholders. 97 CES/CEIE documents coordination and correspondence with these agencies, satisfying a portion of the requirements of 90 Federal Register 27857, *Department of Defense Implementation of the National Environmental Policy Act*. Goals and objectives require monitoring on a continuous basis and management strategies, especially in light of any changes in mission requirements, adverse effects to or from natural resources, or changes in regulations governing management of natural resources.

The INRMP implements ecosystem-based management and adaptive management techniques to maintain and enhance ecosystem resiliency while also supporting the military mission and compliance with environmental regulations. The following 5 DAF principles for ecosystem management must occur on an installation where practical and consistent with the military mission (Department of the Air Force Manual [DAFMAN] 32-7003, Section 3.10.1):

- Maintain or restore native ecosystem types across their natural range.
- Maintain or restore natural ecological processes such as fire and other disturbance regimes.
- Maintain or restore the hydrological processes in streams, floodplains, and wetlands.
- Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components, as well as other federal, state, and local agencies, and adjoining property owners.
- Provide for outdoor recreation, agricultural production, harvesting of forest products, and other practical use of the land and its resources, provided that such use does not inflict long-term ecosystem damage or negatively impact the DAF mission.

1.3 Authority

The Sikes Act, 16 US Code (USC) § 670a, *Conservation Programs on Military Installations*, provides for DoD and the Department of Interior cooperation with federal and state agencies in planning, developing, and maintaining natural resources on military installations. The Sikes Act Improvement Amendment

(SAIA), November 1997, mandates that all DoD installations with significant natural resources prepare and implement an INRMP. The Air Force Civil Engineer Center (AFCEC), the USFWS, and ODWC have designated Altus AFB as a Category I installation, as it contains significant natural resources requiring conservation and management. The SAIA requires Category I installations to prepare an INRMP and conduct 5-year updates and annual reviews in cooperation with external partners. Altus AFB meets the following Category I criteria:

- Conducts on-the-ground military missions on unimproved lands (Section 2.4.2) that necessitate conservation measures to maintain natural resources and minimize impacts of military testing and training activities (e.g., soil erosion control)
- Allows natural resources-based recreation (hunting and fishing) on the installation
- Experiences significant bird/wildlife aircraft strike hazards (BASH), requiring habitat manipulation on or near the airfield and extensive wildlife hazing and depredation activities

97 CES/CEIE developed this INRMP under and proposes actions IAW applicable DoD and DAF directives, policies, and instructions. DoDI 4715.03 establishes policy and assigns responsibilities for compliance with applicable federal laws and regulations for the integrated management of natural resources. Air Force Policy Directive (AFPD) 32-70, *Environmental Considerations in Air Force Programs and Activities*, establishes policy to address environmental considerations in all DAF programs and activities using a framework for environmental management. DAFMAN 32-7003 provides direction and instructions for INRMP preparation and implementation.

The INRMP guides the management of natural resources in support of installation mission requirements in compliance with federal environmental regulations such as the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), Clean Water Act (CWA), and Executive Orders (EOs), including EO 13112, *Invasive Species*; EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*; EO 11990, *Protection of Wetlands*; and EO 11988, *Floodplains Management*.

The National Environmental Policy Act (NEPA) of 1969 requires federal agencies to evaluate potential environmental impacts of proposed federal actions and consider alternatives prior to action approval. NEPA may require proposed projects to conduct an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS) to assess potential impacts to the human environment from the proposed actions. The installation Natural Resources Manager (NRM) collaborates with action proponents and the base NEPA Program Manager to ensure that activities that may affect natural resources are fully considered in compliance with NEPA.

A summary of key legislation and guidance used to create and implement this INRMP is provided in Section 14.1.1. Table 1-1 summarizes installation-specific policies, including state and local laws and regulations.

Table 1-1. Installation-specific policies, including state and/or local laws and regulations

Policy	Description
Altus Air Force Base (AFB) Access Policy	The installation is only accessible to DoD employees, guests, family members, and retirees.
Altus AFB Fishing Rules	Base personnel must catch and release bass and sunfish. Daily limit of 2 fish over 12 inches for catfish. No more than 2 rods per person. No swimming or wading in base fishing pond.

Table 1-1. Installation-specific policies, including state and/or local laws and regulations

Policy	Description
Altus AFB Tree Selection Policy	Per Executive Order (EO) 13148, *Greening the Government Through Leadership in Environmental Management*, all trees planted on Altus AFB must be native trees and planted in consultation with the installation Natural Resources Manager.
Altus AFB Tree Planting/Removal Policies	A tree planting/removal permit must be obtained from the Altus AFB 97th Civil Engineer Squadron/Environmental Element (97 CES/CEIE) prior to the planting or removal of any tree on the installation. Additionally, a digging permit must be obtained from 97 CES/CEIE priority to planting any tree. For every live urban tree removed on base, 1 tree will be planted on the installation to offset the loss.
Altus AFB Tree Maintenance Policy	All trees planted on Altus AFB must be maintained and planted in accordance with (IAW) Altus AFB's Urban Forestry Management Plan.
Oklahoma Statute Title 29, Game and Fish	Establishes the authority of the Oklahoma Department of Wildlife Conservation (ODWC) for state wildlife management efforts. Base policies take precedence when more restrictive than Title 29.
Oklahoma Administrative Code (OAC) 800 §800-1-1	Outlines the function, organization, powers, duties, operations, and procedures of the ODWC and the Oklahoma Wildlife Conservation Commission.
OAC Title 800:25-26 and Oklahoma Statute Title 29 §29-4-118	Requires a permit for handling and collecting wildlife, nests, and eggs for scientific purposes.
OAC Title 800 § 800:25-7-8	ODWC regulations make it unlawful to kill, capture, keep as pets, or sell Texas horned lizards.
OAC Title 800 § 800:20-1-2	ODWC regulates the introduction and possession of particular aquatic species, including exotic or nuisance species.
OAC Title 800:25-1, Wildlife Rules	Sets the state standards for all fish and wildlife handling, collection, trapping, and hunting. All hunting and fishing are IAW Oklahoma Statute Title 29, as adopted by the ODWC.
OAC Title 35 §35:48-1, Wildlife Services	Establishes the state Wildlife Services Division responsible for managing potentially harmful wildlife such as predatory animals, nuisance wildlife, and invasive species.
OAC Title 310 §310:599-1	Establishes uniform rules for the prevention and control of zoonotic diseases in Oklahoma to protect public health.
OAC Title 35 §35:44-1, Agriculture Environmental Permitting and Agriculture Pollutant Discharge Elimination System	Implement the Oklahoma Agriculture Pollutant Discharge Elimination System Act and the Oklahoma Agriculture Environmental Permitting Act, establishing the standard for environmental protection during agricultural activities.
OAC Title 252 §252:100-1-1, Air Pollution Control	Sets the air quality standards of the Oklahoma Clean Air Act.
OAC Title 252 §252:205-1-1, Hazardous Waste Management	Implements the Oklahoma Hazardous Waste Management Act, the Hazardous Waste Fund Act, and the Recycling, Reuse and Source Reduction Incentive Act.

Table 1-1. Installation-specific policies, including state and/or local laws and regulations

Policy	Description
OAC Title 252 §252:606-1-3, Oklahoma Pollutant Discharge Elimination System Standards	Implements the Oklahoma Pollutant Discharge Elimination System Act, which instates the standards of stormwater, point source, and biosolid permitting for discharges to Oklahoma waters.
OAC Title 252 §252:611	Establishes guidance and requirements for the Oklahoma Department of Environmental Quality (ODEQ) jurisdictional areas for the implementation of Oklahoma's water quality standards (OAC 252:730).
OAC Title 252 §252:730	Establishes the authority and responsibility of the ODEQ's establishment of the state's water quality standards.

1.4 Integration with Other Plans

97 CES/CEIE coordinates all INRMP revisions and concurrence of the final plan through the installation chain of command, internal administrators of related documents, and the following stakeholders:

- 97th Air Mobility Wing Public Affairs (97 AMW/PA)
- 97th Civil Engineer Squadron/Operations Flight (97 CES/CEO)
- 97th Civil Engineer Squadron/Engineer Flight (97 CES/CEN)
- 97th Force Support Squadron (97 FSS)

Representatives of various organizations throughout the installation annually review the INRMP. 97 CES/CEIE coordinates INRMP projects with all affected installation organizations. The NRM must ensure that the INRMP, Integrated Cultural Resources Management Plan (ICRMP; Tab 4), BASH Plan (Tab 2), Golf Environmental Management (GEM) Plan (Tab 3), Integrated Pest Management Plan (IPMP; Tab 5), Wildland Fire Management Plan (WFMP; Tab 1), Golf grounds maintenance Performance Work Statement (PWS), the Prescribed Burn Plan (Tab 6), and any other plans that may affect natural resources are mutually supportive and not in conflict.

Table 1-2. Natural resources plans and programs at Altus Air Force Base

Plan	Description
Air Installation Compatible Use Zone Study (AICUZ)	Reaffirms Department of the Air Force (DAF) policy of assisting local, regional, state, and federal officials in the areas neighboring Altus Air Force Base (AFB) by promoting compatible development within the AICUZ area of influence; and protecting DAF operational capability from the effects of land use incompatible with aircraft operations.
Altus AFB Prescribed Burn Plan (Tab 6)	Describes the prescribed burn management objectives and actions in support of using prescribed fire as a natural resources management tool on the installation. Section 7.9 further discusses the Prescribed Burn Plan.

Table 1-2. Natural resources plans and programs at Altus Air Force Base

Plan	Description
Bird/Wildlife Aircraft Strike Hazard (BASH) Plan (Tab 2)	Describes management actions to mitigate bird and wildlife aircraft strikes for the protection of mission operations, personnel, and wildlife. The Integrated Natural Resources Management Plan (INRMP) and BASH Plan are mutually supportive, as both plans establish management actions to limit BASH potential on the installation in support of the DAF mission. Section 7.12 further discusses the BASH Plan.
Facility Response Plan	States the management actions to contain and clean up any contamination from discharges or spills for the protection of the environment. The Facility Response Plan is discussed throughout the INRMP.
Golf Environmental Management (GEM) Plan (Tab 3)	Describes the management actions to maintain the outdoor recreational activity of the golf course while also supporting the health of the environment. The GEM Plan is discussed throughout the INRMP.
Grounds Maintenance Performance Work Statement (PWS)	Outlines the management actions required by the installation to maintain a healthy, functioning urban-wildland landscape. Section 7.7 further discusses the PWS.
Hazardous Waste Management Plan	Describes the management actions to properly store, handle, and eliminate hazardous waste on the installation. The Hazardous Waste Management Plan is discussed throughout the INRMP.
Installation Climate Resilience Plan (Altus AFB 2024*e*)	Identifies natural hazard vulnerability mitigation strategies for integration in planning and development actions at the installation. This plan is discussed throughout the INRMP, and more specifically, in Section 7.16.
Integrated Cultural Resources Management Plan (ICRMP; Tab 4)	States the regulatory guidance and management actions for cultural resources management. Section 7.14 further discusses the ICRMP.
Installation Development Plan	Describes the installation's past, present, and future physical state, and serves as the guidance document for all future facility programming decisions.
Integrated Pest Management Plan (IPMP; Tab 5)	Describes the pest management actions and standard operating procedures at the installation to reduce impact from pests and invasive species. The INRMP and IPMP are mutually supportive, as both plans recommend synonymous management actions for managing pests on the installation. Section 7.11 further discusses the IPMP.
Integrated Solid Waste Management Plan (ISWM)	Contains procedures for the management of solid waste.
Resource Conservation and Recovery Act (RCRA) Corrective Action Permit	Permit for the continued corrective action and groundwater monitoring at Altus AFB.
Spill Prevention, Control, and Countermeasure Plan	Outlines the potential risk of spills on the installation, as well as guidance to prevent oil discharges or hazardous material releases into navigable Waters of the United States. The Spill Prevention, Control, and Countermeasure Plan is discussed throughout the INRMP.

Table 1-2. Natural resources plans and programs at Altus Air Force Base

Plan	Description
Stormwater Pollution Prevention Plan (SWPPP)	Provides guidance to prevent stormwater pollution discharge from the installation for the protection of local water resources. Section 7.5 further discusses the SWPPP.
Wildland Fire Management Plan (Tab 1)	Describes the guidelines, protocols, and authorities responsible for wildland fire and prescribed fire management at Altus AFB.

2.0 INSTALLATION PROFILE

Table 2-1. Installation profile

Office of Primary Responsibility (OPR)	The Altus Air Force Base (AFB) 97th Civil Engineer Squadron/Environmental Element (97 CES/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/Point of Contact (POC)	Name: Delaine Kelley Phone: 580-481-7606 Email: delaine.kelley.1@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	Wade Free, Director Oklahoma Department of Wildlife Conservation Oklahoma City, OK 73152 Kevin Stubbs, Fish & Wildlife Biologist US Fish and Wildlife Service, Oklahoma Ecological Services Field Office Tulsa, OK 74129 918-695-6769 Mark Howery, Senior Wildlife Diversity Biologist Oklahoma Department of Wildlife Conservation 1801 N. Lincoln Blvd Oklahoma City, OK 73105 405-990-7259 Stewart Jacks, Acting Regional Director US Fish and Wildlife Service, Southwest Region 500 Gold Ave. SW Albuquerque, NM 87102 Jonathan Martinez, Coordinator Regional Military Lands Conservation Program US Fish and Wildlife Service 500 Gold Ave. SW Albuquerque, NM 87102
Total acreage managed by installation	7,452 acres total: 4,093 acres—Altus AFB main base 960 acres—Sooner Drop Zone 2,399 acres—Easements and Leases
Total acreage of wetlands	15.47 acres

Table 2-1. Installation profile

Total acreage of forested land	18.68—Wet Woodland Alliance (Center for Environmental Management of Military Lands at Colorado State University [CEMML] 2019)
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	Informal Consultation, Conference Opinion & Biological Opinion for the Department of the Air Force Flight Operations at 32 Installations across the contiguous United States (FWS Log #: 09E30000-2023-0090495-S7, 2024 December 18); filed at 97 CES, Altus AFB, OK (USFWS 2024*a*). A complete record of this consultation is on file at Service Headquarters in Falls Church, Virginia.
Natural Resources Program Applicability (Place an X in the brackets "[X]" 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 ☒ Outdoor Recreation and Access to Natural Resources ☐ Conservation Law Enforcement ☒ Management of Threatened and Endangered Species ☒ Water Resource Protection ☒ Wetland Protection ☒ Grounds Maintenance ☐ Forest Management ☒ Wildland Fire Management ☒ Agricultural Outleasing ☒ Integrated Pest Management Program ☒ Bird/Wildlife Aircraft Strike Hazard (BASH) ☐ Coastal Zone and Marine Resources Management ☒ Cultural Resources Protection ☒ Public Outreach ☒ Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

Altus AFB, home to the 97th Air Mobility Wing (97 AMW), is located in southwestern Oklahoma, approximately 4 miles northeast of the City of Altus within Jackson County (Figure 1 in Tab 7). The City of Altus is about 140 miles southwest of Oklahoma City and 14 miles north of the Oklahoma–Texas border. The city is latitudinally intersected by US Highway 283 and longitudinally intersected by US Highway 62.

The Altus AFB main base consists of approximately 4,093 acres (DAF 2024). The installation's GSU (the SDZ) is in Harmon County, Oklahoma, approximately 23 miles southwest of Altus (Figure 1 in Tab 7). The SDZ is a 960-acre site used by C-17 aircrews to practice aerial pallet drops of simulated cargo loads (Table 2-2). The DAF does not expend munitions on this GSU.

Altus AFB's total economic impact for the region in fiscal year 2024 (FY24) was approximately $733 million (Altus AFB 2024*a*). In 2024, Altus AFB supported a population of 8,320 personnel, including 3,050

military personnel and their dependents, 1,819 civilians, 2,476 cadets/students, and 975 retirees (Altus AFB 2024*a*).

Altus AFB contains 609 facilities, including 167 buildings and 442 privatized housing units. The airfield (Figure 2-1) includes 2 north–south runways, an assault strip, and aircraft operations and maintenance areas. The primary runway, 18R/36L, is 13,450 feet in length. The parallel runway, 18L/36R, is 9,001 feet in length, and the assault strip, 176/356, is 3,500 feet in length. The base also uses the Clinton-Sherman Industrial Air Park in Foss, Oklahoma, located 45 miles to the north, as an alternative runway for aircraft touch and go practice.

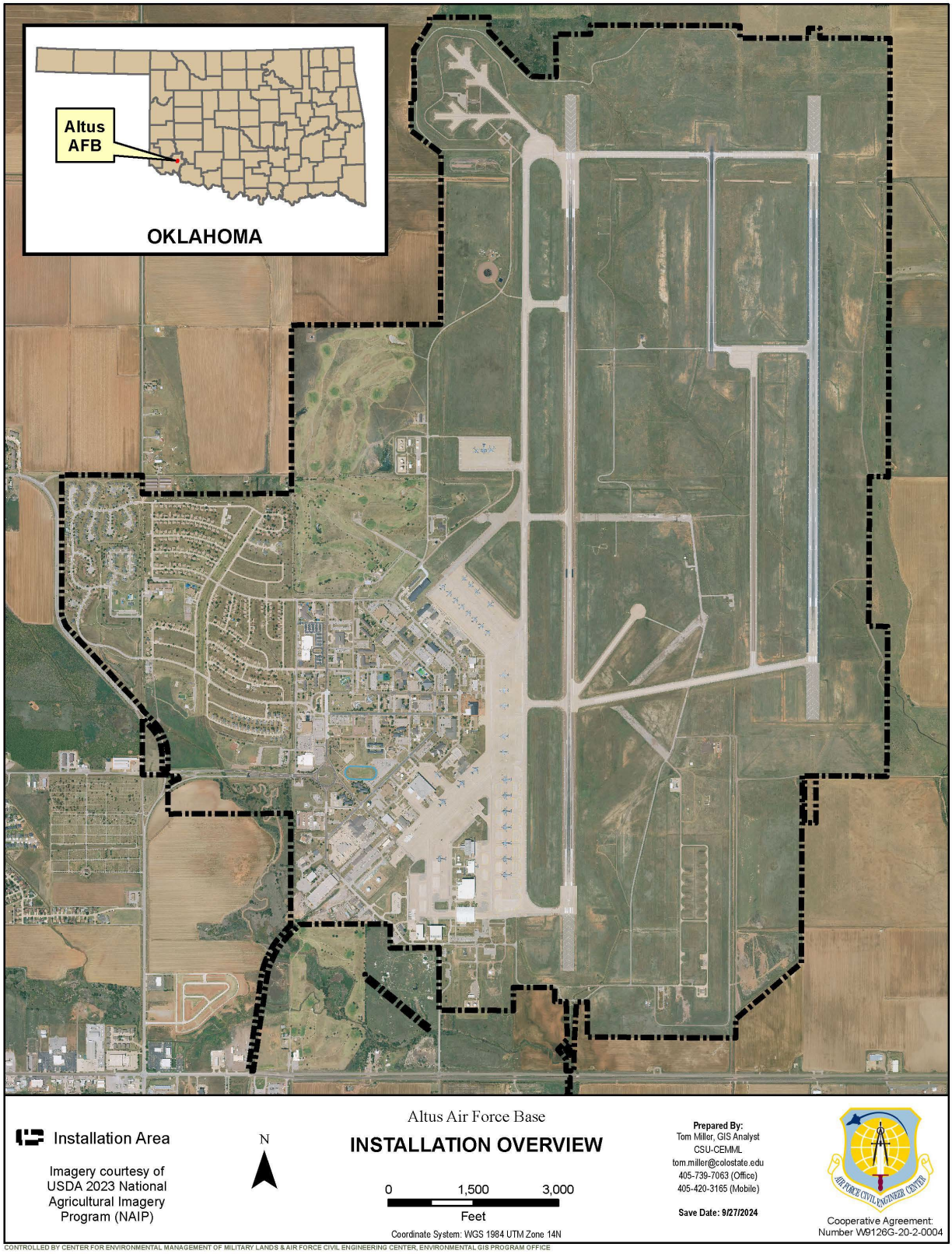

Figure 2-1. An aerial overview of the Altus Air Force Base main base

Table 2-2. Installation and Geographically Separated Unit (GSU) location and area descriptions

Installation/ GSU	Main Use/ Mission	Acreage	Addressed in Integrated Natural Resource Management Plan?	Describe Natural Resource Implications
Altus Air Force Base (main base)	Administrative, Training	4,093	Yes, throughout	• Bird Air Strike Hazard (BASH) • Fish and wildlife species • Species of management concern • Urban forestry • Water resources • Wetlands ecosystems and floodplains • Invasive species • Outdoor recreation • Grounds maintenance
Sooner Drop Zone	Training	960	Yes, throughout	• Wildlife species • Species of management concern • BASH • Invasive species • Grounds maintenance • Water resources (seasonally)

2.1.2 Installation History

Established in 1908, the City of Altus became a major regional agricultural trade and distribution center (City of Altus 2024). Agriculture (specifically, cotton growing) has remained the major industry in the area. This industry has led to the conversion of the native grassland prairie, wetland, and forestry ecosystems to agricultural land.

Land conversion continued with urban development, particularly with the activation of Altus Army Airfield in 1943. The installation began as a training base for Airmen to learn how to operate multi-engine aircraft during World War II (Guinan 2016). At the end of the war in 1945, the US Army inactivated the Altus Army Air Field, and in 1948, the War Assets Administration Office deeded the installation to the City of Altus for $1.00, after which it became the Altus Municipal Airport. Five years later, during the Korean

War, the host unit, the 63d Troop Carrier Wing, operating C-47 and C-45 aircraft, reactivated the installation as Altus AFB.

The installation expanded in 1954, when Strategic Air Command assumed control of Altus AFB and activated the 96th Bombardment Wing to fly strategic bomber aircraft to support Cold War operations. Since 1954, the installation's main base acreage has remained relatively unchanged, but the installation has undergone various mission changes that had numerous impacts on its natural resources and the surrounding community (Altus AFB 2024*b*). The installation gained the 577th Strategic Missile Squadron (577 SMS) in 1961; however, the military phased out missile operations of this squadron in 1965. The loss of the 577 SMS prompted a local business executive to travel to Washington, D.C., to ask the President of the United States for economic aid for the Altus community. In response, President Lyndon B. Johnson temporarily diverted a military unit to Altus AFB. The 4th Mobile Communications arrived at Altus AFB in 1966, operating tactical air traffic control and landing systems for combat and emergency mission support in the Pacific theater.

In 1984, the USAF activated the 340th Air Refueling Wing as a tenant unit on the base to operate KC-135 aircraft. The 97 AMW replaced the 340th Air Refueling Wing in 1992. Command of the 97 AMW was then transferred to Air Education and Training Command (AETC), and the 97 AMW became home to the KC-135 Combat Training School and the C-141 and C-5 Training Schoolhouse, dubbed the University of Military Airlift Command. In 1994, the USAF selected Altus AFB as the training school for the new C-17 cargo aircraft. For airdrop training, the base acquired the 640-acre SDZ near Eldorado, Oklahoma, which requires natural resources management (Table 2-2), including for potential species of conservation concern.

In 2002, the Altus AFB mission expanded to include basic loadmaster training, and the 97 AMW reorganized as a combat wing to conduct strategic airlift, aerial delivery, and aerial refueling training (Altus AFB 2024*b*). Flight operations increased at Altus AFB as the installation became an aerial port of embarkation for the US Army at Fort Sill, Oklahoma. The following year, the base purchased nearly 1,100 acres of easements within the clear zones and accident potential zones of the airfield. In 2005, Altus AFB expanded the SDZ to allow Airmen to practice C-17 dual-row airdrop delivery to double the amount of cargo available for delivery into combat. In 2007, Altus AFB transferred C-5 aircraft to Lackland AFB and transferred the basic loadmaster training and the basic boom operator courses to the authority of the USAF Reserve (Altus AFB 2024*b*). In 2016, the base reactivated the 56th Air Refueling Squadron as the formal training unit for the KC-46A Pegasus air refueling and cargo aircraft, with KC-46 aircraft arriving in 2019.

The 2020 ICRMP provides further details on the installation's history (Tab 4).

2.1.3 Military Missions

Altus AFB is home to the 97 AMW, which is nested under 19th Air Force and AETC. The installation serves as the DAF's sole formal training units for the C-17 Globemaster III, KC-135 Stratotanker, and the KC-46 Pegasus. The Wing trains approximately 2,000 mobility Airmen annually, training over 70% of the Air Force's mobility aircrew, including students from over 20 partner nations. (DoD 2024).

As expressed in the mission statement – "We Train Exceptional Mobility Airmen" – the 97 AMW aims to train combat-ready mobility Airmen to ensure the nations global reach. The installation maintains approximately 550 mobility positions to be available for immediate worldwide deployment. The installation also provides national support and humanitarian aid in emergencies as needed.

The 97 AMW consists of 4 major units: the 97th Operations Group (97 OG), 97th Mission Support Group (97 MSG), 97th Maintenance Group (97 MXG), and 97th Medical Group (97 MDG) (Table 2-3).

Table 2-3. Listing of tenant and natural resources responsibility at Altus Air Force Base

Groups	Military Mission and Operations	Natural Resources Responsibility
97th Operations Group (97 OG)	The 97 OG executes heavy-type aircraft (C-17, KC-135, and KC-46) formal training programs for airland, airdrop, and air-refueling mobility forces. It also provides air traffic control and weather forecasting for flight operations. Six units make up the 97 OG: 1) 97th Operations Support Squadron 2) 97th Training Squadron 3) 54th Air Refueling Squadron 4) 56th Air Refueling Squadron 5) 58th Airlift Squadron 6) 730th Air Mobility Training Squadron (Reserve unit)	The 97 OG, Operations Support Squadron, conducts airfield grounds and runway clear zone management to reduce bird/wildlife aircraft strike hazard (BASH) risk.
97th Mission Support Group (97 MSG)	The 97 MSG provides mission support for aircraft operations and base infrastructure with the following 6 units: 1) 97th Civil Engineer Squadron 2) 97th Communications Squadron 3) 97th Force Support Squadron 4) 97th Logistics Readiness Squadron 5) 97th Security Forces Squadron (97 SFS) 6) 97th Contracting Squadron	The 97 MSG, Civil Engineer Squadron, manages natural resources for all squadrons.
97th Maintenance Group (97 MXG)	The 97 MXG provides sortie generation, aircraft and equipment maintenance, and transient alert. Two units and 2 direct report sections make up the 97 MXG: 1) 97th Maintenance Squadron 2) 97th Aircraft Maintenance Squadron 3) 97th Maintenance Operations Flight 4) 97th Maintenance Group Quality Assurance Section	The 97 MSG, Civil Engineer Squadron, manages natural resources for all squadrons.

Table 2-3. Listing of tenant and natural resources responsibility at Altus Air Force Base

Groups	Military Mission and Operations	Natural Resources Responsibility
97th Medical Group (97 MDG)	The 97 MDG ensures combat readiness and capability by promoting the health, safety, and morale of Active-Duty personnel. Two units make up the 97 MDG: 1) 97th Operational Medical Readiness Squadron 2) 97th Healthcare Operation Squadron	The 97 MDG manages for potential zoonotic diseases and environmental health risk.
97th Wing Staff Agencies (97 WSA)	The 97 WSA is directly responsible to the Wing Commander for coordinating, planning, and directing wing activities across 19 Wing Staff Agencies. Sixteen Agencies make up the 97 WSA: 1) Chapel 2) Commander's Action Group 3) Command Post 4) Community Squadron Coordinator 5) Comptroller Squadron 6) History Office 7) Information Protection 8) Inspector General 9) Judge Advocate 10) Public Affairs (97 AMW/PA) 11) Protocol 12) Wing Safety 13) Sexual Assault, Prevention and Response 14) Transformation 15) WSA Fitness Program 16) Resident Advocate	All events like Arbor Day, Earth Day, and the annual dove hunt are coordinated with 97 AMW/PA. The Judge Advocate reviews all documents and plans before being routed to the Wing Commander for signature. Wing Safety (Flight Safety) houses the BASH program.

2.1.4 Natural Resources Needed to Support the Military Mission

Altus AFB's significant natural resources and landscapes are key assets in sustaining its military mission, providing safe airfields, healthy native habitats, adequate undeveloped areas, and controlled landscapes. A proactive Natural Resources Program with effective conservation actions ensures long-term use of Altus AFB (Benton et al. 2008).

Natural resources management is necessary to create safe airfields that are compatible with flightline operations (Section 7.12). IAW DAFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*, active habitat management in and around the airfield reduces the likelihood of wildlife strikes, promoting effective training capability and preventing loss of life. Airfield vegetation management

discourages wildlife presence and supports stable soils. Stable soils and erosion control are necessary for maintaining mission infrastructure (e.g., the airfield) and mission directives (e.g., refueling operations).

The installation's ecosystem components (including wetlands, floodplains, vegetation, and wildlife) are critical aspects of a healthy landscape necessary to support the mission. Wetlands and floodplains provide ecosystem services such as erosion and flood control by storing floodwaters from local streams after heavy rainfall, which minimizes loss of property in developed areas (Section 2.3.5). These areas help maintain compliance with the Oklahoma Department of Environmental Quality (ODEQ) water quality standards by controlling stormwater runoff and removing pollutants and excess sediment and nutrients (Section 2.2.4). These ecosystem types also contribute to groundwater recharge by promoting infiltration, an increasingly necessary factor as drought conditions persist in the region (Section 7.16). Wetlands and floodplains also contain higher plant diversity, which helps maintain ecosystem integrity.

The undeveloped open space, wetland, and forest tracts at Altus AFB provide the necessary space for safety, security, and airfield buffering for contingency training (Section 2.3.1). Native vegetation in these open spaces provides water filtration and soil stabilization, which prevent erosion. The vegetation also increases the aesthetic value of the landscape. Urban forest stands can provide shade and temperature control around the cantonment area as increasing annual average temperatures cause heating, ventilation, and air conditioning (HVAC) systems to malfunction (Section 7.16).

Natural areas and wildlife also provide for enjoyable outdoor recreation experiences that increase the morale of Airmen, their families, and guests on the installation (Section 7.2). Morale, welfare, and recreation is crucial to the resilience of the base community, per DAFI 34-101, *Department of the Air Force Morale, Welfare, and Recreation (MWR) Management Programs and Use Eligibility*. A healthy environment and proactive natural resources management program at Altus AFB will continue to improve the quality of life for the military community and increase the resiliency of the landscape in support of the DAF mission (DoDI 4715.28, *Military Installation Resiliency*).

2.1.5 Surrounding Communities

Altus AFB is located in the northeast corner of Altus, Oklahoma. According to the 2020 US Census, Altus has a population of approximately 18,729 people. Nearly 15.6% of Altus residents live below the poverty level, and the median household income for the city is $56,620 (US Census Bureau 2024).

Agriculture plays a significant role in the local economy. Agriculture make up most of the land use in Jackson County, with 92.9% of the county acreage classified as farmland. According to the 2022 US Department of Agriculture (USDA) Census of Agriculture, crops account for 66.0% of all agriculture sales in Jackson County, and livestock, poultry, and animal products account for 34.0% of agriculture sales. Cotton lint and cottonseed account for 53.0% of the income from crop sales, and cattle account for 96.0% of animal/animal product sales (USDA 2022).

Collaboration with surrounding communities, most notably the City of Altus, is necessary to mitigate potential conflict between surrounding communities and mission operations. The DoD Readiness and Environmental Protection Integration (REPI) Program, administered by the Office of the Secretary of Defense, aims to support the military mission by helping to remove or avoid land use conflicts adjacent to installations. With funds obtained through REPI, Altus AFB is working to secure stable water sources for the installation and the City of Altus via partnerships with the Tom Steed Master Conservancy District (Section 7.5). Ongoing collaboration with surrounding communities is vital for sustaining Altus AFB's mission in light of increasing vulnerabilities (Section 7.6).

2.1.6 Local and Regional Natural Areas

Farmland and undeveloped open space predominantly surround Altus AFB and the SDZ (Figure 2 in Tab 7). There are no federal wildlife refuges, state wildlife management areas, or nature preserves within 5 miles of Altus AFB. The closest natural area is Gist Wildlife Management Area (WMA), located about 19 miles southeast of the installation. Gist WMA comprises 177 acres of the North Fork Red River area, and bottomland vegetation such as sand plum (*Prunus angustifolia*) thickets, cottonwoods (*Populus* spp.), and tall grasses dominates the area. The next closest natural area is Quartz Mountain State Park, located about 24 miles north of the base. Quartz Mountain is one of the westernmost peaks of the Wichita Mountains and is adjacent to the Altus-Lugert WMA.

The Altus-Lugert WMA is about 3,600 acres and encompasses Lake Altus-Lugert, which impounds the North Fork of the Red River. This WMA includes areas of river bottom, which are dominated by cottonwood, American elm (*Ulmus americana*), honeylocust (*Gleditsia triacanthos*), saltcedar (*Tamarix ramosissima*), and Kentucky coffeetree (*Gymnocladus dioicus*), and of slough areas, which are dominated by cattails (Typhaceae spp.). The northeast portion of the WMA consists of mixed/tallgrass prairie habitat, interspersed with sand plum. The river bottom and slough areas of the Altus-Lugert WMA are similar to the deep marsh alliance and wet woodland alliance areas on Altus AFB. These 2 habitats represent a small percentage of the installation's total land cover but are some of the few remaining natural areas on the base and in the surrounding area.

The City of Altus, located immediately west of Altus AFB, provides anthropomorphic resources for wildlife, including golf courses and parks. Wildlife such as ungulates, migrating waterfowl, and herpetofauna concentrate in the few remaining natural areas in the region. Agricultural lands to the north, east, and south of the installation also provide food sources for wildlife, attracting wintering waterfowl and migrating bird species (Tab 4). As Altus AFB is located within the Central Flyway bird migration route, significant numbers of migratory birds pass through the area in the spring and fall. The local anthropomorphic resources, compounded with the significant increase in wildlife presence during migratory periods, increase the risk of wildlife strikes at the installation (Section 7.12).

2.2 Physical Environment

2.2.1 Climate

Altus AFB experiences a humid, subtropical climate bordering a semi-arid climate zone (Kottek et al. 2006). The region experiences hot, dry summers and warm to cool, dry winters (Figure 2-2). The area experiences extreme variations between day and night temperatures due to generally low nighttime cloud cover and high rates of solar radiation during the day. Altus AFB experiences around 300 days of clear skies per year, making it very compatible with flying operations.

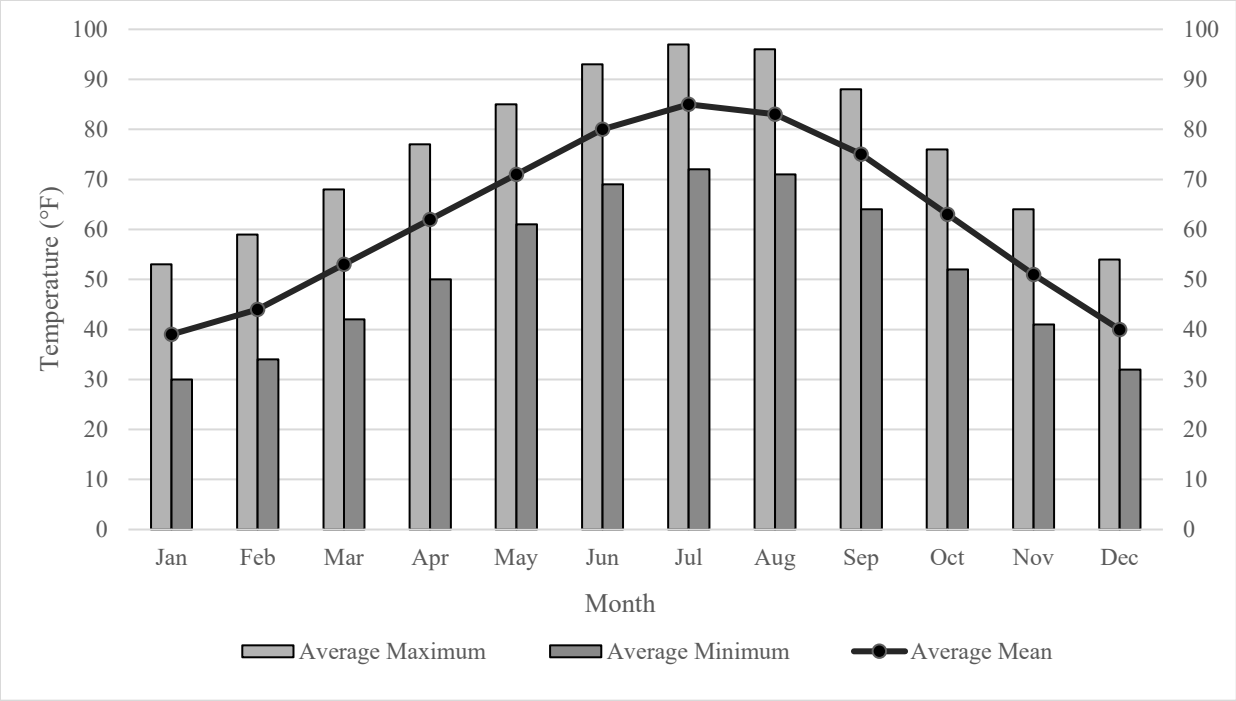

Figure 2-2. Average monthly temperatures at Altus Air Force Base, based on 2016–2024 data (Station ID: KLTS)

Summers are hot and dry, with occasional heavy rainfall due to tropical storm remnants from the Gulf of America (previously Gulf of Mexico). July and August are the warmest months, with average daily temperatures greater than 80.0 °F. Altus AFB sees an annual average of 93.9 days with temperatures that exceed 90.0 °F and an average of 31 days per year with temperatures that exceed 100.0 °F (Altus AFB 2023*e*). The highest recorded temperature of 120.0 °F occurred in 1936.

Autumn in the Altus area is brief and warm. The area experiences another peak in precipitation in September and October from convective thunderstorms and interactions with remnants of the North American Monsoon. Winter is generally cool and dry, but temperatures can be extremely variable. Warm interior Chinook winds may bring in hot temperatures and dry out vegetation, producing wildfires. However, in winter, the region may experience cold fronts below 0.0 °F that can be created when warm air masses form over the Gulf of Alaska, forcing cold polar air southward into the contiguous United States. January has the coldest temperatures of the year, with an average temperature of 39.3 °F. Temperatures below 10.0 °F occur on an average of 3 days per year (Altus AFB 2023*e*).

Snowfall in the Altus area is rare and minimal; the snowy period of the year lasts from approximately mid-December to early February, with an average snowfall of 5.9 inches. Most storms produce accumulations of 2 to 4 inches, although snowfall of up to 7.6 inches is possible. Ice storms with varying thickness of precipitation may occur 1 to 3 times per year during winter (Altus AFB 2021*b*).

Altus AFB sees an average of 29.13 inches of precipitation per year, with the greatest annual average precipitation occurring during September and the lowest annual average occurring in January (US Climate Data 2025). The greatest amount of rain occurs in May (average rainfall of 3.8 inches) and the least amount of rain occurs in January (0.7 inches). Thunderstorms occur approximately 43 days per year, primarily in

spring and summer, and are often associated with heavy rainfall, strong wind, lightning, and occasional hail (Altus AFB 2024*e*).

On rare occasions, a tornado will touch down in the area. From 1950 to 2018, 78 tornadoes were reported in Jackson County (Altus AFB 2024*e*). Tornadic winds cause mission delays or cancellations due to facility or equipment damage and disruption of installation access. The last significant tornado at Altus AFB was in 1982, in which an F3 tornado (wind gusts of 162 to 209 miles per hour) damaged a couple of C-5A airplanes and their hangars, injured at least 18 people, and killed 2 individuals (Altus AFB 2024*e*).

Altus AFB main base and SDZ are at risk of natural hazards including extreme heat, droughts, high winds, and severe storm events such as winter storms and tornadoes (National Oceanic and Atmospheric Administration [NOAA] National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024). Historical weather records in Oklahoma show that temperatures have increased by approximately 0.6 °F from 1900 to 2020 (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024). The winter months have shown higher-than-average temperatures in recent decades; however, extreme cold events are increasing in severity. For example, a historic cold wave impacted the state from 9 to 20 February 2021, with cold temperatures, heavy snow, and severe icing causing power outages and considerable infrastructure damage (NOAA National Centers for Environmental Information 2022). Average annual precipitation varies by year; however, the frequency of extreme precipitation events has increased since 1985. A combination of varying precipitation levels with increased annual average temperatures are augmenting evapotranspiration rates and reducing soil moisture, leading to increased intensity of droughts (NOAA National Centers for Environmental Information 2022). Section 7.16 further discusses natural hazards at Altus AFB and their potential impacts on the mission.

2.2.2 Landforms

Altus AFB lies within the Central Redbed Plains area of the Central Lowlands physiographic region of the United States (Fenneman and Johnson 1946). Agriculture (rangeland and cropland), followed by urban land, woodland, and pasture, dominate the land cover in the region (USDA 1981). This landscape has level to rolling hills and moderately fragmented rolling plains with numerous stream terraces. The deep gravel and sand in the valleys yield some groundwater. Some of the larger rivers contain highly mineralized water. This physiographic area supports mid-height to tall grasses. Sand bluestem (*Andropogon hallii*), little bluestem (*Schizachyrium scoparium*), and sand sagebrush (*Artemisia filifolia*) dominate areas of coarse-textured soil. Finer-textured soil areas have little bluestem, pasture grass species, and associated forbs and grasses (USDA 1981).

Southwest Oklahoma's flat landscape makes it an ideal location for flight training. Topography at the installation is nearly level to gently sloping, and local relief is the result of stream erosion or human activities. Surface elevation ranges from approximately 1,330 feet above mean sea level at the south end of the installation to 1,390 feet above mean sea level at the northernmost point (Altus AFB 2023*e*).

Jackson County is within the Red River Basin, which has a general northwest-to-southeast drainage pattern in the western part of the county, in which Altus is located. The Red River is the southern boundary of the county and the North Fork of the Red River is the eastern boundary, as it flows into the Red River in the southeast corner of the county. Stinking Creek, which flows through the installation, is one of the primary streams that drains most of the county east of the Salt Fork of the Red River.

At SDZ, the surface elevation range is comparably minimal, with the highest elevation point at 1,530 feet above mean sea level and the lowest elevation point at 1,501 feet above mean sea level (Altus AFB 2022*c*).

Overall, surface topography, and thus the drainage pattern, gently slopes to the south-southeast from the high elevation near the northwest corner.

2.2.3 Geology and Soils

Altus AFB is located within the Wichita Uplift geological province. This area contains the Hennessey Group, a reddish-brown gray soft shale with sandstone, shale, and siltstone and interlaced with beds of gypsum and salt underneath (Stanley and Miller 2004).

There are 4 major soil series on Altus AFB: Miles, Tillman, Hollister (intermingled with Tillman), and Altus Series (Figure 3 in Tab 7; USDA 2007). Tillman Clay Loam is deep, well-drained soil that occurs in uplands along natural drains. This soil has a weak granular structure and is moderately susceptible to water erosion. Similarly, Tillman and Hollister Clay loams are deep, lean clays that occur in uplands and grade to slowly permeable clays. These soils are composed of about 60.0% Tillman soil and 40.0% Hollister soil in an intermingled pattern. This soil type has limited moisture for plant use and a moderate to high shrink-swell potential during changes in water content. This type is also moderately susceptible to water erosion, with potential for fine particles of clay and silt that detach from the soil mass and blow away during prolonged dry periods. However, this occurs primarily on poorly managed cultivated fields (USDA 2007).

Miles Fine Sandy Loam is deep and well drained but can store large amounts of moisture that plants can use. The 44-inch subsoil is moderately permeable to air and water. The Altus Fine Sandy Loam surface soil is about 8 inches of fine sandy loam that is friable and easy to work. The subsoil is moderately permeable but readily penetrated by plant roots. The depth to red beds is usually between 4 and 10 feet. This soil is well drained, and in places, it is sub-irrigated during wet seasons. During wet years, the water table is generally within 5 feet of the surface. The stream channel and floodplain of the unnamed tributary to Stinking Creek, along the southwestern border of the installation, contain alluvium deposits of unconsolidated sand, silt, clay, and gravel (USDA 2007).

Due to its geographic distance from Altus AFB, the SDZ contains different soil (Figure 4 in Tab 7). The SDZ dominant soil type is Westill Clay Loam, a deep, well-drained upland soil type that is very slowly permeable. The first 15 inches of soil are friable, followed by dense, compact soil at a depth of 80 inches or greater. Iron-manganese is common in fine accumulations after a few feet of depth. Runoff from this soil type is high to very high. Vernon Clay Loam is common. This soil type has shallow, reddish-brown soils formed over claystone bedrock on uplands. This soil type is well drained, very slowly permeable, and moderately susceptible to water erosion (USDA 2007).

Wet Spur Clay Loam also occurs throughout the SDZ. This is a very deep, well-drained, and moderately permeable soil type that is common in the floodplains of stream tributaries, drainage ways, and irrigated areas. Similarly, Tilvern Clay Loam occurs throughout the SDZ. It is a deep, well-drained, and very permeable soil type that is moderately susceptible to water erosion. These soils reach depths of over 80 inches and are firm and blocky throughout (USDA 2007).

2.2.4 Hydrology

The US Army Corps of Engineers (USACE) identifies a water source as a jurisdictional Water of the United States (WOTUS) during a jurisdictional delineation of waters on a property and an issuance of a Jurisdictional Determination. The CWA protects water resources, which often include wetlands (Section 2.3.5), from impacts such as development and stormwater runoff. Section 404 of the CWA provides for regulatory review and permitting of activities that potentially affect WOTUS. Section 404 requires a permit from the USACE before dredged or fill material can discharge into WOTUS, including wetlands, unless the activity is exempt from Section 404 regulation. For any federally licensed or permitted projects that may result in discharge into WOTUS, Section 401 of the CWA requires that a water quality certification be issued to ensure that the discharge complies with the applicable state water quality standards (DAFMAN 32-7003, Section 3.18). The Rivers and Harbors Act of 1899 protects navigable WOTUS from impacts such as development.

At the state level, ODEQ is the lead agency responsible for implementation of the Section 401 Water Quality Certification in Oklahoma. Pursuant to the CWA, ODEQ is responsible for setting and enforcing the state's surface water quality standards. The Oklahoma Pollutant Discharge Elimination System (OPDES) permit program authorizes discharges to state waters. The type of OPDES permit issued depends on the type of pollutant-generating activity (industrial operations or construction). Additionally, Section 401 of the CWA directs that any proponent of a proposed action that requires a federal license or permit, such as a Section 404 or a National Pollutant Discharge Elimination System (NPDES) permit, must obtain a water quality certificate from the state agency to ensure that the action complies with state water quality standards.

Under Section 303(d) of the CWA, ODEQ must identify and develop a list of impaired waterbodies that do not meet ODEQ water quality standards. To ensure compliance with the standards, ODEQ establishes a total maximum daily load (TMDL) for pollutants. TMDL is the maximum allowable quantity of a pollutant into an impaired waterbody from all or portions of a drainage area needed to achieve compliance with ODEQ's water quality standards. TMDLs set enforceable limits to sustain or improve the current conditions of a 303(d)-listed waterbody (ODEQ 2022).

Groundwater

Groundwater is water that collects or flows beneath the land surface for use in potable water consumption, industrial applications, or agriculture irrigation. An aquifer, which is a body of sediment or porous rock, stores groundwater (North Wind Resource Consulting 2024). The Blaine and Seymour aquifers are the major aquifers closest to Altus AFB. Minor aquifers lie beneath Altus AFB and are comprised of unconsolidated alluvial deposits associated with the Salt Fork and North Fork of the Red River (USAF 2004).

The unconfined aquifer system underlying the installation occurs at shallow depths ranging from 5 to 55 feet below ground surface. Precipitation is the main source of recharge for this aquifer system, with the water-bearing zone significantly fluctuating with the season or periods of heavy rainfall. Groundwater flow in the aquifer moves northwest to southeast across the base; however, irrigation canals, streams, and drainage ditches influence flow patterns (North Wind Resource Consulting 2024).

Groundwater quality in this aquifer system is variable, with high levels of sulfates, iron, chlorides, and suspended solids. This aquifer is a Class 3 aquifer, so its water is not potable and is limited in use primarily for agricultural, manufacturing, and industrial activities (North Wind Resource Consulting 2024). Altus

AFB sources drinking water through the City of Altus from a combination of the Tom Steed Reservoir water and well fields in the Seymour Aquifer in North Wilbarger County, Texas (City of Altus 2024).

Surface Water

Surface water on Altus AFB drains into 2 watersheds via 2 small streams on the installation: Stinking Creek and an unnamed tributary to that creek (Figure 5 in Tab 7). Stinking Creek passes through the northern half of the airfield and flows from the northwest to the southeast, draining the eastern portion of the base. The unnamed tributary to Stinking Creek runs along the southwestern boundary of the installation. These streams flow southeast off the installation to the North Fork of the Red River. The North Fork flows south about 13 miles east of the base and the Salt Fork flows south about 5 miles west of the installation. The Red River flows east about 14 miles south of the installation, on the border between Oklahoma and Texas.

Stinking Creek is a perennial stream with an average flow of less than 20 cubic feet per second, except during rainfall, when the creek experiences an increase in water load. The unnamed tributary to Stinking Creek, with its intermittent flow, drains the housing area and western portions of Altus AFB. The tributary joins Stinking Creek about 5 miles downstream of Altus AFB. This stream usually does not flow during the late summer months. South of the housing area, the stream receives stormwater flow from the City of Altus reservoir.

In 2020, 97 CES/CEIE and ODWC established a 1.88-acre catch-and-release fishing pond on the eastern edge of the Windy Trails Golf Course, adjacent to the airfield, to provide more outdoor recreation opportunities during the Covid-19 pandemic (Altus AFB 2020*a*). However, the installation filled in the pond in 2025 because it was attracting wildlife and increasing BASH risk (Section 7.12). In fall 2024, 97 CES/CEIE began construction of a 2.5-acre, 15-foot-deep fishing pond directly south of the base housing area to replace the former fishing pond. Altus AFB also contains 5 small impoundments that are all located on the golf course. Some of the ponds provide water for golf course irrigation; however, they are not potable water sources and are not permanent.

The Ozark Canal is an agricultural irrigation canal that crosses the northernmost end of the base. In addition to the Ozark Canal, an unnamed irrigation canal passes under the main runway, flowing southeast for several hundred yards before turning south to exit the base at the southern end. These canals do not receive surface runoff from the base, and the base has no access to their water. The canals solely supply water for agricultural irrigation and may be dry or ponded during the off-season.

The surface water at SDZ consists of a series of tributaries that drain south through the GSU (Figure 6 in Tab 7). SDZ is a part of 2 watersheds: the Upper Gypsum Creek and Hydrologic Unit Code 111301010306 watersheds. Three small vernal pools dot the lower half of the site.

As Jackson County experiences an increase in annual average air temperature, the water quality of surface water sources is vulnerable, particularly in lentic systems (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024). As water temperatures rise in lentic systems, dissolved oxygen content decreases, impairing water quality, particularly for larval amphibians and aquatic macroinvertebrates. Increasing water temperature will also increase the chance of algal bloom occurrence, further depleting dissolved oxygen content and degrading habitat quality (Paerl et al. 2011). Regional shift in annual average temperatures and severe storm events will alter the natural flow of water systems in the region, shifting the movement, and thus the dilution, of contaminants and sediment. A change in creek morphology will impact wetland ecosystems, threatening water quality and the health of riparian flora and fauna species (Section 2.3.5). Section 7.5 provides management actions to mitigate natural hazard impacts to water resources.

Stormwater

The ODEQ is responsible for regulating all discharges on Altus AFB. Pursuant to the CWA, the US Environmental Protection Agency (US EPA) NPDES must permit stormwater collection systems. Altus AFB has an OPDES Multi-Sector General Permit for stormwater discharges from industrial activity and non-stormwater discharges (contingent on its non-stormwater discharge compliance with effluent limits set forth in Parts 2 and 10 of the 2022 Multi-Sector General Permit). An ODEQ-issued permit for stormwater conveyance regulates the private housing on Altus AFB as a small municipal separate sewer system (North Wind Resource Consulting 2024).

Most of the developed areas of Altus AFB have underground storm drainage piping with catch basins, manholes, and drain inlets. Stinking Creek and its unnamed tributary receive this water, and both eventually discharge into the Red River (Altus AFB 2023*e*). Stormwater discharges off the base through 10 drainage ways associated with outfalls. These drainage ways service non-industrial and industrial facilities at Altus AFB.

The industrial areas of Altus AFB include runways, aircraft hangars, aircraft parking areas, fuels dispensing and storage, motor pools, maintenance shops, outdoor storage areas, and wash racks. These industrial areas connect to a stormwater drainage system of 6 outfall locations throughout the installation. These outfalls receive stormwater runoff from industrial areas, covered under OPDES regulations for stormwater discharges associated with industrial activity. The 6 industrial outfalls transmit stormwater runoff to one location, where it discharges to a receiving waterbody outside of the installation's boundaries.

Non-industrial areas consist of residential, undeveloped, recreational, administrative, and other land uses. There are 4 outfalls that service non-industrial areas. Since these outfalls are not associated with industrial activities, 97 CES/CEIE does not have to monitor them under the OPDES Multi-Sector General Permit (Altus AFB 2023*e*).

As Jackson County continues to experience an increase in extreme storm events that are increasing flooding risk (Section 2.3.5), stormwater runoff poses a risk to water quality in and around the installation (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024).

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

An ecosystem is an area of varying size with an association of biotic and abiotic components that are dependent on each other for the functioning of the entire system. On a broader scale, an ecoregion is a major ecosystem, resulting from large-scale, predictable patterns of moisture and solar radiation that influence the types of flora and fauna present (Bailey 2014). Classifying ecosystems on the landscape provides information for land use management activities that affect common biota at the ecosystem level, projecting responses to land management practices, assessing ecosystem-scale environmental issues, and evaluating ecosystem productivity. The National Hierarchical Framework of Ecological Units, also known as Bailey's Ecoregions, is a common framework for classifying ecosystems (Bailey et al. 1995, Bailey 2014).

According to Bailey's Ecoregion framework (Bailey 2014), Altus AFB lies within the Dry Domain, Subtropical Steppe Division, Great Plains Steppe and Shrub Province, Redbed Plains Section of the Southern Plains Ecoregion (Figure 7 in Tab 7). Characteristics of the ecoregion include:

- Dissected topography with gently sloping to rolling plains (McNab et al. 2007)

- Arid climate with high air and soil temperatures: summer temperatures are warm to hot and winters are cold to dry; maximum rainfall occurs in the summer (Bailey et al. 1995, Bailey 2014)
- Extreme variations between day and night temperatures due to high direct solar radiation and outgoing radiation (Oklahoma State University 2017)
- Rock formations are primarily sedimentary sandstones with significant quantities of red shale that weather easily, as well as smaller areas of wind-deposited sands and loess (McNab et al. 2007)
- Dominated by tall grasses, with sand sagebrush-bluestem prairies common on coarse-textured soils near the province's western edge (McNab et al. 2007)

On an ecosystem level, the natural ecosystems at Altus AFB include grassland prairies, floodplains, wetlands, and urban forest. Almost half of the landscape is open space. Floodplain, wetland, and urban forest ecosystems comprise an extremely small portion of the landscape, whereas prairie ecosystems comprise a majority of the natural areas (Center for Environmental Management of Military Lands at Colorado State University [CEMML] 2019).

The composition, distribution, and abundance of species in these ecosystems and the products and services that they provide are at risk to the extreme heat and severe storms events that Jackson County continues to experience (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024). Since grassland prairies are relatively dry, with a strong seasonal climate, they are sensitive to natural hazards such as droughts, which augment soil decomposition and reduce plant productivity over large areas (Grand et al. 2019). Floral and faunal species that are dependent on grassland ecosystems are vulnerable to the loss of availability and quality of these ecosystems in Oklahoma, which increases the risk of these species needing protection through state or federal listings (Section 2.3.4). Ongoing drought conditions and shifting climatic variables may impact the natural ecosystems necessary to support the military mission, effectively reducing the resiliency of the installation.

2.3.2 Vegetation

2.3.2.1 Historical Vegetation Cover

Altus AFB is located within the Kansan biotic province, originally a region of mixed prairie grassland. Historically, dominant grass species were bluestem (*Andropogon* spp.), buffalograss (*Bouteloua dactyloides*), grama grasses (*Bouteloua* spp.), and needlegrasses (*Stipa* spp.) (USAF 2002). Other grasses included vine mesquite (*Panicum obtusum*), switchgrass (*Panicum virgatum*), tobosagrass (*Pleuraphis mutica*), and Arizona cottontop (*Digitaria californica*), intermingled with scattered shrubs such as yucca (*Yucca* spp.) and sagebrush (*Artemisia* spp.). Native trees in the area, such as mesquite (*Prosopis* spp.) and hackberry (*Celtis* spp.), were common primarily in riparian zones along streams and in floodplains (Oklahoma State University 2017).

Almost all vegetation communities throughout Oklahoma have undergone extensive alteration by human activity since the arrival of prehistoric Native Americans during the glacial retreat in North America. Plant communities developed under the influences of frequent fire and changing climatic conditions associated with the glacial retreat. Early Native American tribes in Oklahoma practiced a frequent prescribed fire regime on the landscape. The relocation of Native American tribes in the 1830s and the influx of European settlers on the land resulted in a lower fire frequency and an increase in agricultural practices that make up the current vegetative communities. For example, past livestock grazing converted much of the historical mixed prairie land surrounding the installation to short-grass pasture (USAF 1998). Agricultural practices

in the region have converted and degraded about 90.0% of the natural grassland cover types for agricultural use (Bailey et al. 1995, McNab et al. 2007, Bailey 2014).

The altering of Oklahoma's natural vegetative community dynamics has also led to a loss in grassland habitat. European settlers actively suppressed wildfires and installed fencing to delineate property boundaries. Historically, areas that had undergone recent burns attracted large herbivores (including white-tailed deer [*Odocoileus virginianus*], bison [*Bos bison*], and elk [*Cervus canadensis*]) and small grazing mammals, naturally creating a rotational grazing regime on prairies, shrublands, and forests. Interruption of the native fire regime, in tandem with the fences that obstructed wildlife movement, altered the natural fire–grazing interaction that supported the area's grassland communities. The reduction in fire and the introduced pattern of repeated livestock grazing reduced the fine fuels necessary to support wildland fires, further removing fire as a driving ecological force on the landscape.

2.3.2.2 Current Vegetation Cover

The current vegetative cover (Table 14-2) of the installation's unimproved, grassland prairie areas is similar to the historical species composition (USAF 2009). Big bluestem (*Andropogon gerardii*) and little bluestem dominate the sandy and loamy soils on the alluvial plains and along streams of Altus AFB. These areas also support silver bluestem (*Bothriochloa laguroides*), switchgrass, sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), dropseeds (*Sporobolus* spp.), buffalograss, and vine mesquite. Blue grama and sideoats grama dominate the bottomland areas of the Tillman Clay Loam and Hollister soil series in the south and west portion of the base. These areas also support little bluestem, silver bluestem, switchgrass, Indiangrass (*Sorghastrum nutans*), sedges (*Carex* spp.), Texas wintergrass (*Nassella leucotricha*), and vine mesquite.

The major native grass species that occur on the installation's semi-improved grounds (Section 2.4.2) are sideoats grama, blue grama, switchgrass, buffalograss, and little bluestem. The native trees in the upland areas are honey mesquite and honeylocust, whereas the draws and stream channels contain elm (*Ulmus* spp.) and cottonwood trees, along with some encroaching saltcedar.

The Urban Forestry Program manages urban tree species within improved (Section 2.4.2) and semi-improved areas (Section 7.7). Tree species identified on the installation include Afghan pine (*Pinus brutia* var. *eldarica*), aleppo pine (*Pinus halepensis*), American sycamore (*Platanus occidentalis*), Bradford pear (*Pyrus calleryana*), escarpment live oak (*Quercus fusiformis*), sugarberry, and honeylocust (Table 14-2).

CEMML (2019) assessed vegetation communities at Altus AFB to develop alliance-level data using the US National Vegetation Classification system. This assessment determined that 71.3% of the base contained highly maintained vegetation communities of warm-season grasses and hardscapes and that only 6.36% of the installation constituted natural vegetative communities that function as natural habitat and do not require active maintenance (Table 2-4, Figure 8 in Tab 7).

Table 2-4. Vegetation communities at Altus Air Force Base (CEMML 2019)

Vegetation Community	Community Description	Common Species
Deep Marsh Alliance	Tall emergent marsh species adjacent to water sources and in shallow basins.	• Narrowleaf cattail (*Typha angustifolia*) • Broadleaf cattail (*Typha latifolia*)
Recreational Open Lawn	Sub-alliance of warm-season open lawn cultural subgroup accounting for recreational areas, such as athletic fields. The vegetation is similar to the warm-season open lawn but mixed with hardscapes, like gravel, for recreational purposes.	• Bermudagrass (*Cynodon dactylon*)
Wet Woodland Alliance	Dense or scattered patches of honeylocust (*Gleditsia triacanthos*), cover ranging from 20.0 to 70.0%. Approximately 10.0% of the community is bare soil.	• Honeylocust • Box elder (*Acer negundo*) • Annual ragweed
Ruderal Grassland Alliance	Large patches of grassland dominating the golf course on the northern portion of the installation, subject to intermittent or seasonal mowing.	• Little bluestem • Johnsongrass (*Sorghum halepense*) • Weeping lovegrass (*Eragrostis curvula*) • Annual ragweed (*Ambrosia artemisiifolia*) • Canadian horseweed (*Conyza canadensis*) • Goldenrod (*Solidago* spp.)
Tropical & Temperate Crop Cultural Subgroup	Area designed for agricultural production. As of 2025, Altus Air Force Base no longer uses this land for agricultural production.	• Cotton (*Gossypium* spp.) and wheat (*Triticum* spp.)
Temperate Shrub & Herb Developed Wetland Vegetation Cultural Subgroup	Areas with small to moderate slopes used to channelize water from the airfield, promoting the presence of hydrophilic herbaceous plants.	• Common reed (*Phragmites australis*) • Sedges • Cattails
Warm-Season Open Lawn Cultural Subgroup	Herbaceous areas where regular maintenance occurs, including the flightlines, residential, and urban areas.	• Bermudagrass • White clover (*Trifolium repens*) • Common plantain (*Plantago major*)

Table 2-4. Vegetation communities at Altus Air Force Base (CEMML 2019)

Vegetation Community	Community Description	Common Species
Water	Surface water on the installation.	• N/A
Urban	Improved land on the installation.	• N/A

Invasive Species

The most common invasive species at Altus AFB are common reed (*Phragmites australis*), Johnsongrass, Bermudagrass (*Cynodon dactylon*), saltcedar, field bindweed (*Convolvulus arvensis*), and Russian thistle (*Salsola tragus*). Other invasive species present on the installation include Palmer's amaranth (*Amaranthus palmeri*) and Old-World bluestem (syn., yellow bluestem, *Bothriochloa ischaemum*). Invasive aquatic vegetation includes duckweed (Lemnoideae subfamily), which is a management concern in the golf course ponds (D. Kelley, Altus AFB, personal communication, 2024). Section 7.11 further discusses invasive species management.

Pollinator Habitat

97 CES/CEIE established a monarch waystation at the community garden on base. This waystation supports suitable habitat for the monarch butterfly (*Danaus plexippus*), a USFWS-proposed threatened species under the ESA, and other pollinators (Section 2.3.4) that may be present on the base. 97 CES/CEIE plans to establish approximately 22 acres of native prairie and pollinator habitat around the new fishing pond near the community garden to support pollinators such as monarchs and broaden prairie restoration efforts (Section 7.2). Additionally, 97 CES/CEIE plans to establish 6.5 acres of native prairie habitat in the location of the old fishing pond to support pollinators and the Texas horned lizard (*Phrynosoma cornutum*). Section 7.4 and Section 7.7 further discuss pollinator habitat management.

2.3.2.3 Future Vegetation Cover

Jackson County is experiencing an alteration in the composition, distribution, and quantity of vegetation due to the increase in annual average temperatures (Grand et al. 2019). As the region continues to undergo drought conditions and warming temperatures, savanna communities are becoming increasingly common in natural areas. The compounding factors of drought, pests, and anthropogenic disturbance (e.g., agriculture and residential encroachment) are increasing rates of tree mortality. Thus, the quantities of native forest stands in the region are decreasing (Bendixsen et al. 2015). Grassland systems are continuing to diminish in the region due to shrub encroachment, exotic plant introduction, conversion for agriculture, and the loss of necessary drivers of disturbance (i.e., grazing species, wildland fire) to maintain a healthy community (Askins et al. 2007). Changes in vegetation cover would have the greatest impact on specialist wildlife species, such as the western meadowlark (*Sturnella neglecta*), that have historically depended on specific native plant communities for their survival (Dukes and Mooney 1999). Proactive vegetation management can help prevent mission delays that might occur in an increased regulatory environment (Section 7.0).

Moreover, severe storm events coupled with increased duration and intensity of drought will impact plant growth and productivity in the region (Bendixsen et al. 2015). For example, increased drought frequency and increases in precipitation intensity from extreme storm events have led to a loss of vegetative cover on Altus AFB. If this trend continues, it is likely to further reduce soil aggregate stability and thus increase erosion rates. Furthermore, the warmer temperatures and drought may open niches for nonnative invasive

species to expand onto Altus AFB, as invasive species can often outcompete native species that are already experiencing reduced fitness due to environmental stressors (Crowl et al. 2008). Monitoring for changes in vegetative cover and the presence of invasive species (Section 7.11) will be essential tools to inform adaptive management and maintain ecosystem function under these conditions.

Severe storms may also drive shifts in vegetation cover in the future. For example, long-stemmed vegetation is especially vulnerable to damage from hail impacts and winds, which are increasing in extremity in Jackson County (Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024). Maintaining healthy native vegetation will make the installation more resilient to these extreme events. Native trees are well adapted to drought events, surviving better under low soil moisture conditions than do grass species, as they can reduce their leaf area index, close their stomata, and tap deeper water sources; Healthy, native trees are also resilient to increased wind velocity and temperature fluctuations (Baldocchi et al. 2004). Ongoing monitoring and management of urban forest stands will be necessary to increase installation resilience to weather-related impacts. Section 7.7 provides further discussion on urban forestry management to increase installation resilience.

2.3.2.4 Turf and Landscaped Areas

Turf and landscaped areas dominate Altus AFB's overall vegetative cover, as approximately 22.29% of the installation is urban land and 71.3% of the base is comprised of highly maintained vegetative communities (warm-season grasses and recreational open lawn). Bermudagrass dominates improved grounds in developed areas of the installation, including residential areas and the flightline (CEMML 2019). Boxwood shrub species (Buxaceae family) are common in landscaped areas. Trees planted in developed areas include Siberian elm (*Ulmus pumila*), pin oak (*Quercus palustris*), eastern cottonwood (*Populus deltoides*), and sugarberry (*Celtis laevigata*) (Table 14-2). Section 7.7 further discusses the grounds maintenance activities to manage these vegetation communities.

2.3.3 Fish and Wildlife

Altus AFB is home to a diverse variety of wildlife. Many species, particularly bird species, are only briefly present on the installation during migration. Wildlife documented on Altus AFB include 41 mammal, 126 bird, 25 reptile, 8 amphibian, and 66 invertebrate species (Section 14.2.2). A substantial proportion of Altus AFB is developed land, and as a result, some of its wildlife species are reliant on human-associated resources (e.g., artificial habitat, refuse). Thus, they are largely resilient to natural hazards that threaten natural resources. However, as the Altus AFB area continues to experience warmer-than-normal temperatures (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024), habitat loss, and habitat conversion, many species that depend on specific environmental conditions for survival will experience reduced survival and/or fitness (Dukes and Mooney 1999). For example, important roosting habitat for bat species, including the tricolored bat (*Perimyotis subflavus*), is vulnerable to the increased rates of flooding and drought conditions in the region. Several fish and wildlife species have state and federal protections (Section 2.3.4) due to the loss and degradation of habitat from human activity and natural hazards (e.g., drought, increased evapotranspiration rates, severe storm events).

Years with higher-than-normal heat can directly impact fauna by causing physiological stress and indirectly impact them via stress on their habitats. For example, high temperatures reduce water quality and can increase the frequency and severity of algal blooms (Section 2.2.4), impairing the health of fish populations. Above-average temperatures can also increase foodborne and zoonotic diseases (e.g., rabies and West Nile virus), particularly those carried by foxes, rodents, and arthropods (White and Razgour 2020). Warming temperatures are altering the geographic distribution of disease vectors (e.g., mosquitoes [*Culicidae* spp.]

and ticks), extending the season of transmission as well as the area where these vectors reproduce and survive (Becvarik et al. 2023). Moreover, fish and wildlife face increasing pressures from invasive species that are expanding their range and abundance with shifting weather patterns. Invasive species are easily adaptable to environmental stress, thus outcompeting native species that are already vulnerable to the natural hazards occurring (Crowl et al. 2008, Poland et al. 2021).

Below is a discussion of the taxonomic groups present on Altus AFB. Section 7.1 provides additional information on fish and wildlife management.

Mammals

Rodents are some of the most abundant mammals present on the installation. Common species include fox squirrels (*Sciurus niger*) and thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*). Schnell et al. (1998) conducted the first survey to document small mammal species on Altus AFB and SDZ. The researchers set out Sherman live traps in 5 plots at Altus AFB and in 1 plot at SDZ, all baited with a mixture of rolled oats and peanut butter and set out for 3 consecutive nights. The survey documented the North American deermouse (*Peromyscus maniculatus*), hispid cotton rat (*Sigmodon hispidus*), house mouse (*Mus musculus*), white-footed deer mouse (*Peromyscus leucopus*), and fulvous harvest mouse (*Reithrodontomys fulvescens*) at the main base. The white-footed deer mouse was the only small mammal detected at the SDZ (Schnell et al. 1998).

In 2023, 97 CES/CEIE began annual small mammal surveys, setting out traps for a week every spring and fall. That year, 97 CES/CEIE conducted mark-recapture methods to monitor native species populations at the main base and SDZ, and in 2024, they conducted monitoring at just the main base. 97 CES/CEIE captured all species documented by Schnell et al. (1998), as well as the Southern Plains woodrat (*Neotoma micropus*), at the main base. 97 CES/CEIE also documented the hispid pocket mouse (*Chaetodipus hispidus*), fulvous harvest mouse, North American deermouse, plains harvest mouse (*Reithrodontomys montanus*), and house mouse at SDZ for the first time (Altus AFB 2024*i*). During the fall 2023 and spring 2024 surveys, 97 CES/CEIE also caught the northern pygmy mouse (*Baiomys taylori*) at the main base, which is one of the first detections of this species in the region (M. Howery, ODWC, personal communication, 2024; Altus AFB 2024*i*).

Lagomorphs are also abundant on the installation and include the eastern cottontail (*Sylvilagus floridanus*) and black-tailed jackrabbit (*Lepus californicus*). Common medium to large mammals include the coyote (*Canis latrans*), striped skunk (*Mephitis mephitis*), northern raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), domestic (feral) cat (*Felis catus*), nine-banded armadillo (*Dasypus novemcinctus*), white-tailed deer, and Virginia opossum (*Didelphis virginiana*) (USDA–Animal and Plant Health Inspection Service–Wildlife Services [USDA–APHIS–WS] 2024).

There are 12 known bat species at Altus AFB (Table 14-3). In 2017, the University of Montana and Tetra Tech, Inc., conducted an acoustic and mist-net survey at Altus AFB to establish a baseline inventory of bat species on the installation. The study detected 11 bat species via 4 bat detectors and manual confirmation, with the eastern red bat (*Lasiurus borealis*), Brazilian free-tailed bat (syn., Mexican free-tailed bat, *Tadarida brasiliensis*), and silver-haired bat (*Lasionycteris noctivagans*) being the most commonly detected (Hauer and Schwab 2017).

In 2022, 97 CES/CEIE began ongoing monitoring of bat species. In 2023, the installation implemented the 2015 North American Bat Monitoring Program (NABat) acoustic bat monitoring protocol (Loeb et al. 2015), deploying 4 stationary acoustic detectors for 4 consecutive nights each month in June, July, and

August. The acoustic survey provides data on species presence and distribution (NABat 2023). The National Data Processing Lab processes all acoustic recordings using auto-identification algorithms in Kaleidoscope Pro 5.3.9 and SonoBat 4.4 to identify species. The 2022 survey season detected a new species, the evening bat (*Nycticeius humeralis*), at Altus AFB (NABat 2023).

Since April 2024, 97 CES/CEIE and USFWS have been conducting year-round monitoring of bat species. They have stationed 4 bat acoustic monitors throughout the installation: one each at the northern and eastern edges of the airfield, one at a pond at the Windy Trails Golf Course, and one at the forested area just south of the main gate. The detectors are set to start recording 30 minutes before sunset to 30 minutes after sunrise. The USFWS collects and processes all data collected at the stations (D. Kelley, personal communication, 2024). Bat Conservation International further processes data and facilitates archival in the North American Bat Monitoring Database.

Herpetofauna

Amphibian species on base are abundant where they occur; however, most amphibian presence is in the immediate areas surrounding permanent water bodies or vernal pools. Toad species use a greater range of habitats around base. Since 2022, 97 CES/CEIE has been conducting ongoing (every 5 years) herpetofauna surveys on Altus AFB with drift nets and funnel traps to monitor species over time. To date, 97 CES/CEIE has detected the barred tiger salamander (*Ambystoma mavortium*), Plains leopard frog (*Lithobates blairi*), gray treefrog (*Hyla versicolor*), plains spadefoot (*Spea bombifrons*), Blanchard's cricket frog (*Acris blanchardi*), American bullfrog (*Lithobates catesbeianus*), and Woodhouse's toad (*Anaxyrus woodhousii*) (Altus AFB 2022*a*, 2022*b*, 2023*c*).

The most commonly observed reptile species on the installation (in 97 CES/CEIE's herpetofauna surveys, USFWS surveys, and by USDA–APHIS–WS biologists) are the Texas horned lizard (Section 2.3.4), bullsnake (*Pituophis catenifer sayi*), ornate box turtle (*Terrapene ornata*), plain-bellied watersnake (*Nerodia erythrogaster*), and western ratsnake (*Pantherophis obsoletus*) (USFWS 2021*b*, Altus AFB 2022*a*, 2022*b*, 2023*c*; USDA–APHIS–WS 2024).

Birds

Birds are the most speciose vertebrates on Altus AFB. Schnell et al. (1998) established the first records of bird species at the installation, with 68 species in 25 families observed at Altus AFB and 32 species in 16 families observed at SDZ. Since 1998, researchers have surveyed for bird species at Altus AFB during monthly point-count surveys by USDA–APHIS–WS biologists, Christmas Bird Counts, and general observations by 97 CES/CEIE. The 97 CES/CEIE and base personnel opportunistically enter bird data into iNaturalist, a social network platform on which citizens can report bird locations. The most commonly observed species during these surveys are the mourning dove (*Zenaida macroura*), eastern meadowlark (*Sturnella magna*), western meadowlark, scissor-tailed flycatcher (*Tyrannus forficatus*), red-winged blackbird (*Agelaius phoeniceus*), killdeer (*Charadrius vociferus*), dickcissel (*Spiza americana*), barn swallow (*Hirundo rustica*), common grackle (*Quiscalus quiscula*), rock pigeon (*Columba livia*), and European starling (*Sturnus vulgaris*).

Fish

Historically, 97 CES/CEIE has conducted fish surveys at Stinking Creek and the old fishing pond near the Windy Trails Golf Course. However, 97 CES/CEIE did not conduct a fish survey at Stinking Creek in 2024. In summer 2024, 97 CES/CEIE temporarily relocated all fish in the former fishing pond to a pond at the Windy Trails Golf Course before transferring them to the new fishing pond. 97 CES/CEIE collected

stocking records and conducted an inventory when they moved all the fish from the old fishing pond to the golf course pond holding area. Based on these records and inventories, the fish present in the streams and ponds on the installation include hybrid sunfish (*Lepomis macrochirus* X *microlophus* and X *cyanellus*), channel catfish (*Ictalurus punctatus*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), longear sunfish (*Lepomis megalotis*), black bullhead catfish (*Ameiurus melas*), red shiner (*Cyprinella lutrensis*), yellow bullhead (*Ameiurus natalis*), and western mosquitofish (*Gambusia affinis*) (Altus AFB 2023*a*, iNaturalist Community 2024).

97 CES/CEIE conducts annual monitoring of catfish species in installation ponds, capturing and tagging individuals to monitor population abundance and health. In 2023, 97 CES/CEIE tagged 32 catfish individuals. The average weight of catfish captured was 0.83 pounds and the average length was 19.97 inches (Altus AFB 2023*d*).

Invertebrates

Historically, 97 CES/CEIE Water Quality Program Manager conducted quarterly benthic macroinvertebrate surveys at water sources on Altus AFB, documenting the presence of the predaceous diving beetle (Dytiscidae family), Southern Plains crayfish (*Procambarus simulans*), and amphipod crustacean (*Gammarus* sp.) (Altus AFB 2019, 2022*b*, 2023*c*; T. Fleishman, 97 CES/CEIE, personal communication, 2022, 2023).

97 CES/CEIE documents incidental observations of terrestrial invertebrates during monarch surveys and other activities on iNaturalist (iNaturalist Community 2024; Section 2.3.4). Common terrestrial invertebrates on Altus AFB include the western honeybee (*Apis mellifera*), common green June beetle (*Cotinis nitida*), admirable grasshopper (*Syrbula admirabilis*), black swallowtail (*Papilio polyxenes*), black horse fly (*Tabanus atratus*), and western spotted orbweaver (*Neoscona oaxacensis*) (Altus AFB 2019, 2022*b*, 2023*c*; T. Fleishman, personal communication 2022, 2023; iNaturalist Community 2024).

2.3.4 Threatened and Endangered Species and Species of Concern

The ESA of 1973 (16 USC §1531 et seq.) serves to protect and recover species that are nearing extinction and the ecosystems on which they depend. The USFWS administers the ESA, which designates federal T&E species. An endangered species is in danger of extinction throughout all or a significant portion of its range, while a threatened species is likely to become endangered within the foreseeable future (50 Code of Federal Regulations [CFR] 17.3). Candidate species are organisms that the USFWS proposes for listing under the ESA.

Section 7(a)(1) of the ESA mandates all federal agencies to use their respective authorities to conserve T&E species and their habitats through direct management actions and/or by implementing recovery plans through interagency cooperation. If certain biological or physical aspects of a specific area are vital to the survival of a T&E species, the USFWS can designate that area as critical habitat. Critical habitat may require specific management actions, including consulting with the USFWS, to ensure that management actions do not harm the habitat. The USFWS has not designated any critical habitat on Altus AFB.

When feasible and IAW the military mission, state-protected species require similar conservation measures as those afforded to T&E species on an installation (DAFMAN 32-7003, Section 3.38.2). Species in Oklahoma receive conservation consideration under the ODWC's Oklahoma Comprehensive Wildlife Conservation Strategy (OCWCS) when listed as a SGCN (ODWC 2016). The ODWC organized the OCWCS by the state's ecological regions, and Altus AFB is within the Mixed-grass Prairie Region.

The SGCN designation guides conservation measures and programs to protect and preserve the state's biological heritage (ODWC 2016). The OCWCS ranks and designates each SGCN into 3 tiers, based on immediate conservation need and management priority. Tier I indicates that the species has a critical conservation need, Tier II indicates that it has a high conservation need, and Tier III indicates that it has a moderate conservation need (ODWC 2016). SGCN listing provides no regulatory context, the list is meant to be a planning and resource-prioritization tool for conservation management.

As of 2025, there are no T&E species confirmed present on Altus AFB. However, there are 2 proposed T&E species, 4 unconfirmed T&E species, and several SGCN on Altus AFB that are of management concern. Several species are also listed under various conservation programs. For example, the DoD Partners in Flight (PIF) provides a Mission Sensitive Species (MSS) list of birds that have the greatest potential to impact DoD missions if the USFWS lists them under the ESA (DoD 2021). The USFWS identifies additional birds that are likely to become candidates for listing under the ESA as Birds of Conservation Concern (BCC; USFWS 2021*a*). Both BCC and DoD PIF MSS designations provide no legal protection, but they help prioritize vulnerable bird species management. Altus AFB has documented the presence of several of these species.

Additionally, migratory bird species present on Altus AFB receive federal protection from the MBTA of 1918, which prohibits the trading, selling, killing, capturing, or transporting of migratory bird species, including any part, nest, or egg thereof, unless permitted by the USFWS through depredation or salvage permits. All federal actions must strive to minimize such take; however, the DAF is partially exempt from MBTA's incidental take prohibition due to a 2006 Memorandum of Understanding (MOU) between the USFWS and DoD (DoD and USFWS 2006).

IAW that MOU, the DAF must give appropriate consideration to migratory bird protections during the planning and execution of military readiness activities; however, implementing protections must not affect the effectiveness of those activities (DAFMAN 32-7003, Section 3.34.2). The DoD Military Readiness Rule authorizes the incidental take of migratory birds for military readiness activities, given that a NEPA determination states that the proposed readiness action does not have significant effects on a migratory bird population. Migratory birds also receive protection through EO 13186, which mandates the conservation of migratory birds and their habitats, including the prevention or reduction of pollution and severe alteration of their habitat and integrating migratory bird conservation into installation natural resources management when consistent with the BASH Plan (DAFMAN 32-7003, Section 3.34).

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) receive protection from the MBTA and the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA prohibits pursuit, shooting at, poisoning, wounding, capturing, trapping, killing, collecting, molesting, or disturbing bald and golden eagles (including their parts, nests, or eggs) without a permit issued by the Secretary of the Interior (16 USC 668–668c). Altus AFB has not detected any bald or golden eagles at Altus AFB, potentially due to limited suitable habitat on the base. However, the ODWC has recorded bald eagles at the nearby Wichita Mountains Wildlife Refuge (ODWC 2024*a*).

The USFWS-identified BCC species (USFWS 2021*a*) do not legally require special protection (aside from that of the MBTA) but would benefit from monitoring and management to support the recovery that is necessary to avoid an ESA listing. The Altus AFB federal depredation permit limits the take of species on the BCC list to 10 individuals per year.

Presidential Memorandum 14946, *Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators*, affords all pollinators management consideration due to their vital role in sustaining

native habitats. Pollinator species listed under the ESA, MBTA, and/or state laws receive the highest level of protection.

Section 14.1.1 provides a list of all federal legislation that directs the management of listed species on the installation. Section 14.2.2 provides a list of species of management concern with known or potential occurrences at Altus AFB. Below is a discussion of the species of management concern. Section 7.4 includes management actions for these species, and Figure 9 in Tab 7 depicts these species' known locations from surveys and general observations.

Proposed Federally Listed Species

Tricolored bat

The USFWS proposed the tricolored bat as endangered under the ESA on 13 September 2022. This species is also a Tier II SGCN. Researchers detected this species on the installation in 2016 during an acoustic bat survey, with an overall mean activity rate of 0.5 bat passes per night (Hauer and Schwab 2017). The USFWS and 97 CES/CEIE detected the species again in 2023 with an acoustic detector stationed in the forest stand, just south of the main gate (D. Kelley, personal communication, 2024). The tricolored bat is among the many hibernating bat species facing dramatic population declines around the nation due to human disturbance and disease. White-nose syndrome (WNS), a fungal disease impacting hibernating bat species, is a major threat to tricolored bat populations (Frick et al. 2010, Langwig et al. 2015). The disease causes bats to repeatedly rouse during hibernation, which causes them to consume their fat stores and potentially starve (Reeder et al. 2012). The US Geological Survey (USGS) first detected the disease in eastern Oklahoma in 2017. Since then, WNS has spread westward (ODWC 2017). In 2019, ODWC detected the fungal pathogen for the disease in a cave in Washita County, a county adjacent to Jackson County. In 2021, the Texas Parks and Wildlife Department confirmed WNS present in Cottle County and Hardeman County, Texas, approximately 40 miles southeast of Altus AFB (USFWS 2024*i*).

Monarch butterfly

The eastern population of the monarch butterfly is present on the installation during its spring and fall migrations (Altus AFB 2023*c*). In December 2024, the USFWS proposed the monarch butterfly as threatened under the ESA; the agency will issue a formal determination of the listing within a year of the proposal (USFWS 2024*e*). North American populations of the monarch butterfly have substantially declined due to factors such as reduced availability of native milkweed (*Asclepias* spp.), plants on which they depend; loss of overwintering habitat; disease; natural enemies; and broad use of insecticides (USFWS 2020).

In response to the USFWS categorizing the monarch as a candidate species under the ESA from December 2020 to December 2024, Altus AFB implemented management and recovery efforts, when feasible and in support of the military mission, to support national conservation actions for this species (DAFMAN 32-7003, Section 3.38.1). For example, 97 CES/CEIE planted pollinator habitat around the community garden, which includes a variety of native milkweed species that support the survival of monarchs in this area. With the proposed status, the installation will implement additional conservation actions and best management practices (BMPs) for the species in line with the DoD's 7(a)(1) Conservation Strategy for the Monarch Butterfly (Natural Resources Institute 2024). Section 7.4 further discusses these activities.

Other potential species

According to the USFWS Information for Planning and Consultation (IPaC) list of species that are known or expected to be on or near Altus AFB, the federally endangered and Tier III SGCN whooping crane (*Grus*

americana), the threatened and Tier III SGCN piping plover (*Charadrius melodus*), and the threatened and Tier III SGCN rufa red knot (*Calidris canutus rufa*) have the potential to be on Altus AFB (USFWS 2024*b*). In 2024, USGS confirmed the presence of whooping cranes in the area surrounding Altus AFB (USGS 2024). However, since Altus AFB does not contain any habitat that is likely to attract this species, the crane is not likely to be present on the base.

Rufa red knots and piping plovers are known to pass through the state during their spring and fall migration (ODWC 2024*c*). Although both species have the potential to be in Jackson County, researchers have not yet recorded either species in the county to date (USFWS 2024*d*, 2024*f*). The installation has not yet recorded either species on Altus AFB. Fewer than 5 rufa red knots are reported in Oklahoma annually, most of which are reported during fall migration (ODWC 2024*c*). These species prefer to forage on mudflats and sandy beaches, neither of which are on Altus AFB. Both species face threats from reduced prey availability, habitat loss, and habitat degradation (Niles et al. 2009, Escudero et al. 2011, Gratto-Trevor and Abbott 2011)

In 2023, the USFWS proposed the Texas kangaroo rat (*Dipodomys elator*), a Tier II SGCN, for listing as endangered; the species is currently under review by the USFWS. This species may occur at the southernmost boundary of Jackson County, but 97 CES/CEIE has not recorded the species on Altus AFB property (D. Kelley, personal communication, 2024). The USFWS did not include this species on the IPaC list of species that are known or expected to occur on or near the main base or the SDZ (USFWS 2024*h*), and further investigation may be required to confirm or deny its presence (Section 7.4).

Species of Greatest Conservation Need

Section 14.2.2 lists all SGCN on Altus AFB. Altus AFB conducts conservation management for the following SGCN.

Texas horned lizard

Pursuant to OAC Title 800, the Texas horned lizard receives year-round protection from all forms of direct take and commercial activity. The lizard is a Tier I SGCN that is experiencing habitat loss and fragmentation from urban development and agriculture across its native range of Oklahoma (Tucker et al. 2023). This species also faces pressure from the red imported fire ant (*Solenopsis invicta*), which depredates the lizard's hatchlings and displaces its food sources such as the harvester ants (Huerta 2021, Fulton 2023). The red imported fire ant's distribution on Altus AFB is currently unknown; however, Altus AFB is in a USDA Imported Fire Ant Federal Quarantine area (USDA–APHIS–WS 2023). Due to these various pressures, the Texas Parks and Wildlife Department has listed this species as threatened in Texas.

Texas horned lizards are present throughout the installation, especially on the roadway just east and parallel to the airfield. The installation has nicknamed this roadway "Lizard Highway", as surveys often detect the most lizards there during annual surveys (D. Kelley, personal communication, 2024).

Brazilian Free-Tailed bat

The ODWC lists the Brazilian free-tailed bat as a Tier II SGCN that is at risk due to habitat destruction and a loss of prey base from pesticides. WNS does not impact the Brazilian free-tailed bat, as it does other imperiled bats. This species establishes only a few large maternity roosts, and Oklahoma hosts its northernmost maternity roosts. The state has 4 maternity caves that house Brazilian free-tailed bats in the spring and summer as they arrive from their winter range in south Texas and Central Mexico (Ganow et al. 2024). 97 CES/CEIE has documented this species at acoustic monitoring stations throughout the base (Figure 9 in Tab 7; Hauer and Schwab 2017, NABat 2023).

2.3.5 Wetlands and Floodplains

Wetlands and floodplains are categories of water resources that receive regulatory guidance and protection. As discussed in Section 2.2.4, the CWA protects water resources, including wetlands, from impacts that can impair or degrade them. Additionally, EO 11990 requires federal agencies to minimize the destruction, loss, or degradation of wetlands. EO 11988 broadens the scope of protected water resources to include both wetlands and floodplains and requires federal agencies to avoid conducting new development on wetlands. EO 11988 mandates preservation of the inherent benefits provided by floodplains, particularly the 100-year floodplain. The Fish and Wildlife Coordination Act is another federal regulation that provides protection to wetlands and floodplains since wetlands are crucial habitat for a variety of species. This act mandates federal agencies to consult with the USFWS if they plan to affect or modify any stream or waterbody, including wetlands, to minimize impacts to fish and wildlife.

The Oklahoma Conservation Commission is the lead agency for wetland planning and management in the state. The ODWC is responsible for reviewing federal actions that may impact wetlands in the state and is involved with wetland mitigation actions. The Oklahoma Water Resources Board authorizes all Oklahoma water-quality standards and management and administration of water rights for groundwater and streams.

IAW these federal and state regulations, an installation must mitigate potential loss of or impact to wetlands on base. However, wetlands in and around an airfield may create a BASH risk by attracting wildlife, and flight safety is a DAF priority that may require the removal or modification of wetlands IAW regulatory procedures (DAFMAN 32-7003, Section 3.63.3). If an agency is unable to minimize or avoid potential wetland damage or loss, it may purchase wetland credits to compensate for these actions (DAFMAN 32-7003, Section 3.21).

Similarly, installations must minimize potential damage to or within floodplains (DAFMAN 32-7003, Section 3.23). If a proposed action within a floodplain may permanently alter its National Flood Insurance Program flood-hazard delineation, the installation must prepare and submit a recommended map modification to the Federal Emergency Management Agency (FEMA) IAW current agency guidance (DAFMAN 32-7003, Section 3.24).

Section 14.1.1 provides further discussion of federal regulations on wetland and floodplain management. Table 1-1 lists Oklahoma's state-level protections for wetlands.

Wetlands

Wetland jurisdictional delineations define wetlands as areas with specific hydrology, wet (or hydric) soils, and frequent inundation by surface or groundwater, which sustains particular vegetation and aquatic life that require saturated or seasonally saturated soil conditions for survival (USACE 1987). Wetland ecosystems often include marshes, bogs, swamps, wet meadows, river overflows, mud flats, sloughs, and natural ponds (DAFMAN 32-7003).

Wetlands provide an array of biological and hydrological functions, including linear habitat connectivity, thermal refugia for wildlife, stormwater storage, erosion protection, nutrient recycling, groundwater recharge, and water quality improvement. Wetlands also act as natural buffers to terrestrial areas during extreme flooding and storm surge events (Maltby 2013, Nath et al. 2016). Pursuant to DoDI 4715.28, these wetland functions improve an area's ecological resilience to natural hazards.

In 1994, the installation conducted a formal USACE wetland delineation at Altus AFB using 3 types of designations to address wetlands and other aquatic systems that may be subject to jurisdictional permitting under Section 404: System 1, System 2, and System 3 designations (Webb and Aurelius 1994).

System 1 designations are riverine, intermittent streambed systems with permanent, seasonal, or temporary hydrology. These are natural drainages with defined beds and banks that support wetland indicator plant species, although the presence of hydric soils may vary throughout. System 1 areas occur in channelized portions of Stinking Creek, as well as in unnamed tributaries and natural drainages that connect to that creek. Grounds maintenance personnel routinely mow and maintain many of these drainages. Small, intermittent, oxbow-like, isolated patches of wetland within these beds are jurisdictional wetlands that are subject to Section 404 regulations. Plant species commonly observed within these isolated wetlands are threesquare bulrush (syn., common threesquare, *Scirpus pungens* var. *pungens*) and common spikerush (*Eleocharis palustris*).

System 2 designations identify palustrine, emergent, persistent systems that may have temporary or seasonal hydrology or seasonally saturated soils. Altus AFB contains 4 of these areas, which are larger, more easily distinguishable sites that may be subject to Section 404 regulatory review as special aquatic sites (i.e., wetlands). Common species observed in these systems include rescuegrass (*Bromus catharticus*), cheatgrass (*Bromus tectorum*), and common spikerush.

System 3 designations are riverine, intermittent, streambed systems with seasonal, permanent, or temporary hydrology. Altus AFB contains 8 System 3 areas of maintained canals: 2 of these areas have permanent hydrology, 4 areas have seasonal hydrology, and 2 areas have temporary hydrology. These areas include constructed drainages and well-defined canal systems that provide drainage for base facilities and experience various levels of routine maintenance. A small portion of the System 3 areas support emergent vegetation within a defined bed that consists primarily of cattails. These systems directly connect to natural drainages that cross the base through historical uplands, and thus, they are not regulated under Section 404. Jurisdictional limits to adjacent WOTUS for these systems normally end at the connection to natural tributaries and historical wetlands (Webb and Aurelius 1994)

The USACE classified 6 excavated areas on Altus AFB as palustrine, unconsolidated bottom aquatic sites that may have semi-permanent hydrology. These areas are percolation ponds for facility treatment systems or ponds used for irrigation for the base golf course. Section 404 does not regulate artificial ponds.

The USFWS' National Wetlands Inventory provides up-to-date wetland information for Altus AFB. The National Wetlands Inventory identifies roughly 26.15 acres of wetlands on Altus AFB (Figure 10 in Tab 7), excluding creeks, irrigation canals, and drainage swales; there are no documented wetlands on SDZ (USFWS 2019).

Wetland ecosystems are experiencing resounding impacts from increases in air and surface water temperatures, alterations in the magnitude and seasonality of precipitation and runoff, and shifts in the reproductive phenology and distribution of plants and animals (Sievers et al. 2018). Despite their natural resilience, these ecosystems experience alterations from natural hazards, including increased frequency and severity of inundation events.

Floodplains

EO 11988 defines floodplains as lowlands and relatively flat areas that connect inland and coastal waters and are subject to a 1.0% or greater chance of flooding in any given year (DAFMAN 32-7003). Floodplains provide space to accommodate floodwaters from stream overflow after heavy rain events. The USGS (2018) categorizes the probability of a flood into 2 types:

- 100-year floodplain: a flood that statistically has a 1.0% probability of occurring in any given year
- 500-year floodplain: a flood that statistically has a 0.2% probability of occurring in any given year

DAFMAN 32-7003 encourages installations to use FEMA's National Flood Insurance Program maps to determine if a proposed action occurs in a floodplain. However, Altus AFB uses inundation models developed by Colorado State University (CSU) because up-to-date FEMA models are not available (DAFMAN 32-7003, Section 3.22). According to FEMA guidelines, FEMA considers the installation's most recent 100-year and 500-year FEMA flood maps as outdated since the maps were from 2012. FEMA performed a review of the CSU-generated flood maps and endorsed the models and methodology used (CSU 2020).

CSU (2020) generated 100-year and 500-year floodplain mapping for Altus AFB with high-quality spatial data and 2D hydraulic modeling. CSU generated the flood maps for stream channels within or adjacent to the installation based on land cover data, soil type, depth to water table, slope, percent imperviousness, infiltration rates, and elevation data over the contributing watershed. CSU's modeling did not include stormwater infrastructure (CSU 2020). The modeling determined that floodplains on Altus AFB surround Stinking Creek and the creek's unnamed tributaries. Most of the floodplains are within unimproved and semi-improved areas, as well as the airfield grounds (Figure 11 in Tab 7).

CSU's (2020) floodplain analyses projected the following flooding impacts for Altus AFB:

- Maximum flood depth may be 1.8 feet for the 100-year storm and 1.9 feet for the 500-year storm.
- Maximum flood velocity may be 1.3 feet/second for the 100-year storm and 1.4 feet/second for the 500-year storm.
- Maximum shear stress on the local terrain due to flooding may be 0.2 pounds/square foot for the 100-year storm and 0.1 pounds/square foot for the 500-year storm.

Altus AFB has not yet conducted a formal survey to inventory floodplains at SDZ. CEMML adapted FEMA data from a 1998 Flood Insurance Rate Map analysis in Harmon County (FEMA 2012) to generate 100-year and 500-year floodplain maps for the GSU. This adaptation of the data on SDZ property shows that only a 100-year floodplain is present along the primary tributary running through the property (Figure 12 in Tab 7).

Based on these floodplain evaluations, Altus AFB is highly vulnerable to flooding, a threat that is exacerbated by off-base development (Section 2.1.5) and natural hazards (Section 7.16). Floodplains in the Jackson County area are vulnerable to the various risks posed by natural hazards. Increased severity of storm events in the region is placing increased stress on these floodplain systems that are naturally meant to dissipate flood waters. However, increasing drought conditions have limited natural stream flow in the areas and are disconnecting the stream channels from the floodplains, leading to incised streams (Tockner et al. 2008, VanBuskirk et al. 2023). Incised channels do not have the capacity to distribute flood flow onto the floodplain, resulting in increased flood velocity as the water moves through a channelized, deep channel, augmenting the risk of flooding and downstream flow on Altus AFB. Section 2.4.1 discusses the impact of flooding on the military mission. Section 7.6 describes management actions to mitigate the impacts of natural hazards on floodplains and wetland ecosystems.

2.3.6 Other Natural Resource Information

This section is not applicable to this installation.

2.4 Mission and Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Natural resources management may constrain military operations. Natural resource constraints to the mission include any natural features that restrict current mission needs, future development, and mission expansion at Altus AFB. Natural resource constraints at Altus AFB include BASH risk and the presence of floodplains, wetlands, waterways, and species of management concern (Figure 13 in Tab 7).

The primary natural resources constraint to the mission on Altus AFB is associated with BASH risk (Section 7.12). The installation has a higher annual strike rate than any other AETC wing due to its low-level flight operations, particularly with C-17 aircraft, and its location within the Central Flyway, which results in a high proportion of strikes with nighttime flights during bird migration (A. Kohler, USDA–APHIS–WS, personal communication, 2024). Controlling wildlife species near the runway is necessary to ensure the protection of personnel and aircraft (Altus AFB 2020*c*).

The presence of wetlands, floodplains, and water resources on base limit mission expansion and operations (Section 2.2.4, Section 2.3.5). Any proposed action that will occur or could adversely affect WOTUS, including wetlands and floodplains, will require full compliance with an Environmental Impact Analysis Process (EIAP) under NEPA, CWA, EO 11990, and EO 11988. Due to the proximity of waterways on the installation and the potential for pollution of stormwater runoff, any construction activity that disturbs at least 1 acre of land must obtain a stormwater discharge permit from ODEQ. Moreover, removing or negatively impacting wetlands for mission expansion requires the purchase of wetland mitigation banking (DAFMAN 32-7003, Section 3.21). The removal of wetlands may also impact Altus AFB's ability to follow ODEQ's water quality standards and potentially increase flood risk, as wetlands help mitigate pollutant runoff and reduce flooding severity.

Flooding is a major mission constraint since most of the installation, particularly the airfield, is within the 100-year and 500-year floodplains (Figure 11 in Tab 7). Riverine flooding and flash-flooding is common in Jackson County, particularly during heavy rain events (Jackson County Department of Emergency Management 2024). Flash-flooding is a risk to the area because the flat terrain causes rapid runoff during and following heavy rains, especially in systems with poor drainage (Jackson County Department of Emergency Management 2024).

The presence of species of management concern incurs federal and state regulations on Altus AFB. IAW the ESA, Altus AFB must use its authority to conserve and strive to minimize all impacts to species of management concern, their populations, and their habitats (Section 2.3.4). When compatible with their mission, installations must extend similar conservation measures for SGCN as they would for T&E species (DAFMAN 32-7003, Section 3.38). The ESA requires consultation with the USFWS, via an EIAP, when proposed or ongoing actions have the potential to affect T&E species (DAFMAN 32-7003, Section 3.40). These consultation measures reduce the likelihood of regulations affecting, prohibiting, or slowing down mission operations and planning.

Well-planned development at Altus AFB will help mitigate potential conflicts between mission expansion and natural resources present on the installation. The integration of the INRMP with the Installation Development Plan and other component plans will ensure stakeholders and project proponents understand the current risks and limitations with mission expansion at Altus AFB. Effective planning, coordination, and site design will ensure Altus AFB remains in compliance with the numerous state and federal regulations that protect the installation's natural resources.

2.4.2 Land Use

DAFMAN 32-7003 classifies grounds on the installation into 3 categories based on the level of maintenance conducted: unimproved, semi-improved, and improved grounds. The main base is approximately 4,093 acres, a significant portion of which is improved and semi-improved grounds (Figure 14 in Tab 7).

Improved land includes buildings and other permanent structures that require ongoing, intensive grounds maintenance. This land use type includes areas for aircraft operations and maintenance; military training; medical, administrative, and industrial facilities; housing; community services; and the airfield. About two-thirds of the improved land on Altus AFB consists of the airfield (USAF 2014), which requires intensive grounds maintenance to reduce BASH risk (Section 7.12). Altus AFB organizes improved land into compatible land uses. The installation consolidated industrial facilities at the southern edge of the installation, and operations and maintenance areas are located along the flightline. Commercial and service-based land uses are centrally located. Privatized military family housing is located in the northwest portion of the base.

Semi-improved grounds undergo periodic maintenance for operational reasons such as reducing BASH risk or erosion and dust control. This land use classification includes areas adjacent to taxiways, aprons, runways, runway clear zones, munition ranges, and golf course roughs. Grounds maintenance personnel mow these areas less often than improved grounds.

Unimproved land includes open space such as croplands, grazing lands, forest lands, lakes, ponds, and wetlands (DAFMAN 32-7003, Section 3.58.2). Open space occurs predominantly along the northeastern border of the base and at the southern edge of the family housing area, north of the main gate.

The 960-acre SDZ consists of approximately 10.55 acres of improved grounds, 921.52 acres of semi-improved grounds, and 22.5 acres of unimproved grounds (Figure 15 in Tab 7).

2.4.3 Current Major Mission Impacts on Natural Resources

This section describes current mission operations that directly or indirectly affect natural resources on the installation. Direct impacts from mission operations include air, water, and noise pollution, wildlife impacts (e.g., BASH), land use changes, and loss of habitat. Indirect mission impacts to natural resources include Environmental Restoration Program (ERP; formerly Installation Restoration Program) activities and hazardous waste generation.

Erosion

Land management practices and development that affect soil integrity cause erosion and sediment loss on Altus AFB. Construction activities that cause land disturbance constitute the primary avenue of potential erosion and sedimentation damage at Altus AFB (Altus AFB 2023*e*).

Erosion can be a major management concern for the installation's groundwater and surface water sources, including wetlands. Bank erosion and sediment buildup is evident in all streams on the installation. Lack of vegetation along streams and drainage ditches may expose soils to erosion by wind or rain, which can cause sediment buildup in stormwater drainage systems and degrade the water quality of local waterways (Section 7.5). Stormwater runoff can also aggregate sediment in surface waters, particularly in impervious ground-cover areas where development has caused disturbance or soil exposure (Müller et al. 2021).

Water Pollution Sources

Primary sources of water pollution at Altus AFB include petroleum, oil, and lubricant (POL) leaks and spills during aircraft refueling and emergency maintenance activities, aqueous film forming foam (AFFF) discharged during fire prevention and maintenance activities, and aircraft/runway de-icing fluids (Altus AFB 2023*e*). These pollutants are exposed to stormwater mainly on aprons and taxiways, and they have the potential to enter the storm sewer system and contaminate receiving waterways. From 2019 to 2022, Altus AFB documented 13 significant spills and leaks of oil or hazardous substances that occurred in areas exposed to stormwater or that drained to a stormwater conveyance. Altus AFB also recorded 3 additional significant spills from AFFF and a spill from a bioreactor overflow with vinyl chloride.

As discussed in Section 2.2.4, Altus AFB has an ODEQ-issued Multi-Sector General Permit that authorizes the discharge of stormwater from industrial areas at the installation (Altus AFB 2023*e*). The Stormwater Pollution Prevention Plan (SWPPP) outlines all stormwater management initiatives for Altus AFB (Altus AFB 2023*e*). Under the SWPPP, 97 CES/CEIE conducts quarterly visual assessments of stormwater discharges that drain industrial areas of the base. The SWPPP also establishes routine facility inspections and annual comprehensive site inspections to ensure compliance in areas where stormwater may become exposed to industrial materials, including the flightline, maintenance shops, bulk fuel storage, motor pools, and scrap metal and waste recycling facilities.

Moreover, the SWPPP outlines the monitoring requirements for impaired waterbodies, including Stinking Creek, which the ODEQ listed on the 2022 Oklahoma 303(d) list of Impaired Waterbodies for the State of Oklahoma due to high quantities of total suspended solids and turbidity (ODEQ 2022). IAW the CWA, after initial identification of *Enterococcus* bacteria, *Escherichia coli*, fecal coliform, pathogens, and total coliform in 2008, ODEQ established TMDLs for each pollutant to mitigate further impairment to the water body. Altus AFB must comply with these TMDLs by conducting pollution prevention measures to protect water resources on the installation (Section 7.5).

Hazardous Waste

The 1976 Resource Conservation and Recovery Act defines hazardous waste as solid waste (or a combination of solid waste and other waste) that, because of its concentration, amount, or physical, chemical, or infectious characteristics, may cause severe damage to human or environmental health if improperly treated, stored, disposed of, transported, or otherwise managed. Base operations generate several types of hazardous waste, including oils and fuels, cleaning compounds, paints and solvents, batteries, and mercury and lead foil.

IAW the Resource Conservation and Recovery Act, Altus AFB maintains a Hazardous Waste Management Plan that guides proper management of hazardous waste generated on base (Altus AFB 2024*j*). The installation collects all hazardous waste from satellite accumulation points for 90-day storage in a central accumulation point facility before transportation to an approved disposal facility off-base. Proper hazardous waste storage and disposal is vital to reduce spill probability. Spills present a particularly high risk to wetlands, which contain significant biological diversity and provide critical habitat for many types of plants and animals.

Littered or improperly contained solid waste also contributes to environmental degradation. Waste often accumulates in drainage swales and transports to off-base waterways via stormwater runoff. To protect water resources from potentially hazardous waste spills, Altus AFB has a Spill Prevention, Control, and Countermeasure Plan (Oneida Total Integrated Enterprises [OTIE] 2024*b*) and a Facility Response Plan

(OTIE 2021). These plans provide guidance to prevent oil discharges or hazardous material releases into navigable WOTUS.

The ERP identified 39 areas on the installation that contain contaminants from hazardous waste spills or disposal activities that may pose environmental health risks. As of 2025, 29 of these sites are in active remediation, and the installation has closed 10 sites. The ERP investigates, cleans up, and ultimately closes out such sites in an effort to protect the environment and human health. Altus AFB must conduct long-term groundwater monitoring at some sites for the ERP to consider those sites for closure. Monitoring wells are located around the sites where contamination possibly occurred. To date, Altus AFB has conducted cleanup at 15 sites, and 14 sites are still undergoing corrective actions (North Wind Resource Consulting 2024).

Air Pollution Sources

Various industrial activities at Altus AFB generate air emissions that release pollutants and have the potential to impact air quality. Altus AFB's mission of operating heavy-type aircraft requires frequent training flights, which require maintenance, fire protection, and fueling, all of which contribute to emissions. Altus AFB currently operates under a minor source permit from the ODEQ, and the 97 CES/CEIE Air Quality Program Manager monitors all air emissions (Altus AFB 2024*d*). Emission sources on the installation include mobile sources such as aircraft, automobiles, munitions, and grounds maintenance equipment (e.g., for herbicide/pesticide application) and stationary sources such as aboveground storage tanks, power generation, fire training exercises, fueling operations, painting operations, welding operations, and woodworking facilities.

IAW DAFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, Altus AFB conducts an annual air emission inventory to quantify air pollutant emissions from each source and calculate the installation's total air emission amount. The 2023 air emission inventory confirmed that regulated air emissions on the installation are well below the permitted limits. However, from 2022 to 2023, carbon monoxide and nitrogen oxide emission quantities increased due to longer emergency run times for emergency generator engines (OTIE 2024*a*). Since Altus AFB emits less than 25,000 metric tons of carbon dioxide equivalent per year in combined emissions from combined sources, the installation does not have to submit an annual greenhouse gas report to ODEQ or the US EPA under its Mandatory Reporting Rule (OTIE 2024*a*).

Airfield Vegetation Management

Sustained airfield operations requires active airfield vegetation management, as vegetation can attract wildlife in search of forage or cover. To mitigate BASH risk, the installation must maintain airfield vegetation in a manner that discourages wildlife presence (Section 7.12). Thus, grounds maintenance contractors maintain vegetation on the airfield at a height between 7 to 14 inches (Altus AFB 2020*c*). To maintain a uniform vegetation community, the installation minimizes woody and broadleaf vegetation, ornamental landscaping, and bare ground on the airfield. However, these management actions have the potential to negatively impact the installation's natural resources, as the majority of the installation is composed of the airfield. Maintaining a monoculture vegetation stand on the airfield limits floral biodiversity, and thus faunal biodiversity, on the installation. Biodiversity is key for the viability and function of ecosystems, which helps Altus AFB comply with the ESA, MBTA, CWA, and other state and federal environmental regulations (Cardinale et al. 2012). Moreover, restoration of indigenous prairie grass species, which would support the SGCN-listed Texas horned lizard (Section 2.3.4), is not feasible in these areas.

2.4.4 Potential Future Mission Impacts on Natural Resources

Future impacts to natural resources on Altus AFB will be similar to the current impacts discussed in Section 2.4.3. New impacts to natural resources may occur during a mission change and may include infrastructure development. For example, from 2026 through 2030, 7 military construction projects may occur:

1) Construction of an additional aircraft taxiway with parking space
2) Construction of a multipurpose aircraft maintenance hangar
3) Construction of a new fitness center
4) Construction of 3 operational support facilities to house military personnel and their administrative functions
5) Construction of an entry-control facility (Main Gate) with a designated access road, visitor's center, and vehicle inspection area
6) Renovation of existing South Gate facilities (North Wind Resource Consulting 2024)
7) Construction of solar farms

Mission expansion and infrastructure development may require NEPA review to evaluate potential impact to natural resources. An ESA Section 7 Consultation with the USFWS may be necessary to assess potential impacts of a project on species of management concern that are known to or may occur on the base.

Future development on and surrounding Altus AFB may negatively affect native plant and wildlife communities if not carefully planned and reviewed. Development may also impact the installation's wetlands, floodplains, and stormwater management systems. Expansion into open space may impact natural resources through land conversion, vegetation alteration, wildlife displacement, and potential contamination. Development on open space creates habitat loss and fragmentation, which may reduce biodiversity on the installation. Vegetation removal and increased impervious land cover have the potential to increase soil erosion and flooding impacts.

Additionally, development in wetlands and floodplains may exacerbate flooding issues on the installation (Section 7.5, Section 7.16). For example, between 2025 to 2027, Altus AFB plans to replace the existing electrical substation through a series of construction and demolition actions that would take place over 6 to 8 months (North Wind Resource Consulting 2024). Under NEPA, Altus AFB conducted an EA that determined that the project would not cause significant impacts to the human environment. However, the project site is within the 100- and 500-year floodplains of the unnamed tributary of Stinking Creek. The project would adversely affect 0.3 acres of the 100-year floodplain from the placement of about 2,280 cubic yards of clean fill, which would permanently raise the surface elevation of the area. The EA determined that this potential long-term adverse effect on the 100-year floodplain is minor, as the small project site is a small percentage of the entire 100-year floodplain. Furthermore, the affected floodplain area is relatively well drained and may not impact adjacent surface water bodies (North Wind Resource Consulting 2024). IAW the CWA, EO 11900, EO 11988, and the Rivers and Harbors Act, any impacts to wetlands will follow the approved DAF protocols, permits, and project consultations (Section 2.2.4).

The project construction and demolition actions would include earthwork, leveling, soil compaction, and trenching, which may expose soils that are more susceptible to water and wind erosion. Moreover, excavation and backfill actions may alter the soil structure and composition, impairing normal soil function. The project also includes the risk of accidental release of contaminants or disturbance of existing contaminants in local soils and surficial groundwater. Overall, the potential impacts to groundwater and soil quantity and quality would be short-term and minor (North Wind Resource Consulting 2024).

Ongoing natural hazards, such as extreme weather events, loss of vegetation, and erosion, may threaten the resiliency of the mission at Altus AFB into the future. Section 7.16 provides further discussion of the impacts of these natural hazards to Altus AFB's mission.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The DAF environmental program adheres to the Environmental Management System framework and its "Plan, Do, Check, Act" cycle for ensuring mission success. EO 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*; DoDI 4715.17, *Environmental Management Systems*; DAFI 32-7001, *Environmental Management*; and International Organization for Standardization 14001 standard, *Environmental Management Systems—Requirements with guidance for use*, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the environmental management systems (EMS) framework.

The Natural Resources Program employs EMS-based processes to achieve compliance with all legal obligations and current policy drivers, effectively manage associated risks, and instill a culture of continual improvement. The INRMP serves as an administrative operational control that defines compliance-related activities and processes.

4.0 GENERAL ROLES AND RESPONSIBILITIES

Table 4-1 lists the general roles and responsibilities that are necessary to implement and support the Natural Resources Program. Specific natural resources management-related roles and responsibilities are in appropriate sections of this plan.

Table 4-1. Roles and responsibilities for implementing the Altus Air Force Base Natural Resources Program

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander, 97th Air Mobility Wing (97 AMW/CC)	• Approves and signs the Integrated Natural Resources Management Plan (INRMP), or delegates the signature, at least every 5 years • Chairs the Environment, Safety, and Occupational Health Council • Controls access to and use of installation natural resources • Ensures compliance with natural resources laws • Ensures funding and staffing are sufficient for INRMP implementation
Air Force Civil Engineer Center (AFCEC)	• Reviews revised INRMP • Reviews and disburses funding to implement INRMP projects • Provides Department of the Air Force natural resources budget guidance and program natural resources projects into the Air Force Civil Engineer System
AFCEC Natural Resources Media Manager/Subject Matter Expert (SME)/Subject Matter Specialist	• Provides base-level guidance and technical assistance to ensure Natural Resources Program execution is in accordance with the Sikes Act and other regulatory requirements • Advocates for resources required to implement the INRMP • Provides and manages interagency agreements, contracts, and cooperative agreements in support of INRMP implementation

Table 4-1. Roles and responsibilities for implementing the Altus Air Force Base Natural Resources Program

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Natural Resources Manager/Point of Contact (97 Civil Engineer Squadron/Installation Management Environmental [97 CES/CEIE])	• Oversees the Natural Resources Program and plans, coordinates, and implements natural resource projects • Oversees the Cultural Resources Program and plans, coordinates, and implements cultural resources projects • Maintains the INRMP and Integrated Cultural Resources Management Plan and ensures regulatory compliance • Provides technical advice on natural resources • Reviews installation plans, project proposals, and work requests to ensure INRMP and regulatory compliance and evaluate potential impacts to natural resources • Coordinates Section 7 Consultation with the US Fish and Wildlife Service (USFWS)
Installation Engineering	• Stormwater/erosion control design • Construction project design • Community planning
Installation Security Forces	• Enforces access and use restrictions to DoD assets • Provides security for Altus Air Force Base (AFB)
Installation Unit Environmental Coordinators (see Department of the Air Force Instruction 32-7001 for role description)	• Manages the Environmental Element • Serves as the Point of Contact for the Environmental Element installation unit • Ensure the Environmental Element with environmental requirements
Installation Airfield Management Flight	• Airfield grounds management • Runway clear zone management
Installation Wildland Fire Program Manager	• Coordinates with Air Force Wildland Fire Branch, Wildland Support Module on all wildland fire matters • Coordinates the annual Wildland Fire Management Plan update and annual review • Assists in the planning and implementation of prescribed burns on Altus AFB

Table 4-1. Roles and responsibilities for implementing the Altus Air Force Base Natural Resources Program

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Pest Manager	• Oversees pest control operations and management services • Develops and implements the Integrated Pest Management Plan • Responsible for control of nuisance wildlife species
Range Operating Agency	• Not applicable
Conservation Law Enforcement Officer	• Not applicable; the Oklahoma Department of Wildlife Conservation (ODWC) Jackson County Game Warden enforces state regulations regarding fish and wildlife and outdoor recreation
National Environmental Policy Act/Environmental Impact Analysis Process (NEPA/EIAP) & Water Quality Program Manager	• Ensures NEPA compliance for all Altus AFB activities by analyzing the effects of proposed federal actions that have the potential to significantly affect environmental quality and ensures documentation and disclosure of potential impacts • Maintaining the Stormwater Pollution Prevention Plan to guide the responsible management of industrial stormwater pollution in drainage areas located within the installation boundary
National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service	• Not applicable
United States Department of Agriculture (USDA)	• Implements the 97th Air Mobility Wing Bird/Wildlife Aircraft Strike Hazard Program and nuisance wildlife control, pending coordination and available funding
USDA, Forest Service	• Provides technical advice on urban forest management • Reviews and signs the installation Tree City USA application annually

Table 4-1. Roles and responsibilities for implementing the Altus Air Force Base Natural Resources Program

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
USFWS	• Reviews and signs the INRMP during annual and 5-year reviews • Consults with 97 CES/CEIE on projects that may affect species listed under the Endangered Species Act (ESA) under USFWS management • Provides advice and assistance on natural resources management and projects at Altus AFB • Acts as the regulatory authority for the ESA and the Migratory Bird Treaty Act • Assists in the identification of threatened or endangered species and their habitats
ODWC	• Reviews and signs the INRMP during annual and 5-year reviews • Provides advice and assistance on natural resources management at Altus AFB • Helps identify Species of Greatest Conservation Need protected by the state • Is responsible for reviewing Altus AFB annual wildlife report and administering annual permits
United States Army Corps of Engineers, Tulsa District	• Has authority over wetland management and delineation

5.0 TRAINING

DAF installation NRMs/Points of Contact (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.

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- NRMs at Category I installations such as Altus AFB must take the DoD Natural Resources Compliance course that is endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval Civil Engineer Corps Officers School. See https://www.denix.osd.mil/cecos/conservation/nrc/ for 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 (https://www.blm.gov/learn/national-training-center).
- Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and they 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 DAF 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. 97 CES/Pest Management (97 CES/CEOI) and USDA–APHIS–WS personnel receive training in wildlife control techniques and receive a USDA license for pesticide application.
- Personnel supporting the BASH program should receive flightline drivers training, training in the identification of bird species occurring on airfields, and specialized training in the use of firearms and pyrotechnics as appropriate for their expected level of involvement.
- The DoD supported publication, *Conserving Biodiversity on Military Lands—A Handbook for Natural Resources Managers* (Leslie et al. 1996), 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 installation personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success, per DAFMAN 32-7003. 97 CES/CEIE maintains training records IAW Section 6.0. Below are key natural resources management-related training requirements and programs.

Installation-specific Training

Below are key natural resources management-related training requirements and programs:

- Annual National Military Fish and Wildlife Association conference
- Annual Urban Prairie Workshop held at Tinker AFB
- Wildland Fire Training held at Tinker AFB

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

The installation maintains required records IAW Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposes of records IAW the Air Force Records Management System records disposition schedule. The installation maintains numerous types of records to support implementation of the natural resources program. The installation identifies specific records in applicable sections of this plan, in the *Natural Resources Playbook*, and in referenced documents.

The NRM maintains natural resource records on eDASH and on the 97 CES shared drive network. 97 CES/CEIE uploads avian data to the DoD Avian Knowledge Network (AKN), submits bat data on NABat, and shares monarch butterfly tagging data with Monarch Watch, a volunteer-based citizen science organization. 97 CES/CEIE also documents data from research-grade plant and wildlife observations made by personnel and citizen scientists in the Altus AFB project on iNaturalist. 97 CES/CEIE maintains some natural resource records as hard copy documents in the program's office and submits an annual report to ODWC in compliance with permitting requirements.

6.2 Reporting

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

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Natural resources-related reporting consists of the following:

- Annual INRMP review summary (NRM submits reports to USFWS, ODWC, AFCEC, and installation stakeholders)
- Annual Scientific Collection Report and Letter of Authorization renewal (NRM to ODWC)
- Annual report and renewal of the MBTA depredation permit (USDA–APHIS–WS to USFWS and NRM)
- Annual Depredation Report Form 3-202-9 (USDA–APHIS–WS to USFWS and NRM)
- Semi-annual natural resources environmental quality Data Call (NRM to AFCEC's Environmental Directorate via the DAF's Enterprise Environmental Safety & Occupational Health Management Information System database)
- Semi-annual Natural Resources Program assessment (NRM to 97 CES via Management Internal Control Toolkit database)
- Prescribed fire reports (Joint Base San Antonio [JBSA] Wildland Support Module [WSM] to Air Force Wildland Fire Branch [AFCEC/CZOF])
- Wildfire reports (Altus AFB Fire and Emergency Services [FES] or WSM to AFCEC/CZOF)

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. This section describes current management practices, including common day-to-day management practices and ongoing special initiatives, for each applicable program area used to manage existing resources. Certain sections identify program elements that do not exist on the installation and are thus not applicable, providing a justification, as necessary.

7.1 Fish and Wildlife Management

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

97 CES/CEIE conducts fish and wildlife management activities in a manner that is consistent with the military mission and compliant with applicable environmental laws and regulations (DAFMAN 32-7003, Section 3.31). The goal of fish and wildlife management is to support the miliary mission by maintaining or improving ecosystem integrity and landscape resiliency through biodiversity conservation (DAFMAN 32-7003, Section 3.10.2). Management activities focus on creating and improving natural habitat to maintain viable native wildlife populations. Section 7.4 discusses the management of species of management concern.

97 CES/CEIE ensures coordination of fish and wildlife management with the BASH program, grounds maintenance, urban forest management, and other land management programs so that that the various natural resources management actions mutually support the military mission. The NRM collaborates with ODWC, USFWS, and USDA–APHIS–WS during project planning and wildlife monitoring (DAFMAN 32-7003, Section 3.31). If applicable, proposed actions that have the potential to affect fish and wildlife populations and habitat at Altus AFB undergo an EIAP and NEPA process. The Jackson County Game Warden enforces compliance with state conservation regulations at Altus AFB (Section 7.3).

Fish and Wildlife Monitoring

Data collected from fish and wildlife monitoring inform natural resource management decisions and help evaluate proposed activities for environmental impacts. High-quality survey data help 97 CES/CEIE maintain or reestablish viable populations of native species when practical and consistent with the military mission. 97 CES/CEIE maintains an ODWC Letter of Authorization for the NRM, and any seasonal or permanent employee of Altus AFB working directly with the NRM, to engage in the following activities involving native wildlife:

- Collect/voucher macroinvertebrate and fish samples on and in the immediate vicinity of the installation to assess water quality in water sources.
- Collect/voucher invertebrates, mammals, reptiles, and amphibians, including individuals that 97 CES/CEIE finds deceased, for the purpose of education outreach.
- Live-trap, mark, and release small mammals to improve the understanding of rodent diversity and population dynamics.

- Capture, handle, tag, and release Texas horned lizards (Section 7.4) on Altus AFB property to evaluate local movement, abundance, and microhabitat selection.
- Capture, handle, and release bats on Altus AFB property for ongoing monitoring.

The handling and collection of wildlife provides valuable data for regional-specific population dynamics and provides specimens for public outreach (Section 7.15). 97 CES/CEIE must submit an annual report to ODWC of all collected specimens, including animals captured and held in temporary possession, to maintain and renew this authorization (ODWC 2024*b*).

In addition to the Letter of Authorization, 97 CES/CEIE conducts various fish and wildlife surveys to inform responsible management actions. These surveys provide information on species occurrence on Altus AFB and can provide basic distribution information. The current surveys do not support population trend assessment, as that type of analysis would require standardized surveys with replication and sufficient sample sizes, which would necessitate additional staffing.

97 CES/CEIE began conducting small mammal surveys in the winter and spring of 2023. Surveys use mark-recapture to inventory small mammal species on the main base and SDZ and will continue twice per year (spring and fall). During fall 2023 and spring 2024, surveys captured the northern pygmy mouse on the main base. This was a new species detection for this region of Oklahoma. Ongoing monitoring of small mammal populations will contribute to an understanding of this and other species, including any potential range shifts in the future (Section 7.1.1).

IAW DAFI 34-101, 97 CES/CEIE monitors game fish populations in support of recreational fishing on the installation. 97 CES/CEIE stocks channel catfish in the fishing pond each spring for an annual fishing derby (Section 7.2; DAFMAN 32-7003, Section 3.32). The ODWC provides conservation law enforcement support and assists anglers as needed. In 2023, 97 CES/CEIE stocked the former 1.88-acre fishing pond with 500 bluegill, 200 redear sunfish, and 500 pounds of catfish purchased from Dunn's Fish Farm. 97 CES/CEIE also released 4 nonbreeding triploid grass carp to assist with algae control in the pond (Altus AFB 2023*a*). In 2023, the USFWS stocked approximately 1,500 catfish from a USFWS fish hatchery into the former pond. Beforehand, the USFWS determined that no invasive zebra mussels (*Dreissena polymorpha*) were present in the stock (Altus AFB 2023*a*). In spring 2024, 97 CES/CEIE stocked 2,000 pounds of catfish at the former fishing pond in preparation for the annual fishing derby.

Quality aquatic survey data can also support other components of natural resources management, including water resources protection (Section 7.5) and invasive species management (Section 7.11) (DAFMAN 32-7003, Section 3.10.2). Environmental deoxyribonucleic acid (eDNA) surveys can more efficiently and effectively identify all species present in a water source. Sampling for eDNA can also provide data on water quality and help identify any invasive species present in the water sources. This is especially helpful for species such as zebra mussels, which are hard to detect, particularly in their final larval stage (Laramie et al. 2015).

In support of the BASH program, 97 CES/CEIE and USDA–APHIS–WS biologists conduct ongoing monitoring and assessment of wildlife species on the installation. The USDA–APHIS–WS biologists conduct monthly dawn, midday, and dusk bird point-count surveys. They also conduct nighttime mammal surveys once a month on the airfield and golf course using thermal imaging. Monthly avian surveys contribute to local bird population and habitat use information as well as the monitoring and assessment of migratory bird populations IAW the MBTA (Section 7.4) and BASH program (Section 7.12).

The NRM oversees wildlife monitoring projects conducted by USFWS, which include reptile and amphibian surveys. 97 CES/CEIE is conducting herpetofauna surveys every 5 years. In 2022, 97 CES/CEIE

and the USFWS used drift fences and funnel traps to inventory herpetofauna species on the installation. 97 CES/CEIE confirmed 16 species, including 5 species documented on the installation for the first time: the western narrow-mouthed toad (*Gastrophryne olivacea*), spotted chorus frog (*Pseudacris clarkii*), six-lined racerunner (*Aspidoscelis sexlineatus*), prairie kingsnake (*Lampropeltis calligaster*), and Graham's crayfish snake (*Regina grahamii*). 97 CES/CEIE will conduct the next herpetofauna survey in 2027.

Bats are important to monitor because they provide imperative ecosystem services by controlling insects and pollinating plants (Kunz and Reichard 2011) and they pose a moderate BASH risk on the installation (Section 7.12). As mentioned in Section 2.3.3, 97 CES/CEIE actively monitors bats at Altus AFB through acoustic surveys. The 97 CES/CEIE and the USFWS are planning to conduct ongoing mist-net surveys in tandem with the acoustic surveys. This ongoing survey effort provides data on population demographics, health, and breeding status. Researchers can conduct a WNS assessment while processing bats caught in the mist-net, contributing to the nationwide and regional understanding of the disease as it spreads westward. Monitoring and assessment of bat species are necessary to support their conservation, as hibernating bat species face increasing threats from WNS, habitat loss and degradation, and pesticide use.

The DoD has emphasized the importance of conserving pollinators, including bat species, on military installations. The DoD has an MOU with Bat Conservation International to collaborate on surveys to identify, document, and maintain bat populations and their habitats on DoD installations. Increased bat monitoring will contribute to well-informed management decisions if population declines lead to federal listing. For example, the USFWS and 97 CES/CEIE detected the hoary bat (*Lasiurus cinereus*) on the installation via acoustic monitoring, and in April 2023, the USFWS added this species to the National Listing Workplan for ESA-listing consideration in 2027. Thus, this bat could become federally regulated as a T&E species under the ESA.

To support the current survey efforts targeting specific taxonomic groups, establishing acoustic recording units (ARUs) throughout the installation will allow for year-round data collection on vocal animals, including bats, herpetofauna, and birds. 97 CES/CEIE can establish the ARUs at the existing bat acoustic detector stations, as well as around the airfield and water sources. Year-round data collection on species presence will assist with understanding seasonal variation in species presence to support effective management actions and the BASH program (Section 7.12).

Fish and Wildlife Habitat Creation and Enhancement

Habitat enhancements and protection help sustain viable populations of native wildlife. Habitat management on the installation includes increasing pollinator habitat, restoring prairie and riparian habitat, and removing exotic and invasive plants.

Per Presidential Memorandum 14946, the installation should implement habitat restoration projects for pollinators when possible since pollinators play a critical role in maintaining native habitats. 97 CES/CEIE partners with the USFWS and USDA Natural Resources Conservation Service (NRCS) to plan pollinator habitat projects on the installation. For example, in 2021, 97 CES/CEIE and NRCS collaborated on the establishment of a 600-square-foot patch of pollinator habitat outside of the community garden by planting over 280 native forbs and grasses. Monarch Watch certified this space as a monarch waystation, indicating that the patch contributes to monarch conservation by containing enough milkweed, nectar sources, and cover to sustain monarchs throughout their yearly cycle of reproduction and migration. 97 CES/CEIE continuously maintains this habitat and adds native pollinator grasses, shrubs, and forbs each year.

Table 14-2 lists all species planted in the pollinator patch since its creation. 97 CES/CEIE added the following species to the waystation in 2023 and in 2024:

- 180 seedlings of the following species were grown from seed indoors and transplanted to the garden: eastern purple coneflower (*Echinacea purpurea*), lemon beebalm (*Monarda citriodora*), big bluestem, purple lovegrass (*Eragrostis spectabilis*), wild four-o'clock (*Mirabilis nyctaginea*), common buttonbush (*Cephalanthus occidentalis*), wild bergamot (*Monardo fistulosa*), eastern prickly pear (*Opuntia humifusa*), Azure blue sage (*Salvia azurea*), little bluestem, white heath aster (*Symphyotrichum ericoides*), aromatic aster (*Symphyotrichum oblongifolium*), butterfly milkweed (*Asclepias tuberosa*), lanceleaf tickseed (*Coreopsis lanceolata*), and long-headed coneflower (*Ratibida columnifera*)
- NRCS seed mix of Indian blanket (*Gaillardia pulchella*), alfalfa (*Medicago sativa*), Engelmann's daisy (*Engelmannia peristenia*), plains coreopsis (*Coreopsis tinctoria*), blackeyed Susan (*Rudbeckia hirta*), lemon beebalm, Illinois bundleflower (*Desmanthus illinoensis*), partridge pea (*Chamaecrista fasciculata*), and Maximilian sunflower (*Helianthus maximiliani*)

97 CES/CEIE is expanding pollinator habitat on the installation through native mixed-grass prairie restoration. 97 CES/CEIE is converting 22 acres of open space surrounding the new fishing pond to mixed-grass prairie habitat. Once filled in, 97 CES/CEIE will also convert 6.5 acres around the old fishing pond to pollinator habitat. 97 CES applied prescribed fire in 2022 and 2023 (Section 7.9) to start a natural fire regime and remove all current vegetation, including invasive species (i.e., Johnsongrass, Bermudagrass). This space contains the largest acreage on the installation that is feasible for prescribed burns. Sustaining this native habitat type requires frequent disturbance from a fire regime (Zouhar 2021), and prairie wildlife will likely benefit from fire regimes and removal of exotic vegetation.

In June 2025, 97 CES/CEIE and 97 CES/CEOI collaborated to remove existing vegetation with herbicide. In spring 2026, the USFWS will help seed the area with mixed native grasses and pollinator species. 97 CES/CEIE is partnering with USFWS and NRCS to plant a mix of drought-tolerant and flood-tolerant native mixed-grass prairie species (D. Kelley, personal communication, 2024). All grassland restoration activities must adhere to the following grassland restoration BMPs outlined in the DoD's 7(a)(a) Conservation Strategy for the monarch butterfly (Natural Resources Institute 2024):

- Increase native milkweed and other flowering plants in monarch breeding areas. Plant locally appropriate milkweed species.
- Increase native flowering plant abundance and diversity along migration routes that bloom during the time of migration.
- Eliminate invasive plant species, especially nonnative milkweed, to limit the spread of monarch diseases and parasites (e.g., *Ophryocystis elektroscirrha*). Do not plant nonnative milkweed such as tropical milkweed (*Asclepias curassavica*) or balloon plant (*Gomphocarpus physocarpus*).
- Include a minimum of 9 total native flowering plant species, including 3 species per blooming period (April to June; August to October), in seed mixes.
- Locally source all seeds for planting. Contact the NRCS, Xerces Society, and/or Monarch Joint Venture for regional-specific planting and native plant guidance.

In addition to providing natural beauty and landscape diversity, restoring native prairie areas on the installation will support pollinators and other native wildlife. According to the OCWCS SGCN, the loss and degradation of mixed-grass prairies is a primary cause of decline for the northern bobwhite (*Colinus virginianus*), loggerhead shrike (*Lanius ludovicianus*), and burrowing owl (*Athene cunicularia*). This habitat restoration will include additional BMPs for erosion control and herbicide application, as established in the SWPPP and IPMP (Tab 5), to protect the prairie habitat.

According to the 1994 Presidential Memorandum, *Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* (60 Federal Register [FR] 40837), pollinator-friendly native landscaping must minimize the use of pesticides harmful to pollinators through integrated vegetation and pest management practices. To avoid damage to the new pollinator habitat, instead of conducting vehicle fogging to control mosquitoes, the 97 CES/CEOI treats the pond water with larvicide dunks. Collaboration with the 97 CES/CEOI and Environmental Public Health unit (Section 7.11) to instate these protocols within and adjacent to the pollinator areas are necessary to ensure the survival of pollinators that will maintain and enhance the new mixed-grass prairie habitat.

Plans for future habitat enhancement also include controlling exotic and invasive species (Section 7.11) and restoring riparian zones on the base to better control erosion and flooding and benefit aquatic species (Section 7.6).

Nuisance Wildlife and Wildlife Disease

DAFMAN 32-7003 defines nuisance wildlife as wildlife that impedes mission operations, damages property, or endangers public safety and health to the degree that necessitates control measures. This classification excludes wildlife species protected under the ESA or MBTA. The objectives of nuisance wildlife control on Altus AFB are to minimize negative effects to the mission, including human safety concerns, BASH issues, infrastructure damage, and ecosystem degradation. Depending on the species, techniques used for wildlife control include exclusion, hazing, trapping, shooting, chemical control, and environmental manipulation.

IAW EO 13112 and EO 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, the installation continuously deters or removes nuisance wildlife from the installation to minimize their economic, ecological, and human health impacts. The 97 CES/CEOI and 97th Air Mobility Wing Flight Safety Office (97 AMW/SEF) are equally responsible for nuisance wildlife control. The 97 CES/CEOI maintains an IPMP, which includes guidance for nuisance wildlife control on the installation (Section 7.11). USDA BASH staff control nuisance vertebrate species that affect flight operations, as guided by the BASH Plan (Tab 2), to reduce potential BASH risk (DAFMAN 32-7003, Section 3.36.2). The NRM ensures the INRMP, IPMP, and BASH Plan are mutually supportive and annually reviews the application to renew the BASH depredation permit (DAFMAN 32-7003, Section 3.36.1.3).

All nuisance control actions that affect migratory birds or ESA-listed species require a USFWS permit (DAFMAN 32-7003, Section 3.36.1.1). An interagency agreement between USDA–APHIS–WS and ODWC facilitates the extirpation or trapping of nuisance wildlife. USDA provides an annual summary of depredation actions to ODWC. The installation must bury any nuisance wildlife carcasses on the base. The 97 CES/CEOI does not lethally control any state-protected vertebrate species without coordination with USDA. The Bioenvironmental and Public Health unit conducts mosquito trapping and virus testing and submits fogging requests to Pest Management. The 97 CES/CEOI prioritizes control of species that pose a greater risk to human health and species that create issues in workplace buildings (Section 7.11).

Common nuisance wildlife on Altus AFB include birds that roost and defecate on buildings, rodents and insects that infest facilities and equipment, and feral dogs (*Canis lupus familiaris*) and cats (*Felis catus*) that roam the installation. Various mammal species cause damage to infrastructure by burrowing and denning. The 97 CES/CEOI and USDA–APHIS–WS biologists live-trap feral cats and dogs and call animal control to transport them to the local animal shelter. The NRM and USFWS occasionally trap and relocate nuisance snakes in base housing.

Larger mammals occasionally present a physical threat to human safety on the installation. Coyotes are commonly managed as a nuisance species, as their abundance in and around the airfield is a BASH concern. USDA–APHIS–WS biologists manage all coyote monitoring and removal. An increase in coyote presence occurs during the spring period when coyotes give birth to pups, as there are likely denning sites in the middle of the airfield. When installation personnel observe a coyote on the airfield, all airfield operations must stop until USDA can either haze or lethally remove the individual off the airfield (A. Kohler, personal communication, 2024).

Because coyotes are clever and strongly attracted to unoccupied habitats and exogenous resources provided by humans, management actions need to be thoughtful and sustained. USDA–APHIS–WS biologists can help keep coyotes off the airfield by regularly using heavy hazing. Ensuring that trash is not accessible to coyotes or rodents (coyote prey) is also important. 97 CES/CEIE and USDA–APHIS–WS biologists should also investigate the denning location on the airfield.

A major objective of nuisance management at Altus AFB includes managing MBTA-protected Mississippi kites (*Ictinia mississippiensis*) at the golf course. This species migrates through the area in the spring, nesting in almost every tree at the golf course until late summer. Due to their aggressive territorial behavior at their nesting sites, 97 CES/CEIE receives reported incidences of Mississippi kite attacks on pedestrians every year. Per the Golf Environmental Management (GEM) Plan (Tab 3), the USDA–APHIS–WS and golf course maintenance personnel are conducting habitat management to discourage Mississippi kite presence and nesting opportunities IAW the MBTA, EO 13186, and the Migratory Bird Conservation Act. In winter 2021, the installation removed dead trees and limbs that created ideal Mississippi kite nesting and perching habitat from areas where pedestrian attacks were common. The USFWS and 97 CES/CEIE also assigned a hazard score and a condition assessment during the 2024/2025 tree inventory to determine which trees may require removal or trimming. This facilitates the removal of trees available for kite nesting and promotes safety at the golf course (Section 7.7).

No wildlife diseases are known to be on Altus AFB; however, numerous species on base, including Norway rats (*Rattus norvegicus*), are known to carry zoonotic diseases that present a threat to human health. In 2022, the NRM and USFWS captured snakes on the installation to test for snake fungal disease, a North American pathogen that reduces reproductive output and physiological function in snakes, but they did not detect the disease (Allender et al. 2023). Many zoonotic pathogens exhibit seasonal trends associated with variations in temperature and precipitation. Transmission of zoonotic pathogens, such as malaria and rabies, between wildlife and humans increases during periods of extreme heat and humidity (Zhang et al. 2024).

The installation should continue to conduct regular surveys to document changes over time, including the spread of invasive species within important habitats. Ongoing fish and wildlife monitoring will continue to be important, as populations may have varying responses to habitat loss and degradation (Ehrlén and Morris 2015). A species' response to a weather-related event is unpredictable, partially due to genetic variation within subpopulations, which helps certain populations adapt better than others. Researchers have already observed behavioral changes, such as adjusting food sources, in some animals (Ozgul et al. 2010, Iwamura et al. 2013).

Adaptive management will be necessary to responsibly manage fish and wildlife populations during natural hazard events, which may imperil flora and fauna species and lead to state or federal listings, thus increasing the regulatory burden on the installation. Adaptive management uses data from ongoing monitoring efforts to guide responsible management actions for the preservation of imperiled species. For example, ongoing monitoring of the bat species on the installation will provide population demographic and habitat data that

may be necessary as bat species face increasing pressures from disease and habitat loss. Management plans should be flexible enough to adapt to changing fish and wildlife concerns (Crowl et al. 2008).

7.2 Outdoor Recreation and Public Access to Natural Resources

Installation Supplement

Applicability Statement

This section applies to all DAF 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 provide the multipurpose use of natural resources, including hunting, fishing, and other natural resources-based outdoor recreation activities, when consistent with the military mission (DAFMAN 32-7003, Section 3.4.1.3). IAW DAFI 34-101, Altus AFB strives to support the military mission by providing outdoor recreational opportunities to improve morale and enhance the quality of life for people who live and work on the installation.

The 97 FSS Outdoor Recreation Center manages outdoor recreation opportunities at Altus AFB (DAFMAN 32-7003, Section 3.56). The 97 FSS offers a variety of outdoor trips and activities including hikes, bike rides, rock climbs, fishing trips, and paintball and archery tournaments. The organization also provides rental items for camping, hunting, fishing, gardening, biking, and paintball tournaments. The 97 FSS maintains a 1-acre plot of land known as FamCamp, located just north of the main gate, which provides tent campsites and full-hookup recreational vehicle (RV) sites with water, electrical, and sewer hookups (Figure 16 in Tab 7). Additionally, the 97 FSS oversees a plot of camping and RV sites at Quartz Mountain State Park for use by military personnel.

The NRM collaborates with the Community Planner and 97 FSS when planning for new outdoor recreation opportunities at Altus AFB to ensure all activities are consistent with the INRMP and the DAF mission. 97 CES/CEIE aims to provide for and promote the sustainable multi-purpose use of natural resources by enhancing existing outdoor recreation areas, providing sustainable opportunities for natural resources-based outdoor recreation, and improving aesthetic value by planting native trees, shrubs, grasses, and forbs.

DAFMAN 32-7003 organizes outdoor recreation areas by classes that are based on recreation potential and ecosystem sustainability: Class I (developed), Class II (dispersed), or Class III (special interest areas). Class I recreation areas accommodate intensive activities such as sports, RV camping, picnicking, and the use of paved trails. Developed recreation areas at Altus AFB include a running track, sports fields/courts (volleyball, baseball, softball, football, soccer), playgrounds, 18-hole golf course, miniature golf course, archery range, and 2 outdoor saltwater swimming pools. Class I areas also include the FamCamp and a 1-acre picnic area. Altus AFB also contains a paved walking trail that passes through the housing area and Windy Trails Golf Course, which is maintained by Balfour Beatty Communities, the organization that manages the private base housing. There is another walking trail (3-mile Altus Perimeter Trail) around the airfield, and the installation plans to construct a walking path around the new fishing pond to promote Watchable Wildlife opportunities.

Class II dispersed recreation areas are suitable to support activities such as hunting, fishing, birdwatching, primitive camping, boating, hiking, and Watchable Wildlife opportunities. The base does not contain areas for mountain biking or off-road vehicle use. 97 CES/CEIE and the 97 FSS Outdoor Recreation Center will

consider available areas of open space for the creation of nature paths, fishing ponds, and wildlife viewing areas. 97 CES/CEIE hosts a 1-day dove hunt event annually and maintains a pond for recreational fishing.

Class III special-interest recreation areas contain valuable archaeological, botanical, ecological, geological, historical, zoological, or scenic features that warrant special protection and access control. Altus AFB does not contain any Class III recreation areas.

The aesthetics of the natural resources on the installation may be impaired as native vegetation communities shift, facilitating the establishment of unattractive invasive species. Moreover, the nonnative trees on the golf course are not adapted to the increasingly hot, dry landscape, and they are more susceptible to insect infestation. The combination of drought, hot and dry extreme summers, and insect infestations are leading to mass die-offs of trees (Section 7.7).

Access and Participation

DAFMAN 32-7003 (Section 3.32.3.1) designates 3 basic access categories for installations:

1) Open Areas: unrestricted areas where the installation permits all participants, including the public, to partake in hunting, fishing, trapping, and outdoor recreation
2) Restricted Areas: areas designated by the 97th Air Mobility Wing Commander (97 AMW/CC) in which only certain categories of participants, or under special conditions as defined by the Commander, can partake in hunting, fishing, trapping, and outdoor recreation
3) Off-Limits Areas: areas designated by the 97 AMW/CC as being off limits to recreational hunting, fishing, trapping, and dispersed outdoor recreation by any person at any time due to mission security and safety concerns

Altus AFB does not contain any Open Areas. All outdoor areas on the installation are Restricted Areas, with the exception of the flightline and CMA's around the airfield, which are Off-Limits Areas accessible only to personnel with special security clearance due to mission security concerns regarding military aircraft operations. Restricted Areas on Altus AFB are open to Active-Duty military personnel, dependents, and family members; DoD civilians and civilian retirees; disabled veterans; military retirees, employees of installation prime contractors; and civilians enlisted in the National Guard and Reserve that are not on active duty.

Altus AFB does not charge fees for hunting, fishing, or outdoor recreation access. Outdoor recreation is not available to the public due to installation security requirements; the entire installation has a fence line, so people must enter a security gate, and only those with a Common Access Card and escorted individuals may have access. Access designations will not change during Normal, Alpha, or Bravo Force Protection Conditions (FPCON). During FPCON Charlie or Delta, gate closures may affect installation access, as the installation will limit entry to essential personnel. The 97 AMW/CC may authorize controlled access for special events to certain public groups.

The impacts of natural hazards may affect the health and safety of recreationalists. Increasing temperatures and precipitation favor disease vectors such as mosquitoes (Section 7.11) and ticks (Léger et al. 2013) and may affect the seasonal patterns and range of vector-borne diseases. For example, warmer temperatures increase the risk of human exposure to West Nile virus, as drought conditions and milder winters accelerate mosquito development, biting rates, and incubation of the disease within mosquitoes (Hahn et al. 2015).

Fishing and Hunting

Hunting and fishing are generally consistent with the DoD principles for ecosystem management and biodiversity (DAFMAN 32-7003, Section 3.32.1). The installation manages limited hunting and fishing to provide consumptive outdoor recreation opportunities to boost morale for base personnel (DAFI 34-101). The installation limits participation to DoD cardholders with base access. The NRM oversees all hunting and fishing activities to ensure that they are IAW all federal and state laws. ODWC provides voluntary assistance to help manage hunting and fishing programs. ODWC Game Wardens and biologists assist with planning and implementation of dove hunts and fishing derbies.

Altus AFB does not have hunting or trapping seasons due to a lack of unimproved landscape suitable for this purpose. However, the base implements a 1-day annual dove hunt around the airfield (Figure 16 in Tab 7) to boost morale for base personnel while targeting species that have a high BASH risk (Section 7.12). The target species are mourning doves, which are the most commonly struck species on Altus AFB; white-winged doves (*Zenaida asiatica*); Eurasian collared doves (*Streptopelia decaocto*); and rock pigeons. The latter are invasive species that do not have a bag limit. The event also includes a clay target shooting station that is set up by ODWC personnel. The Jackson County Game Warden or USDA BASH biologist provides a safety brief to the hunters. Participants of the hunt must abide by all federal and state hunting laws and regulations and must carry a current state hunting license and a Harvest Information Program (HIP) permit. The NRM coordinates with the 97th Security Forces Squadron (97 SFS) and Airfield Management during dove hunt planning to meet security and safety requirements. The Occupational Safety office may provide a risk assessment for the event. The SDZ contains suitable dove habitat and open space to hold a dove hunting event; however, 97 CES/CEIE does not currently have the resources to implement a hunt at this location.

In 2022, Altus AFB began using RecAccess, an online outdoor recreation access management system, for its annual dove hunts. The installation uses RecAccess to issue hunting permits, track recreational user access to the installation, provide interactive mapping, collect harvest reports, and announce rules, open and restricted areas, and safety guidelines to authorized participants. All public users can access the RecAccess Altus AFB web page (https://altusafb.recaccess.com) without logging in to view specific outdoor recreation information and installation permits added by the NRM.

Recreational fishing is a common outdoor recreation activity at Altus AFB. 97 CES/CEIE established the new 2.5-acre fishing pond (15 feet deep) in 2025 in the open space adjacent to Excellence Park, just south of base housing (Figure 16 in Tab 7). The new pond increases recreational fishing opportunities and poses less of a BASH risk, as it is in a more populated location, away from the airfield. To promote multi-purpose use of the new pond, 97 CES/CEIE is establishing a fishing dock and a walking path around the pond.

97 CES/CEIE stocked the new pond with the new fish, including fish from the former pond. Commonly stocked species include hybrid sunfish, channel catfish, longear sunfish, and bluegill. Anglers must have a state fishing license and abide by ODWC state fishing regulations and base-specific rules. Base regulations are more restrictive than state regulations; the method of take is rod and reel only, with a maximum of 2 rods per person. The daily creel limit is set at 2, and the size limit is 12 inches for channel catfish. The daily creel limit for sunfish species is 10, and largemouth bass, if stocked, are catch-and-release only.

To celebrate Earth Day, 97 CES/CEIE implements a free fishing derby each April. If ODWC sanctions the event as a fishing clinic, the agency does not require derby participants to have a state fishing license. 97 CES/CEIE stocks channel catfish each spring to facilitate this event. 97 CES/CEIE tags 10 fish prior to the event, and anyone who catches a tagged fish wins a prize, as does the angler with the heaviest catch. ODWC

Game Wardens provide a safety briefing and filet fish (when available) for participants to take home (Section 7.15).

The health of game fish species will require ongoing monitoring to maintain recreational fishing opportunities. 97 CES/CEIE routinely surveys the pond to support responsible management of fish populations and maintain suitable habitat for fish survival and reproduction. The Water Quality Program Manager also samples and analyzes the water quarterly to assess water quality.

As the region continues to experience increasing air and water temperatures (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024) that may impair water quality, the health of fish populations can be compromised (Section 7.1). Monitoring fish species over time will support continued angler opportunities and maintain functioning ecosystems.

Community Garden

In 2021, 97 CES/CEIE established a community garden at Excellence Park for base personnel and families to have an outdoor space to easily grow their own food and to facilitate community involvement (Figure 16 in Tab 7). The 3,000-square-foot garden contains 32 plots within 8 raised beds (4-feet by 16-feet) and a shaded seating area for gardeners. Gardeners are responsible for the raised beds they rent; 97 CES/CEIE is responsible for maintaining the garden overall, including adding soil to the raised beds and maintaining the pollinator patch surrounding the garden.

97 CES/CEIE collects annual plot rental fees in the Reimbursable Conservation Program account, which is an account used to purchase supplies for wildlife and habitat management. The establishment of the adjacent pollinator patch not only benefits native pollinator and invertebrate species (Section 7.1) but also improves garden yield. 97 CES/CEIE installed gutters on the shed at the garden to collect rainwater into a barrel for watering plants during winter, when the water lines are inaccessible. Based on the protocols and experience establishing this garden, 97 CES/CEIE contributed to a public guide on developing a community garden on a military installation (Root et al. 2022). 97 CES/CEIE also started a garden club to boost community morale and share gardening tips.

When 97 CES/CEIE created the garden, they also established compost bins at the garden and in the 97 CES building to collect organic waste for gardening use. However, due to staff and time limitations, 97 CES/CEIE no longer weekly collects food waste, nor adds compost to enrich the soil at the pollinator patch. Composting bins are still not operational, and the compost bin at the garden has become polluted with trash. Restarting the compost system will not only aid Altus AFB's solid waste load, but will improve garden yield.

Maintaining and enhancing the community garden entail fixing the drip irrigation system that waters the pollinator patch, staining the fence that surrounds the garden, adding more pollinator plants, and repotting the raised beds with vegetables or flowers. Due to the time limitations of the NRM, a Natural Resources technician, stationed at Altus AFB from October 2024 to October 2025, will lead these garden maintenance activities.

7.3 Conservation Law Enforcement

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

The 97 AMW/CC is responsible for the enforcement of state and federal laws for the protection and management of natural and cultural resources on DAF installations (DAFMAN 32-7003, Section 3.33). The Sikes Act authorizes the DoD to enforce federal natural resources laws on federal land on military installations through the Conservation Law Enforcement Program, under the authority of DoDI 5525.17, *Conservation Law Enforcement Programs* (DAFMAN 32-7003, Section 3.33.1). Altus AFB does not have its own Conservation Law Enforcement Officer program due to its small size and limited fishing and hunting programs.

IAW the Sikes Act (16 USC § 670a(d)), DoDI 5525.17, DoDI 4715.03, and DoDI 4715.16, installations can coordinate with the appropriate agencies to support conservation law enforcement pertaining to natural and cultural resources use and management on the base (DAFMAN 32-7003, Section 3.33.1). The ODWC Game Warden of Jackson County has base access to patrol fishing and hunting areas and enforce compliance with state regulations. If illegal activities involving natural resources on base occur, 97 CES/CEIE will notify the Game Warden. The 97 SFS may enforce base-specific hunting and fishing rules that are more restrictive than state regulations.

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

Installation Supplement

Applicability Statement

This section applies to DAF installations that have T&E species on DAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Pursuant to the ESA Section 7(a)(1), Altus AFB instates conservation measures of federally listed T&E species and their habitats (DAFMAN 32-7003, Section 3.38). When practical and consistent with the military mission, 97 CES/CEIE employs an ecosystem management strategy for the protection and recovery of T&E species and SGCN (DAFMAN 32-7003, Sections 3.38.1 and 3.38.2).

In 2025, 97 CES/CEIE and the USFWS conducted a basic reconnaissance survey to determine the presence of any suspected federally listed faunal T&E species or SGCN on the installation (DAFMAN 32-7003, Section 3.39). These surveys aimed to identify all wildlife taxa on the installation, including protected invertebrates, herpetofauna, fish, mammals, and birds. Although there are no T&E species confirmed present on Altus AFB, the USFWS and the ODWC assist 97 CES/CEIE with the management of 2 proposed T&E species (monarch butterfly and tricolored bat) and several SGCN, respectively, on the installation. Section 14.2.2 provides a list of the 2 proposed T&E species, 4 unconfirmed T&E species, and several SGCN on Altus AFB.

97 CES/CEIE manages these proposed T&E species and SGCN through ecosystem management techniques to enhance their resiliency to the impacts of natural hazards, including habitat loss and degradation, thermal and water stress, and invasive species competition (Section 7.1). Evidence of species adaptations to changes in habitat and food availability, seasonal patterns, or other factors will inform future management actions to ensure compliance with the ESA. Ongoing monitoring of species of management concern is necessary

to ensure responsible management actions are taking place in light of the increasing vulnerability from natural hazards.

Threatened and Endangered Species Management

On 12 December 2024, the USFWS proposed the monarch as threatened under the ESA (USFWS 2024*e*). The USFWS will issue an official listing decision in December 2025. The USFWS and DoD developed the DoD's 7(a)(1) Conservation Strategy for the Monarch Butterfly (Natural Resources Institute 2024) to detail how the DoD will continue to use its authorities to conserve monarchs and abate the impacts of identified threats to monarchs. Supporting and enhancing monarch habitat also contributes to conservation of other pollinators likely to occur in the region, such as the American bumble bee (*Bombus pensylvanicus*), which is an SGCN and under review for federal listing (Section 14.2.2).

Pursuant to that strategy and the DoD Pollinator Conservation Strategy and Reference Guide (Armed Forces Pest Management Board 2018), ongoing participation in monarch monitoring will support compliance with the ESA. In fall 2022, the NRM began tagging monarchs on Altus AFB as part of the Monarch Watch Tagging Program, an international community science effort to collect data on monarch migration through mark-recapture efforts (Monarch Watch 2024). During fall migration, 97 CES/CEIE captures monarchs via fine-scale nets and tags them with numbered tags. As of November 2024, Altus AFB has tagged 54 monarchs and identified the sex of most of these individuals. 97 CES/CEIE shared all tag data with Monarch Watch, contributing to an international database on the dynamics of monarch migration, including information about the origin of butterflies that reach Mexico, changes in geographic range, migration mortality, and migration timing and pace.

Additionally, Monarch Joint Venture, in collaboration with the Environment for the Americas, implemented Integrated Monarch Monitoring Program surveys on the installation in 2024. The survey report includes:

- Adult monarch presence/absence
- Monarch egg and larval densities
- Milkweed diversity, stem density, and abundance
- Milkweed species preferences
- Adult nectaring preferences
- Flowering plant diversity and abundance
- Impact of conservation actions on monarch habitat quality

As agricultural and urban use has converted much of the land in the region (Section 2.1.6), maintaining nutrient-rich, pollinator-friendly habitat will promote survival of this species during its long migration. All monarch habitat management actions must follow the BMPs outlined in the DoD's 7(a)(1) Conservation Strategy for the Monarch Butterfly (Natural Resources Institute 2024). Successful maintenance of pollinator habitat on the installation requires collaboration with the 97 CES/CEOI and Bioenvironmental Health Unit for responsible pesticide application (Section 7.11). These efforts, and expansion of pollinator habitat on the installation such as around the new fishing pond, ensure Altus AFB is proactively managing in anticipation of a potential future ESA listing while also contributing to the conservation efforts outlined in Presidential Memorandum 14946.

Altus AFB consults with the USFWS when proposed installation activities may affect a listed species or designated critical habitat (DAFMAN 32-7003, Section 3.40.1). On 18 December 2024, the USFWS issued a Biological Opinion, concurrence, and conference opinion of the DAF's proposed activities related to flight operations and BASH program activities at 32 installations, including Altus AFB, IAW Section 7 of the ESA (USFWS 2024*a*). The Biological Opinion evaluated 4 primary potential effects of DAF flight

operations on listed species and their habits including (1) aircraft strikes, (2) auditory and visual disturbances from flight operations, (3) habitat disruption or modification, (4) changes in air and water quality. The Biological Opinion determined that the ongoing and proposed DAF flight operations at the 32 installations are not likely to jeopardize the continued existence of any of the species analyzed. The listed species analyzed in this Biological Opinion pertinent to Altus AFB include the whooping crane, rufa red knot, piping plover, and tricolored bat. Altus AFB is required to submit an annual report to the USFWS related to this Opinion.

T&E species with the potential to occur on Altus AFB and/or at the SDZ include the tricolored bat, Texas kangaroo rat, whooping crane, rufa red knot, and piping plover (USFWS 2024*b*). To maintain compliance with the ESA, Altus AFB monitors for the proposed endangered tricolored bat and SGCN Tier II Brazilian free-tailed bat via stationary acoustic surveys. Researchers have confirmed the presence of these protected species on Altus AFB (Hauer and Schwab 2017, NABat 2023, USDA–APHIS–WS 2024). Further proactive research, such as manual capture, will provide 97 CES/CEIE with a greater understanding of population dynamics and health. 97 CES/CEIE will pursue active collaboration and participation in regional and national conservation efforts, such as continuing to share data with Bat Conservation International, USFWS, ODWC, and NABat (DAFMAN 32-7003, Section 3.31). This collaboration will be especially important for listed bat species, as they are highly sensitive to changing environmental conditions (Jones et al. 2009). Tricolored bat habitat management is described in the Brazilian free-tailed bat management section below.

97 CES/CEIE also monitors the Texas kangaroo rat, as the species has the potential to be at the SDZ. However, since small mammal trapping at the SDZ began, 97 CES/CEIE has not yet detected the Texas kangaroo rat. In December 2024, 97 CES/CEIE and the NRM at Fort Sill conducted Texas kangaroo rat surveys at SDZ, but that trapping effort did not detect the species either. 97 CES/CEIE and the USFWS aim to conduct an additional survey with improved trapping methods to increase trapping success. IAW the ESA, conducting surveys specifically targeting this species will help determine the species presence on Altus AFB (DAFMAN 32-7003, Section 3.39). Making this determination will have profound effects on the potential management of SDZ, as the WFMP (Tab 1) has established a prescribed burning plan for the GSU to sustain the native habitat. Moreover, the determination will ensure that Altus AFB is in compliance with the ESA and that proper procedures, such as Section 7 Consultations with the USFWS, are occurring.

Altus AFB has not yet documented the whooping crane on the installation. Since 2017, the USGS, USFWS, and Canadian Wildlife Service have been monitoring whooping crane movement in the region via Global System for Mobile Communications transmitters. USGS recorded 2 instances of a whooping crane flying within 3.1 miles of the base in 2021, one in spring and another in fall. In 2024, the USGS confirmed the presence of whooping cranes in the area surrounding Altus AFB, indicating that whooping cranes have used additional stopover sites in the vicinity of Altus AFB more frequently than previously recorded (USGS 2024, USFWS 2024*a*). Currently, Altus AFB does not contain suitable wetland habitat to attract this species; however, the City of Altus plans to enhance the nearby Altus Reservoir, which currently contains suitable whooping crane habitat (USFWS 2024*a*). Limited suitable migratory stopover habitat near Altus AFB may correlate with low detection numbers.

In support of the USFWS (2024*a*) Biological Opinion, 97 CES/CEIE can continue to monitor whooping crane presence by reviewing USFWS, USGS, and Canadian Wildlife Service reports of the species in the area. USGS telemetry data indicate that whooping cranes generally arrive in Oklahoma during the third week of March, departing by mid-April during the spring migration. During the fall migration, cranes generally arrive in late October and depart by early December. These consistent seasonal patterns provide opportunities for targeted mitigation and monitoring efforts (USFWS 2024*a*). If the installation confirms

whooping crane presence on the base, Altus AFB will consult with the USFWS and ODWC on management of the species IAW the ESA and ODWC regulations (DAFMAN 32-7003, Section 3.38).

97 CES/CEIE has not yet detected the rufa red knot nor the piping plover on or near the installation (USFWS 2024*a*). Thus, Altus AFB conducts no direct management or these species. However, since the installation is within the migratory range of the piping plover, Altus AFB must continue to implement the BASH program (Section 7.12) and conduct specific BASH mitigation activities outlined in the Biological Opinion (USFWS 2024*a*).

In 2022, USDA–APHIS–WS personnel installed a Motus telemetry system to passively monitor birds on Altus AFB. This system can identify birds tagged with VHF radio transmitters that pass through the local area, many of which are species of special conservation interest such as rufa red knot, piping plover, and whooping crane. However, the Motus has not been operational since 2023, and the BASH program plans to reinstate the system to collect valuable data on the presence of these species and other migratory birds in support of the MBTA. USDA–APHIS–WS will share all data with 97 CES/CEIE.

Migratory Bird Management

Pursuant to the MBTA, Altus AFB conserves migratory birds and their habitats by preventing or abating pollution or detrimental alteration of the environment (DAFMAN 32-7003, Section 3.34). Providing environmental reviews of proposed installation projects and adhering to the Integrated Solid Waste Management Plan (Altus AFB 2022*f*), SWPPP (Altus AFB 2023*e*), Spill Prevention, Control, and Countermeasure Plan (OTIE 2024*b*), and the Facility Response Plan (OTIE 2021), prevents and abates pollution (Section 2.4.3).

Pursuant to the MBTA EO 13186, Altus AFB considers 1 April to 1 August to be the migratory bird nesting season. This requires on-base personnel and contractors to abide by special bird protection requirements and permitting when working on sites with nesting migratory birds. These requirements specifically pertain to sites within trees, shrubs, and grasslands (excluding the airfield) on Altus AFB. 97 CES/CEIE coordinates with 97 CES Quality Assurance to limit grass mowing by grounds maintenance contractors in areas outside of the BASH Wildlife Exclusion Zone during the nesting season. Prior to any tree or shrub maintenance (i.e., pruning, trimming, or removal) or grassland mowing during the nesting season, the NRM and/or BASH personnel must conduct a survey of any sites scheduled to undergo these maintenance activities. Additionally, the 2025 WFMP (Tab 1) prohibits prescribed burns during the migratory bird nesting season (1 April to 1 August).

Artificial light management also supports the conservation of birds under the MBTA. Artificial light at night not only increases BASH risk on Altus AFB, but it negatively impacts bird behavior. Artificial light at night attracts and confuses night-migrating birds, causing them to land in unsuitable habitat and collide with structures (Loss et al. 2015, McLaren et al. 2018, Horton et al. 2019, Cabrera-Cruz et al. 2021). It can also impact the timing of breeding and impair melatonin production and brain plasticity (Dominoni et al. 2013, Moaraf et al. 2020). DoD PIF (2022) provided the following guidelines for measuring and reducing the impacts of light pollution:

- Avoid over-lighting by using the minimum lighting intensity required.
- Implement nightly or seasonal blackouts or reduce lighting regimes in sensitive areas.
- Install timers, motion sensors, and dimmers to reduce or eliminate unnecessary light.
- Reduce light trespass by installing fully shielded fixtures, where feasible, IAW Unified Facilities Criteria (UFC) 3-530-01 requirements of full shielding of outdoor lighting and standards for brightness, controls, and spectrums.

- Use warm-spectrum (Correlated Color Temperature ≤ 3,000 K) lights.
- Upgrade eligible communication towers with flashing aviation lights that meet the 2015 Federal Aviation Administration standard.

IAW the BASH Plan (Tab 2), 97 CES/CEIE conducts all migratory bird habitat enhancement activities outside of the designated BASH Wildlife Exclusion Zone. Reinstation of the Motus system in tandem with ongoing point-count avian surveys by USDA–APHIS–WS biologists will support monitoring of bird populations and potential detections of T&E species and SGCN.

Since most bird species at Altus AFB have protection under the MBTA, the 97 AMW/SEF maintains a federal migratory bird depredation permit to resolve significant BASH issues. According to Section 315 of the Bob Stump National Defense Authorization Act, incidental take of migratory birds may occur if done by a military member during a military readiness activity. Such incidental take from aircraft strikes may occur at Altus AFB, at transition airfields, or in transit during military flying operations. Mitigation and management of migratory bird species that pose a BASH risk are outlined in the BASH Plan (Tab 2) and in Section 7.12.

The BGEPA prohibits any harm, harassment, or removal of bald and golden eagle nests without an eagle-specific permit from the USFWS. IAW the requirements of the DoD PIF Program, pursuant to the 2006 MOU between the DoD and USFWS and EO 13186, Altus AFB has a designated database in the AKN, the DoD's data repository for bird research. 97 CES/CEIE can submit bird count data and Motus telemetry data to the AKN to contribute to national and regional monitoring of population trends for appropriate conservation measures (DAFMAN 32-7003, Section 3.31 and Section 3.34). Protection of migratory birds is vital to a successful ecosystem management program (DAFMAN 32-7003, Section 3.10), as these birds benefit ecosystems by helping control pests, pollinating plants, and serving as prey for other wildlife. Ongoing monitoring to assess current migration patterns and future migration patterns in light of the increasing risk of natural hazards can establish direct management actions to protect these birds and their habitats (National Aeronautics and Space Administration 2022).

Species of Greatest Conservation Need Management

97 CES/CEIE manages state-listed species present on the installation, which include SGCN (DAFMAN 32-7003, Section 3.38.2). The Texas horned lizard is the main SGCN that 97 CES/CEIE manages on Altus AFB. The OCWCS (ODWC 2016) identifies the lizard as possibly threatened or vulnerable to extirpation, but insufficient evidence exists to substantiate concern regarding its long-term survival. Uncertainty about the long-term status of this species has led to an increasing number of studies. 97 CES/CEIE and the USFWS collaborated with Tinker AFB in Oklahoma City to design a study on the populations at Altus AFB. The USFWS began surveying in May 2021, with fieldwork occurring throughout the spring and summer to collect biological and geospatial data (USFWS 2021*b*). As of August 2024, 97 CES/CEIE has captured and assessed 190 individual lizards, most of which were outfitted with a passive integrated transponder (PIT) tag, VHF radio transmitter, and/or RECCO diode reflector to track their movements.

By conducting ongoing monitoring, 97 CES/CEIE can estimate abundance, home range, and survival rates of the Texas horned lizard population at Altus AFB. Data collected from these surveys improve 97 CES/CEIE's understanding of the species' ecology, particularly that of populations in fragmented habitat surrounded by agriculture and urban development (USFWS 2021*b*). As this species is facing widespread population decline, further investigation and monitoring may be necessary to instate proper management actions on the installation and contribute to a region-wide conservation effort.

Additionally, active management and conservation of bat habitat are imperative for the protection of bat populations. Researchers detected the Brazilian free-tailed bat and tricolored bat at all 4 acoustic detector stations on Altus AFB, with the former recorded in all survey years (2016, 2022, and 2023) at all locations (NABat 2023). The most suitable habitat for bat species on the installation occurs at the wet woodland, just south of the main gate. Protection of this area is crucial, as it provides both foraging and roosting habitat. Per the 2024 USFWS guidance on maintaining compliance with the ESA and promoting conservation of tricolored bats, federal agencies should avoid removing suitable roost tees within 0.25 miles of known hibernacula (USFWS 2024*c*). Proactive management efforts for bat species, such as maintaining suitable habitat and protecting and identifying roosting habitat, are imperative, as bats are facing widespread population declines and further listings are impending. Bats also benefit from reduced use of insecticides and other chemicals (Estrada et al. 2006, Starik et al. 2018). 97 CES/CEIE, in coordination with USFWS and ODWC, can develop a habitat management plan to guide habitat management actions to protect these vulnerable species.

7.5 Water Resource Protection

Installation Supplement

Applicability Statement

This section applies to DAF installations that have water resources. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Section 2.2.4 provides a complete summary of water resources on Altus AFB. 97 CES/CEIE's management of water resources on the installation focuses on mitigating impact to surface water and groundwater within its regional watersheds. Altus AFB's direct impacts to water sources in and around the installation include erosion impacts and non-point source pollution. A proactive water resources management program supports the conservation and protection of water sources at Altus AFB and in the region.

Altus AFB implements various measures to protect water resources that installation activities may affect. Management practices focus on stormwater pollution prevention, water quality monitoring, and environmental reviews of proposed actions that may affect wetlands and waterways. 97 CES/CEIE manages water resources on Altus AFB through the implementation of federal and state management initiatives, as outlined in the CWA, ODEQ requirements, the Oklahoma Comprehensive Water Plan, and Altus AFB's Multi-Sector General Permit.

On a regional scale, Altus AFB is a stakeholder in the Southwest Oklahoma Water Supply Action Plan (Carollo Engineers et al. 2014). This initiative began in 2014 after a prolonged drought (from 2010 to 2015) caused the Tom Steed Reservoir, the main supply of drinking water to the installation, to drop to historic low water levels in 2011 (Bush 2016). A reduction in water quantity led to lower water quality at the reservoir. To combat the quality degradation, the City of Altus added chlorine to the water. However, this led to a violation of the US EPA's water quality standards in 2013, as the added chlorine caused an overload in trihalomethane by-products.

To ensure compliance with US EPA standards, Altus AFB and the City of Altus created the Altus Water Task Force to improve the water quality and investigate new source options. The City of Altus reinstated a reverse osmosis treatment facility, which filters water without the use of chlorine, and added 7 new wells in Texas to encourage a blend of unfiltered and filtered surface water at the Tom Steed Reservoir and well

water to reduce the need for chlorine use. As a result, in 2016, Altus AFB's water met the US EPA standards (Altus AFB 2018).

To maintain compliance, 97 CES/CEIE's Water Quality Program Manager must test a minimum of 5 water samples per month at various locations throughout the installation. The Water Quality Program Manager also shares monthly data from water quality assessments evaluating bacteria, pH, chlorine, and trihalomethane levels with the City of Altus to ensure proper cross-boundary management (Altus AFB 2018). As of 2024, Altus AFB's drinking water is in compliance with the US EPA's and state water quality standards (Altus AFB 2024*c*).

Altus AFB is not currently located in or draining to a watershed with federal or state water protections, such as those protected under the antidegradation policy in Oklahoma Administrative Code (OAC) 785:45-5-25. However, ODEQ has listed Stinking Creek on the 303(d) list of impaired waterbodies due high turbidity levels from total suspended solids (Altus AFB 2023*e*). ODEQ has not established any waste load allocations or TMDLs for Stinking Creek. Furthermore, ODEQ is not currently requiring Altus AFB to monitor for *Enterococcus* bacteria and *E. coli* in Stinking Creek.

Historically, 97 CES/CEIE conducted quarterly benthic macroinvertebrate surveys and water quality sampling to monitor Stinking Creek and its unnamed tributaries within the installation. The Water Quality Program Manager used the number and species of macroinvertebrates sampled to calculate the Hilsenhoff Biotic Index, using designated tolerance values for each species. The Water Quality Program Manager assessed turbidity, dissolved oxygen, pH, conductivity, total dissolved solids, resistivity, alkalinity, salinity, ammonia, copper, nitrate, nitrite, and phosphate. In 2023, 97 CES/CEIE's sampling determined the water quality to be fair to poor, as the turbidity, phosphate, and dissolved oxygen levels scored poorly. The Hilsenhoff Biotic Index of the water samples also indicated the water quality to be fair to poor (T. Fleishman, personal communication, 2023).

Erosion and sedimentation can cause poor turbidity and dissolved oxygen levels. These phenomena can introduce suspended sediment particles into the water, which can lead to reduced dissolved oxygen levels by reducing light penetration, hindering photosynthesis in aquatic plants and algae, and increasing microbial activity that consumes oxygen. Drainage areas in the southern part of the installation have experienced severe erosion, and the boundary fence has fallen twice due to erosion. Native vegetation along the banks would help stabilize the soils and reduce sedimentation in these regions. IAW DAFMAN 32-7003, Section 3.58.5, conducting comprehensive surveys of base waterways to document areas of significant erosion and sedimentation will identify priority areas for targeted restoration efforts.

Additional targeted restoration methods may be necessary to ensure effective reduction in erosion and sedimentation in Altus AFB's water sources. In collaboration with 97 CES/CEN, the Natural Resources Program can help stabilize banks, reduce runoff, and enhance water quality by installing bioswales, vegetated buffers, and other green infrastructure solutions. Monitoring these projects following implementation is essential to ensure effectiveness and allow for adaptive management. Ongoing efforts to remove invasive aquatic plants and algae from ponds will maintain healthy water quality (Häder et al. 2003).

Collaboration with the grounds maintenance crew is also necessary to ensure proper pollutant runoff mitigation is occurring to support healthy water quality levels. In 2024, 97 CES/CEIE submitted work order requests for stormwater conveyance system repairs to limit potential pollutant runoff into the drainage network. Construction activities constitute the primary avenue of potential erosion and sedimentation damage at Altus AFB. The 2024 EA conducted for the replacement of the installation's electrical substation determined that the proposed construction effort may expose soils to wind and rain erosion, which can

increase sediment concentration in waterways. Additionally, the accidental release of contaminants or disturbance of existing but unknown contaminants, in tandem with the operation of heavy vehicles and equipment, could compact the soil and disrupt normal soil functions such as filtration and water storage. Under the proposed action, the construction contractors must document site-specific stormwater pollution prevention measures as part of an environmental protection plan IAW the SWPPP (North Wind Resource Consulting 2024).

Additionally, to ensure compliance with the CWA, all construction projects of 1 acre or larger must hold a state-issued OKR10 permit for stormwater discharges from construction activities and maintain a SWPPP. The 97 CES/CEIE Water Quality Program Manager monitors permit compliance by reviewing contractor SWPPPs and conducting monthly site inspections. Prior to initiation of any new construction activity, the NRM coordinates on all Certificates of Compliance for Critical Planning Actions prepared IAW DAFI 32-1020, *Planning and Programming Built Infrastructure Projects*. 97 CES/CEIE reviews construction project proposals to ensure compliance with the INRMP and applicable environmental laws and regulations.

Moreover, 97 CES/CEIE assesses all proposed actions within or that could affect floodplains to determine their effects on flood risk (Section 7.6). IAW the CWA, EO 11900, and EO 11988, proponents for proposed development activities that may affect wetlands, streams, or water bodies must conduct site-level jurisdictional delineations of WOTUS (DAFMAN 32-7003, Section 3.18.1). Responsible parties must contact the USACE prior to construction or other activities that may affect open water habitats to determine if a Rivers and Harbors Act Section 10 permit is necessary. A CWA Section 10 permit and, potentially, a USACE Section 404 permit are required for construction, excavation, or deposition of materials in, over, or under navigable waters, or for any work that would affect the course, location, condition, or capacity of those waters (DAFMAN 32-7003, Section 3.18).

To minimize the potential for discharge of pollutants into waterways, Altus AFB maintains an OPDES Multi-Sector General Permit for industrial and non-stormwater discharges and implements a SWPPP (Altus AFB 2023*e*). Pursuant to the OPDES Multi-Sector General, 97 CES/CEIE implements BMPs established in the SWPPP to prevent stormwater pollution, including sediment and erosion controls, oil/water separators, weirs, check dams, grass swales, infiltration galleries, good housekeeping practices, and employee training. The Water Quality Manager conducts routine sampling and inspections of stormwater discharges to check for pollution and ensure compliance with permitted effluent limits. The manager also conducts routine inspections of industrial facilities and stormwater conveyance systems to ensure proper function for pollution prevention. 97 CES/CEIE also conducts annual water sampling of an unnamed tributary to Stinking Creek and sends the samples to an accredited laboratory to test for ammonia, chloride, chemical oxygen demand, pH, nitrate, and sulfate. As of 2024, the results have been compliant with the base stormwater permit.

97 CES/CEIE closely monitors hazardous material use and hazardous waste generation for compliance with the Altus AFB Hazardous Materials Management Standard Operating Procedure and Hazardous Waste Management Plan (Altus AFB 2024*j*). Fuels management and 97 CES personnel conduct responsible operation and maintenance of equipment to prevent fuel discharges, as required by POL Technical Orders. IAW the CWA and DAFMAN 32-1067, *Water and Fuel Systems*, the Water Fuels System Maintenance shop performs mandatory inspections of all fuel facilities, and the Tanks Custodian routinely inspects oil storage tanks for potential spills or leaks. The installation immediately contains and cleans up all spills and leaks to prevent or minimize groundwater or surface water contamination.

IAW the OPDES Multi-Sector General permit, between 2019 to 2022, Altus AFB documented 13 significant spills and leaks of oil or toxic or hazardous substances (reportable under 40 CFR 110, 40 CFR

117, 40 CFR 302, and Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act) that occurred in areas exposed to stormwater or that drained to a stormwater conveyance (Altus AFB 2023*e*). The Spill Prevention, Control, and Countermeasure Plan (OTIE 2024*b*) and a Facility Response Plan (OTIE 2021) outline procedures for preventing and responding to releases of POL products and hazardous substances. Ongoing implementation of these plans and routine inspections can minimize the potential exposure of stormwater to contaminants.

The Snow and Ice Control Plan (Altus AFB 2021*b*) also instates regulations to protect water resources from snow removal and de-icing procedures. IAW the OPDES Multi-Sector General permit, all de-icing procedures must minimize discharge of chemicals via runoff and the installation must notify 97 CES/CEIE of any de-icing events for consideration in the annual analytical sampling and to conduct visual monitoring of the event. Additionally, the quantities of de-icing and anti-icing chemicals must be measured monthly on the installation and results provided to 97 CES/CEIE; an estimate must be provided if a measuring tool is unavailable (Altus AFB 2021*b*).

97 CES/CEIE's investigation and remediation of groundwater contamination under the ERP has also provided water resources protection since 1999. 97 CES/CEIE employs bioremediation technology, a remediation process using microbes, to clean up contaminated groundwater and soil. Bioremediation on Altus AFB includes the installation of permeable reactive barriers to interrupt contaminated groundwater migration, as well as the injection of vegetable oil into contaminated groundwater. The installation's ODEQ Resource Conservation and Recovery Act Corrective Action Permit governs all ERP operations and disposal activities. Altus AFB conducts ERP operations IAW the Spill Prevention, Control, and Countermeasures Plan and the Facility Response Plan to contain and clean up any contaminated groundwater overflow.

Weather-related risks threatens the quality of surface water, as increasing air temperatures reduce dissolved oxygen levels in the water, leading to increasing probability of toxic algal blooms. High rates of polluted stormwater runoff from increased precipitation can also imperil water quality. Additionally, the increasing severity of storm events in the region is increasing sediment loading from stormwater runoff into water sources (Jackson County Department of Emergency Management 2024). Stronger storms and increased stream velocity can increase erosion and result in higher quantities of suspended sediment in water bodies. Excessive levels of suspended water sediment and a change in sediment distribution can negatively impact ecosystem health (Burton and Johnston 2010). Maintaining water quality monitoring and following strict water quality standards will reduce this risk on Altus AFB. Moreover, effective erosion and sediment control management efforts will protect the water quality at Altus AFB.

The increased frequency and severity of droughts and evaporation rates are threatening groundwater resources in the region (Jackson County Department of Emergency Management 2024). Altus AFB is dependent on the City of Altus for supplying short-term and long-term water, the majority of which is surface water. Management actions at Altus AFB must be proactive as water scarcity increases in the region. Within the REPI Program, Altus AFB, the City of Altus, and the Tom Steed Master Conservancy District are partnering to secure water rights to the Tillman Terrace aquifer (DoD 2024). Obtaining these water rights will establish a stable water supply for Altus AFB and assist in securing groundwater for the city's water system. Securing this water right and enacting other proactive water resource protection efforts is vital for establishing drought resiliency not only on the base, but also for the community.

7.6 Wetland Protection

Installation Supplement

Applicability Statement

This section applies to DAF installations that have existing wetlands on DAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

The objective of wetland and floodplain management on Altus AFB is to attain no net loss in the value or function of the existing habitats through protection and restoration efforts. The protection of floodplains and wetlands is vital to successful ecosystem management at the installation, as these ecosystems provide erosion prevention, natural moderation of floods, water quality maintenance through runoff filtration of pollutants and sediment, and groundwater recharge. Thus, conserving the natural values of these ecosystems promotes compliance with the CWA, EO 11900, EO 11988, and the Rivers and Harbors Act. These ecosystems are also a culturally valuable resource for open space, natural beauty, scientific study, outdoor recreation, and education.

In 1994, the USACE conducted a jurisdictional wetland delineation at Altus AFB to identify wetlands and other aquatic systems that may be subject to jurisdictional permitting under Section 404 (Webb and Aurelius 2024). Due to the limited presence of wetlands on the installation, 97 CES/CEIE is not requesting a basewide wetland delineation and inventory. Instead, management of wetlands on the installation is through direct protection from mission development and expansion pursuant to state and federal environmental regulations. Additionally, 97 CES/CEIE can conduct a wetland delineation and inventory with the USACE in conjunction with an assessment of conservation priority areas for flood mitigation efforts. Identification of these areas will help mitigate the increasing nuisance flood risk hazard to the installation. 97 CES/CEIE, 97 CES/CEN, and USACE can partner to identify and address areas of persistent nuisance flooding with responsible and sustainable flood mitigation strategies. IAW EO 14030, implementing nature-based solutions that reduce flood hazard impacts and increase resiliency can effectively protect the installation from an increased frequency and severity of flooding.

In compliance with the CWA, EO 11990, and EO 11988, 97 CES/CEIE mitigates impacts to wetlands and floodplains from installation development to the maximum extent possible. 97 CES/CEIE and USACE review all proposals for actions that may affect wetlands to ensure compliance with the CWA. As stated in Section 7.5, proponents for proposed development activities must complete site-level jurisdictional delineations of WOTUS if the proposed actions may affect wetlands, streams, and water bodies (DAFMAN 32-7003, Section 3.18.1). As of 2024, Altus AFB does not have any existing or pending CWA Section 10 permits or USACE Section 404 permits for construction efforts on the installation.

In the next 3 to 5 years, Altus AFB is planning to renovate the existing entry-control facility of the main gate by developing a designated access road, visitor's center, and vehicle inspection area (North Wind Resource Consulting 2024). The execution date of this project has yet to be determined; however, before the installation can implement the proposed action, 97 CES/CEIE will conduct regulatory review and permitting actions that may affect wetlands, including dredging, filling, and displacing soils or other materials into a wetland. The main gate is adjacent to a wetland area (Figure 10 in Tab 7), so the installation must carefully conduct all project actions to ensure that no impact occurs. Additionally, the channelized waterway of Falcon Road leading to the main gate is prone to severe flooding. IAW EO 11990, 97 CES/CEIE can collaborate with the 97 CES/CEN to conduct targeted drainage enhancement actions near the main gate, such as efforts to improve hydrological flow and sediment control, to help reduce flood risk to Falcon Road.

Due to the arid climate of the region, existing riparian zones are of high importance to riparian-specific species and for water storage capacity. 97 CES/CEIE aims to conserve and restore wetlands and floodplains on the installation due to the increasing threat of flooding and water scarcity in the region (Section 2.4.4). Degradation of riparian areas in the region is often due to stream channelization, dam construction, and stormwater runoff polluted by fertilizers and pesticides. Proactive restoration of riparian habitat in wetlands and along the installation's streams will help reduce sedimentation and soil erosion that impair water quality (Section 7.5). Riparian restoration efforts, such as removing invasive vegetation and sowing the banks with native vegetation, removing debris, and monitoring erosion can maintain and support healthy ecosystem functions.

Restoring and protecting the existing floodplains on the installation is necessary to mitigate flood impact to mission operations. Active floodplain management will directly support the protection of these vital mission assets. For example, Altus AFB purchased land south of Falcon Road to conduct channel realignment in an effort to minimize flooding along Falcon Road, as the channel slope from meander bends is causing backwater conditions. Once this effort is complete, the installation may ultimately combine Outfall 006 and Outfall 007 to discharge at a new location or as a single outfall (Altus AFB 2023*e*). 97 CES/CEIE conducts all riparian restoration activities IAW the vegetation mandates of the BASH program to limit attractiveness to wildlife (DAFMAN 32-7003, Section 3.63.4).

A work with local partners, including the City of Altus and the Tom Steed Master Conservancy District, to pursue the DoD REPI Program may be an effective route for increasing the installation's resilience to natural hazards and encroachment. Pursuant to the REPI Program, DoDI 4715.28, and DAFMAN 32-7003 Section 3.23.1.1, 97 CES/CEIE can work with local organizations to conduct a NEPA evaluation with willing private landowners upstream of the installation to instate flood-control methods such as bioswales on their property to benefit groundwater recharge, local agriculture, and flood mitigation on the installation and surrounding areas. IAW the CWA, protective management actions for wetland systems on base will increase the installation's resiliency to inundation events that may affect mission operations.

Floodplain inundation from the increasing severity of storm events (Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024) is a concern at Altus AFB, particularly as development continues on the installation. The frequency and severity of flooding events is increasing, and floodplains currently do not have the capacity to hold increased floodwaters. If the installation expands into flood zones unmitigated, it will exacerbate flooding impacts on downstream off-base communities such as the City of Altus. Therefore, proper floodplain management is essential to the protection of Altus AFB's mission and surrounding communities.

7.7 Grounds Maintenance

Installation Supplement

Applicability Statement

This section applies to DAF installations that perform ground maintenance activities that could impact natural resources. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

The grounds maintenance PWS guides all grounds management actions on Altus AFB. Grounds maintenance covers several aspects of land management on the main base and SDZ, including maintaining improved grounds, semi-improved grounds, and unimproved grounds (Section 2.4.2; Altus AFB 2024*h*). Specifically, actions include maintaining the airfield grounds, surface drainage ditches, prestige areas, and

fencelines and conducting weed control, soil tests, storm debris removal, tree maintenance, stump removal, and shrub maintenance and removal (Section 7.11). There is currently no grounds maintenance contract to support the Snow and Ice Control Plan (Altus AFB 2021*b*).

The Altus AFB Installation Facilities Standards (Altus AFB 2020*b*) describes landscape design requirements to conserve energy, improve stormwater drainage, prevent erosion, improve air quality, reduce maintenance requirements, and promote a visually aesthetic environment. All grounds maintenance activities on Altus AFB support federal environmental requirements and pollution prevention guidelines outlined in EO 13148, *Greening the Government Through Leadership in Environmental Management*, which requires contractors to integrate environmentally friendly landscaping maintenance programs and policies. The 1994 Presidential Memorandum, *Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds*, is the primary guidance for landscaping requirements on federal properties.

The 97 CES/Contacting Officer Representatives Office (97 CES/CEOES) is responsible for updating the grounds maintenance PWS. Grounds maintenance actions outlined in the PWS follow quality control practices and procedures outlined by the Professional Grounds Management Society, Tree Care Industry Association, American Society of Landscape Architects, American National Standards Institute, and local extension offices of the Federal Cooperative Extension Service. Contractors must provide and maintain an inspection system of executed work that support these procedures (Altus AFB 2024*h*).

Grounds maintenance contractors are responsible for mowing, trimming, and edging improved and semi-improved grounds at Altus AFB. Following the PWS, to maintain a professional appearance, grounds maintenance contractors will also conduct fertilizer application, pest control, and weed control. Grounds maintenance contractors must complete the Altus AFB EMS awareness training and comply with all applicable federal, state, and local environmental laws and regulations.

The grounds service contract ensures all grounds maintenance practices are IAW the BASH Plan (Tab 2) and IPMP (Tab 5). The PWS covers the year-round maintenance of airfield grounds to help mitigate BASH risk, including maintaining vegetation to a specific height to reduce attractiveness to wildlife (Section 7.12). The PWS requires contractors to maintain airfield vegetation height standards by the type of land cover throughout the growing season, unless otherwise specified. The grounds maintenance contractors conduct maintenance of the airfield, all drainage ditches, and perimeter fences year-round to mitigate BASH risk. IAW the SWPPP, drainage ditch maintenance requires removal of shrubs, trees, silt, and debris to prevent erosion and ensure continuous water flow. In 2022, grounds maintenance contractors began using an arm mower instead of herbicides to control vegetation in drainage ditches.

Landscaping of up to 50 feet from facilities is the responsibility of facility managers. The grounds maintenance contractors are responsible for the landscaping at Building 1 and Wings of Freedom Park. The PWS encourages the use of environmentally sound landscaping efforts (Altus AFB 2024*h*). EO 13148 promotes the use of environmentally friendly landscaping by mandating that all federal landscaping, to the extent practicable, reduce fertilizer and pesticide use, implement water-efficient practices, and use construction practices that minimally impact the natural habitat.

As flooding and severe weather events are increasing in the region (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management 2024), guidelines for fertilizer application may need to adjust to limit runoff into water sources and ensure compliance with the CWA. Moreover, years with extreme environmental conditions (e.g., heat waves, drought) substantially stress ornamental plants, particularly nonnative plants. Pursuant to EO 13148, grounds maintenance activities that can increase the

resiliency of the landscape include using xeriscaping and plants with low water needs wherever feasible. IAW the Presidential Memorandum 60 FR 40837, xeriscaping increases water efficiency on the installation, a pressing need as drought conditions and overuse for irrigation threatens the region's water supply (Section 7.5; Bush 2016).

EO 13148 also encourages the use of regionally native plants for landscaping. Native plants are better adapted to survive and thrive in the local environment; sustain native wildlife, including pollinators; and require less maintenance than nonnative plants. Using native plants in grounds maintenance activities also ensures compliance with EO 13112 and the BMPs outlined in the DoD's 7(a)(a) Conservation Strategy for the Monarch butterfly (Natural Resource Institute 2024). Altus AFB has established a list of regionally native landscaping plant species to incorporate into future construction projects on the installation (Table 7-1). Section 7.11 provides additional information on invasive and pest species management.

Table 7-1. Native plants recommended for conservation landscape planning

Common Name	Scientific Name
Deciduous Trees	
American elm	*Ulmus americana*
American smoketree	*Cotinus obovatus*
American sycamore	*Platanus occidentalis*
Blackjack oak	*Quercus marilandica*
Black hickory	*Carya texana*
Black willow	*Salix nigra*
Black walnut	*Juglans nigra*
Boxelder	*Acer negundo*
Bur oak	*Quercus macrocarpa*
Chickasaw plum	*Prunus angustifolia*
Chinquapin oak	*Quercus muehlenbergii*
Cock-spur hawthorn	*Crataegus crus-galli*
Common chokecherry	*Prunus virginiana*
Common hackberry	*Celtis occidentalis*
Common hoptree	*Ptelea trifoliata*
Common persimmon	*Diospyros virginiana*
Dwarf hackberry	*Celtis tenuifolia*
Dwarf chinquapin oak	*Quercus prinoides*
Eastern cottonwood	*Populus deltoides*
Green ash	*Fraxinus pennsylvanica*
Green hawthorn	*Crataegus viridis*
Gum bully	*Sideroxylon lanuginosum*
Honeylocust	*Gleditsia triacanthos*
Kentucky coffeetree	*Gymnocladus dioicus*
Little walnut	*Juglans microcarpa*
Mohr oak	*Quercus mohriana*
Netleaf hackberry	*Celtis laevigata* var. *reticulata*
Oklahoma redbud	*Cercis canadensis* var. *texensis 'Oklahoma'*
Pecan	*Carya illinoinensis*
Post oak	*Quercus stellata*
Red mulberry	*Morus rubra*

Table 7-1. Native plants recommended for conservation landscape planning

Common Name	Scientific Name
Roughleaf dogwood	*Cornus drummondii*
Sugarberry	*Celtis laevigata*
Texas redbud	*Cercis canadensis* var. *texensis*
Sandbar willow	*Salix interior*
Slippery elm	*Ulmus rubra*
Western soapberry	*Sapindus saponaria* var. *drummondii*
Evergreen Trees	
Ashe's juniper	*Juniperus ashei*
Brodie juniper	*Juniperus virginiana* 'Brodie'
Burkii juniper	*Juniperus virginiana* 'Burkii'
Emerald Feather juniper	*Juniperus virginiana* 'Emerald Feather'
Hillspire juniper	*Juniperus virginiana* 'Hillspire'
Idyllwild juniper	*Juniperus virginiana* 'Idyllwild'
Pinchot's juniper	*Juniperus pinchotii*
Rocky Mountain juniper	*Juniperus scopulorum*
Taylor juniper	*Juniperus virginiana* 'Taylor'
Semi-Evergreen Trees	
Texas live oak	*Quercus fusiformis*
Shrubs and Cacti	
Arizona desert-carpet (bank catclaw)	*Acacia redolens*
Christmas cactus	*Cylindropuntia leptocaulis*
Common buttonbush	*Cephalanthus occidentalis*
Davis's cholla (Thistle cholla)	*Cylindropuntia davisii*
Devil's tongue	*Opuntia humifusa*
Leadplant	*Amorpha canescens*
False broomweed	*Haploesthes greggii*
False indigo bush	*Amorpha fruticosa*
Featherplume	*Dalea formosa*
Fourwing saltbush	*Atriplex canescens*
Fragrant mimosa	*Mimosa borealis*
Fragrant sumac	*Rhus aromatica*
Golden currant	*Ribes aureum*
Willow baccharis	*Baccharis salicina*
Horse crippler	*Echinocactus texensis*
James' nailwort	*Paronychia jamesii*
Broom snakeweed	*Gutierrezia sarothrae*
Lace hedgehog cactus	*Echinocereus reichenbachii*
Littleleaf sumac	*Rhus microphylla*
Lotebush	*Ziziphus obtusifolia*
Low silverbush	*Argythamnia humilis*
White sagebrush	*Artemisia ludoviciana* spp. *mexicana*
Missouri foxtail cactus	*Escobaria missouriensis*
Mormon tea (clapweed)	*Ephedra antisyphilitica*
New Jersey tea	*Ceanothus americanus*
Prairie acacia	*Acaciella angustissima*
Prairie false willow	*Baccharis texana*

Table 7-1. Native plants recommended for conservation landscape planning

Common Name	Scientific Name
Prairie redroot (Jersey tea)	*Ceanothus herbaceus*
Sandbar willow	*Salix interior*
Sand sagebrush	*Artemisia filifolia*
Havard oak	*Quercus havardii*
Silver desert-thorn	*Lycium berlandieri*
Smooth sumac	*Rhus glabra*
Soapweed yucca	*Yucca glauca*
Spinystar	*Escobaria vivipara*
Stretchberry	*Forestiera pubescens*
Tall silverbush	*Argythamnia mercurialina*
Tree cholla	*Cylindropuntia imbricata*
Tulip prickly pear	*Opuntia phaeacantha*
Twistspine pricklypear	*Opuntia macrorhiza*
White sagebrush	*Artemisia ludoviciana*
Winged sumac	*Rhus copallinum*
Vines	
Carolina coralbead	*Cocculus carolinus*
Sorrelvine	*Cissus trifoliata*
Virginia creeper	*Parthenocissus quinquefolia*
Graminoids (Grasses) and Sedges	
Alkali muhly	*Muhlenbergia asperifolia*
Alkali sacaton	*Sporobolus airoides*
Arrowfeather threeawn	*Aristida purpurascens*
Big bluestem	*Andropogon gerardii*
Blue grama	*Bouteloua gracilis*
Buffalograss	*Bouteloua dactyloides*
Bushy bluestem	*Andropogon glomeratus*
Canada wildrye	*Elymus canadensis*
Cane bluestem	*Bothriochloa barbinodis*
Eastern gamagrass	*Tripsacum dactyloides*
Feather fingergrass	*Chloris virgata*
Foxtail barley	*Hordeum jubatum*
Hairy grama	*Bouteloua hirsuta*
Hooded windmill grass	*Chloris cucullata*
Indiangrass	*Sorghastrum nutans*
Little bluestem	*Schizachyrium scoparium*
Prairie cordgrass	*Spartina pectinata*
Prairie threeawn	*Aristida oligantha*
Purpletop tridens	*Tridens flavus*
Purple lovegrass	*Eragrostis spectabilis*
Purple threeawn	*Aristida purpurea*
Red lovegrass	*Eragrostis secundiflora*
Red threeawn (slimspike threeawn)	*Aristida longespica*
Sand bluestem	*Andropogon hallii*
Sand lovegrass	*Eragrostis trichodes*
Sideoats grama	*Bouteloua curtipendula*

Table 7-1. Native plants recommended for conservation landscape planning

Common Name	Scientific Name
Silver beardgrass	*Bothriochloa laguroides*
Slim tridens	*Tridens muticus*
Switchgrass	*Panicum virgatum*
Texas bluegrass	*Poa arachnifera*
Texas dropseed	*Sporobolus texanus*
Texas grama	*Bouteloua rigidiseta*
Vine mesquite	*Panicum obtusum*
Virginia wildrye	*Elymus virginicus*
Annual or Biennial Flowers	
Arkansas dozedaisy	*Aphanostephus skirrhobasis*
Bitter rubberweed	*Hymenoxys odorata*
Carolina geranium	*Geranium carolinianum*
Catchfly prairie gentian	*Eustoma exaltatum*
Common sunflower	*Helianthus annuus*
Dakota mock vervain	*Glandularia bipinnatifida*
Desert tobacco	*Nicotiana obtusifolia*
Indian blanket	*Gaillardia pulchella*
Lanceleaf sage	*Salvia reflexa*
Lemon beebalm	*Monarda citriodora*
Matted bluet	*Houstonia humifusa*
Partridge pea	*Chamaecrista fasciculata*
Phlox heliotrope	*Heliotropium convolvulaceum*
Pink mock vervain	*Glandularia pumila*
Pink smartweed (Pennsylvania smartweed)	*Polygonum pensylvanicum*
Prairie fleabane	*Erigeron strigosus*
Prairie sunflower	*Helianthus petiolaris*
Salt heliotrope	*Heliotropium curassavicum*
Sandbells (bristly nama)	*Nama hispidum*
Sleepy silene	*Silene antirrhina*
Spanish clover (American bird's-foot trefoil)	*Lotus unifoliolatus* var. *unifoliolatus*
Tall poppymallow	*Callirhoe leiocarpa*
Turkeypeas	*Astragalus nuttallianus*
Valley redstem	*Ammannia coccinea*
Wingpod purslane	*Portulaca umbraticola*
Yellow sneezeweed	*Helenium amarum*
Perennial Flowers	
Aromatic aster	*Symphyotrichum oblongifolium*
Ashy sunflower	*Helianthus mollis*
Azure blue sage	*Salvia azurea*
Berlandier's yellow flax	*Linum berlandieri*
Berlandier's sundrops	*Calylophus berlandieri*
Blacksamson echinacea (narrowleaf purple coneflower)	*Echinacea angustifolia*
Blackeyed Susan	*Rudbeckia hirta*
Bractless blazingstar	*Mentzelia nuda*
Buckley's beardtongue	*Penstemon buckleyi*

Table 7-1. Native plants recommended for conservation landscape planning

Common Name	Scientific Name
Butterfly milkweed	*Asclepias tuberosa*
Canada goldenrod	*Solidago altissima*
Cardinalflower	*Lobelia cardinalis*
Carolina pucoon	*Lithospermum caroliniense*
Cobaea beardtongue	*Penstemon cobaea*
Common sneezeweed	*Helenium autumnale*
Common yarrow	*Achillea millefolium*
Compassplant	*Silphium laciniatum*
Dakota mock vervain	*Glandularia bipinnatifida*
Dotted blazing star	*Liatris punctata*
Downy paintedcup	*Castilleja sessiliflora*
Downy phlox	*Phlox pilosa*
Downy ragged goldenrod	*Solidago petiolaris*
Drummond's skullcap	*Scutellaria drummondii*
Eastern purple coneflower	*Echinacea purpurea*
False boneset	*Brickellia eupatorioides*
False indigo	*Baptisia australis*
Fendler's penstemon	*Penstemon fendleri*
Fringed bluestar	*Amsonia ciliata*
Giant goldenrod	*Solidago gigantea*
Gray goldenrod	*Solidago nemoralis*
Groundplum milkvetch	*Astragalus crassicarpus*
Hairy lespedeza	*Lespedeza hirta*
High plains goldenrod	*Solidago altiplanities*
Hoary verbena	*Verbena stricta*
Illinois bundleflower	*Desmanthus illinoensis*
Indianhemp	*Apocynum cannabinum*
Lanceleaf tickseed	*Coreopsis lanceolata*
Largeflower fameflower	*Phemeranthus calycinus*
Largeflower tickseed	*Coreopsis grandiflora*
Late purple aster	*Symphyotrichum patens*
Light poppymallow	*Callirhoe alcaeoides*
Longbract spiderwort	*Tradescantia bracteata*
Longbract wild indigo	*Baptisia bracteata*
Lyreleaf greeneyes	*Berlandiera lyrata*
Maximilian sunflower	*Helianthus maximiliani*
Missouri evening primrose	*Oenothera macrocarpa*
Missouri goldenrod	*Solidago missouriensis*
Obedient plant	*Physostegia virginiana*
Ohio spiderwort (bluejacket)	*Tradescantia ohiensis*
Plains coreopsis	*Coreopsis tinctoria*
Plains zinnia	*Zinnia grandiflora*
Prairie groundcherry	*Physalis hispida*
Prairie Indian paintbrush	*Castilleja purpurea* var. *citrina*
Prairie ironweed	*Vernonia fasciculata*
Prairie larkspur	*Delphinium carolinianum*

Table 7-1. Native plants recommended for conservation landscape planning

Common Name	Scientific Name
Prairie milkweed	*Asclepias sullivantii*
Prairie petunia	*Ruellia humilis*
Prairie shooting-star (pride of Ohio)	*Dodecatheon meadia*
Prairie spiderwort	*Tradescantia occidentalis*
Purple poppymallow	*Callirhoe involucrata*
Purple prairie clover	*Dalea purpurea*
Resin-dot/Sticky skullcap	*Scutellaria resinosa*
Rose mock vervain	*Glandularia canadensis*
Scarlet gaura (scarlet beeblossom)	*Oenothera suffrutescens*
Scarlet globemallow	*Sphaeralcea coccinea*
Showy evening primrose	*Oenothera speciosa*
Showy goldenrod	*Solidago speciosa*
Showy milkweed	*Asclepias speciosa*
Slender lespedeza	*Lespedeza virginica*
Sneezeweed	*Helenium amarum*
Spotted beebalm	*Monarda punctata*
Stemmy four-nerve daisy	*Tetraneuris scaposa*
Sunbright	*Phemeranthus parviflorus*
Tall blazing star	*Liatris aspera*
Texas Indian mallow	*Abutilon fruticosum*
Trans-Pecos sea lavender	*Limonium limbatum*
Twoleaf senna	*Senna roemeriana*
Upright prairie coneflower	*Ratibida columnifera*
Velvety goldenrod	*Solidago mollis*
Western yarrow	*Achillea millefolium* var. *occidentalis*
Whitest evening primrose	*Oenothera albicaulis*
White heath aster	*Symphyotrichum ericoides*
White penstemon	*Penstemon albidus*
White prairie aster	*Symphyotrichum falcatum*
White prairie clover	*Dalea candida*
White vervain	*Verbena urticifolia*
Wholeleaf rosinweed	*Silphium integrifolium*
Wild bergamot	*Monarda fistulosa*
White penstemon	*Penstemon albidus*
Wright's skullcap	*Scutellaria wrightii*
Yellow sundrops	*Calylophus serrulatus*

Environmentally friendly landscaping includes the responsible use of chemical herbicides, pesticides, and fertilizers as outlined in the grounds maintenance PWS and conducted IAW the SWPPP. State-certified personnel who have completed the Altus AFB EMS awareness training can conduct chemical control IAW with current federal, state, local, DoD, and DAF regulations, plans, and policies. Only 97 CES/CEIE-approved fertilizers and pesticides can be used on the installation. Similarly, the AETC Pest Management Consultant must approve any herbicides prior to use.

The installation limits chemical control in sensitive areas including the Child Development Center, 97 SFS military working dog kennel area, Munitions Storage Area rooftop, and Excellence Park, where the

community and pollinator gardens are located. The installation prohibits chemical control application in drainage ditches and limits weed control to noxious or invasive species removal in improved, semi-improved (non-airfield), and perimeter fence areas. Weed-control application in grass areas must avoid indirectly killing grass or seeds in the area (Altus AFB 2024*h*). The contractor must have spill-control kits on hand.

The BMPs outlined in the SWPPP mitigate pollution issues associated with pesticides and fertilizers. For example, to reduce the potential of non-point source pollution from chemical applications, the SWPPP mandates the installation to only use US EPA-approved chemicals under the direction of certified applicators, using proper methods, strictly following label instructions, and avoiding applications in proximity to surface waters (Altus AFB 2024*h*). 97 CES/CEIE can prevent wind and water erosion by planting turf grasses, ground cover, trees, and shrubs or by mulching. 97 CES/CEIE clears surface drainage ways of debris and silt to prevent erosion and allow water flow. Vegetated drainage swales act as a filter for stormwater runoff. Thus, the installation must maintain the grass within the swales to ensure filtration and prevent soil erosion and sedimentation downstream.

IAW the PWS, the grounds maintenance contractors must comply with waste minimization and pollution prevention practices and policies outlined in the SWPPP (Altus AFB 2024*h*). Grounds maintenance contractors must store all industrial and hazardous waste generated during grounds maintenance activities in approved containers and manage them IAW the Altus AFB Hazardous Waste Management Plan (Altus AFB 2024*j*), under authority of 97 CES/CEIE. The 97 CES/CEO and 97 CES/CEIE manage the installation's solid waste management program (Altus AFB 2022*f*). The integrated solid waste contractor and the City of Altus Sanitation Department provides solid waste dumpsters and collection services for solid waste generated at work sites. The installation's solid waste management program mandates the disposal of all solid waste, including waste generated from grounds maintenance activities, in the City of Altus landfill (Altus AFB 2022*f*, 2024*i*). In conjunction with the Hazardous Waste Management Plan, the Integrated Solid Waste Management Plan strives to reduce the overall amount of waste generated on the installation to minimize the potential for accidental spills and releases into water sources (Section 7.5).

The Windy Trails Golf Course, comprised of 227 total acres, is a recreation facility maintained through ground maintenance contracts (~128 maintained acres). The 2009 GEM Plan (Tab 3) guides golf course management actions on Altus AFB. The GEM Plan requires golf course managers to minimize potential BASH concerns and comply with the CWA, NPDES standards, EO 11990, and the MBTA. IAW the BASH Plan (Tab 2), the GEM mandates that golf course maintenance crews eliminate broad-leaved weeds, maintain grass heights between 7 and 14 inches, remove perch sites and brushy or forested areas, reduce or eliminate standing water, and plant non-seeding grasses or mow before seed heads develop. Golf course vegetation cover is largely composed of little bluestem and aster species, which require less frequent mowing than do urban lawns (Tab 3). Once established, the Urban Forestry Program will also include recommendations for management of trees located on the golf course.

Urban Forest Management

Altus AFB's Urban Forestry Program includes the management of trees used for ornamental landscaping. Most urban trees are located on improved and semi-improved grounds such as lawns, streets, and landscaped areas. The long-term goals of the Urban Forestry Program are to increase species diversity and age structure to maintain value and ecosystem services and increase the percentage of native species represented. Urban forest stands provide numerous benefits to the installation, including aesthetic value, landscape diversity, and improved morale. Urban trees also filter the air and stormwater, contributing to

compliance with ODEQ permits and regulations, and provide shade during hot summers, reducing air temperature and ozone buildup.

The 97 CES/CEIE and 97 CES/CEOI are responsible for urban forest management at Altus AFB. Grounds maintenance contractors are responsible for the removal of dead trees that pose a fire hazard. Proper maintenance practices, such as monitoring plant pathogens and replacing nonnative species, are priority objectives of the program. The installation's Urban Forestry Program must comply with tree care standards, including the American National Standards Institute's A300 Standard Practices for Tree Care Operations and referenced Combined Federal Regulations. The NRM reviews and approves all work orders for landscaping and tree removals.

Since 2020, Altus AFB has attained annual Tree City USA recognition by the Arbor Day Foundation. This status is an urban forest management driver on the installation. The installation meets requirements for this certification each year by spending at least $2 per capita; having a tree board, ordinance, and signed proclamation; and celebrating Arbor Day. 97 CES/CEIE maintains the tree board and ordinance, and the NRM organizes an Arbor Day celebration (Section 7.15) and submits a Tree City USA application annually.

In 2022, Altus AFB celebrated Arbor Day by planting 5 Oklahoma redbuds (*Cercis canadensis* var. *texensis 'Oklahoma'*) along the base commissary parking lot and 16 fruit trees alongside the community garden to create a small orchard. 97 CES/CEIE also planted an Oklahoma redbud at the Wings of Freedom Park and as a memorial tree by the 97 CES building. As of June 2023, the NRM maintains 149 trees that 97 CES/CEIE planted in the last few years. Maintenance includes watering, mulching, weeding, wrapping trunks, and staking and pruning the trees as needed. In 2023, the NRM provided instruction on the placement and type of species to plant at the new fire station on base. In fall 2023, to provide shade and beauty at Building 358, the 97 CES/CEO planted 12 trees of the following species: bur oak (*Quercus macrocarpa*), desert willow (*Chilopsis linearis*), Oklahoma redbud, and prairiefire crabapple (syn., prairie crab apple, *Malus ioensis*).

IAW the Tree City USA designation, for every live urban tree removed on base, the party responsible for the tree removal must then plant another tree on the installation to offset the loss. All tree planting must follow the proper procedures outlined in Figure 7-1 to encourage survivability. Replacement trees must not have a trunk caliper greater than 1.5 inches at the time of planting. When planting a tree, it is important to note how the age of the tree will impact the care necessary to maintain its health. Older and larger trees take longer to establish roots, requiring more water over a longer period, and have a slower growth rate until establishment. Trees with 2-inch caliper trunks take at least 3 years to establish.

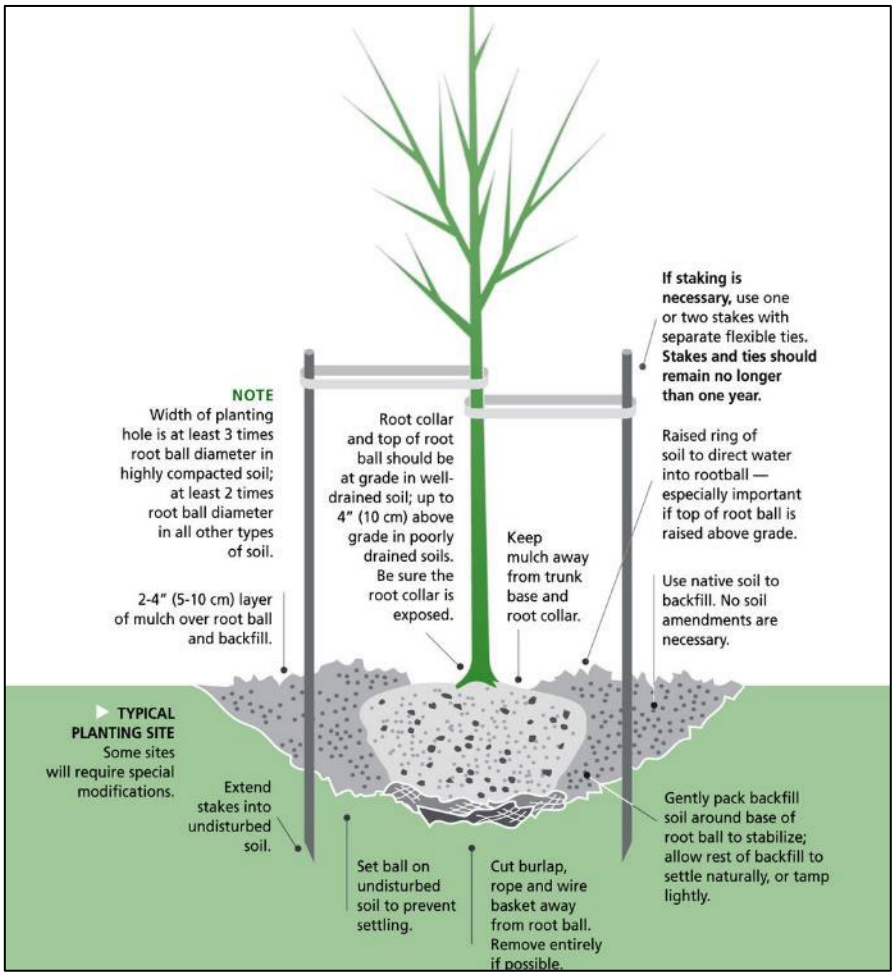

Figure 7-1. Proper tree planting diagram (Trees for Missoula 2024)

The climate and natural history of the region make tree establishment difficult. Nutrient-limited soil, low annual precipitation, high wind, high heat, ice storms, and other factors limit the productivity of woody vegetation. While Altus AFB still pursues the establishment and maintenance of urban trees, 97 CES/CEIE does not have the resources to facilitate widespread planting. To meet the goal of the Urban Forestry Program, ensure a higher chance for viability of plantings, and IAW the 1994 Presidential Memorandum (60 FR 40837), 97 CES/CEIE will select only appropriate, regionally native species for plantings. Planting exceptions may occur for areas within the BASH Wildlife Exclusion Zone to reduce wildlife presence. 97 CES/CEIE established the following mandatory conditions for all new tree plantings:

- The NRM must approve all tree planting/removal requests
- Use only native species from the Native Plants Recommended for Conservation Landscaping list (Table 7-1), unless otherwise approved by the NRM
- Planters must confirm that all trees are free of invasive and/or noxious species (such as red imported fire ants) before entering the installation
- Before planting, there must be a 2-year irrigation and maintenance plan for all plantings

- No use of rubber or plastic mulches, as these materials leach toxins into the soil and/or water and break down into microplastics
- No use of tree grates, as they can damage trunks as they grow larger and require maintenance; Alternatives may include wood mulch, groundcover plants, edging, and fencing
- Off-base companies must place an Oklahoma One-Call System Inc./OKIE811 request to locate underground utilities prior to any planting. For any excavation deeper than 4 inches, the responsible party must obtain a dig permit from 97 CES. Finally, the responsible party must submit an Air Force (AF) Form 103 (Base Civil Engineering Work Clearance Request) to the 97 CES/Requirements and Optimizations Office (97 CES/CEOER) at 97CES.CEO.R_O@us.af.mil (call extension 1220, 6592, or 6606 for more information).

To support the installation's Urban Forestry Program, the USFWS and 97 CES/CEIE conducted an urban tree inventory in FY24/25. Data collected included species identification, location, height, diameter at breast height, health condition, age class, habitat type, hazard rating, maintenance needs, and ecological status (e.g., native, exotic, invasive). The urban tree inventory also included a hazard score rating and a condition assessment to determine which trees may require removal or trimming to ensure safe environmental conditions. The increasing severity of storms and extreme heat/drought events is resulting in less-tolerant trees that can fall, become sick, or die. These weather events are also making trees more susceptible to infestation, including the elm leaf beetle (*Xanthogaleruca luteola*; Section 7.11). Moreover, many trees on the golf course are nonnative and are not adapted to the hot, dry landscape, so they are experiencing a mass die-off. Data from the inventory will contribute to disaster-relief preparation to reduce the risk of infrastructure damage or loss following wind, hail, ice storms, or tornadic activity.

Ongoing tree monitoring and assessment will help identify hazardous trees and contribute to the development of an Urban Forest Management Plan (UFMP). Moreover, 97 CES/CEIE should continuously edit and revise the urban tree inventory dataset based off plantings, maintenance activities, and storm events to monitor changes and gauge the success of tree planting, as well as the ongoing effect of drought conditions and severe storm events on established trees. Revisiting the survey will also help monitor hazard trees and identify new hazard trees for potential maintenance or removal.

A proactive and ongoing urban tree inventory will provide data to incorporate in a range of other management plans at Altus AFB. For example, 97 CES/CEIE is providing data from the urban tree inventory to the Emergency Management office for incorporation into their Emergency Response Plan to assist with disaster-relief preparation. As the area continues to experience an increase in high winds, ice storms, and tornadic activity (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024), augmenting the risk of hazardous trees to installation infrastructure and personnel, continued urban tree surveys and coordination with the Emergency Management office will be vital to ensure the resilience of the installation. Additionally, maintaining healthy urban forests increases the aesthetic appeal of the installation, provides shade for personnel and infrastructure, and reduces the likelihood of hazardous trees breaking or falling over. The inventory will also assist in efforts to mitigate issues caused by Mississippi kites that nest in urban trees on the golf course (Section 7.1).

In addition to the urban tree inventory, 97 CES/CEIE should conduct a basewide plant species inventory (floristics survey) to provide vegetation data to incorporate into other plans and derive goals for future natural resources management. 97 CES/CEIE should carefully plan and synchronize the urban tree inventory updates and floristic surveys for cost-effective data acquisition. The floristic survey will also allow the installation to document any invasive species present on the base, including those that may establish in turf and landscaped areas. Integrating BMPs into the grounds maintenance PWS will help

prevent invasive species introductions by limiting their spread through crews and maintenance equipment (Section 7.11).

The protection and monitoring of the urban forest on base will be vital as natural hazards (e.g., drought, increased evapotranspiration rates, severe storm events) threaten the resiliency of the installation and its species. Urban forest tracts are necessary habitats for multiple species. Pursuant to the ESA and MBTA, maintaining non-commercial forest stands with dead or dying wood provides cover and foraging opportunities for many wildlife species, including migratory birds and native bats. The USFWS encourages the protection of forest stands that provide roosting or hibernacula habitat, as the tricolored bat will roost and nest in snags of forest stands (USFWS 2024*c*). 97 CES/CEIE maintains healthy urban forest stands IAW the management guidelines of the DAF Pollinator Conservation Reference Guide (Section 2.B.3) to ensure maintenance of healthy pollinator habitat. Thus, urban forest management should employ an adaptive conservation approach to ensure the protection of listed species and assist in the prevention of potential listings as natural hazards continue to threaten species survival.

7.8 Forest Management

Installation Supplement

Applicability Statement

This section applies to DAF installations that maintain forested land on DAF property. This section **IS NOT** applicable to this installation.

Program Overview/Current Management Practices

No natural forest stands occur at Altus AFB; the base has only a small urban forest tract. 97 CES/CEIE does not conduct any commercial forestry activities, as the installation does not contain forest stands that are large enough for harvesting (DAFMAN 32-7003, Section 3.44.6).

7.9 Wildland Fire Management

Installation Supplement

Applicability Statement

This section applies to DAF 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 this installation.

Program Overview/Current Management Practices

Wildland fire is any non-structural fire that occurs in a wildland setting. There are 3 types of wildland fire: wildfire (unplanned ignition), wildland fire use, and prescribed fire (DAFMAN 32-7003, Section 3.76). Natural, unplanned fires are an essential and historical ecological disturbance regime in southwestern Oklahoma. Wildland fire is an ecosystem driver that facilitates ecosystem processes, including water and nutrient cycling, necessary for a healthy landscape that can support the military mission. Native plants have evolved tolerance to periodic fire, with some plants requiring fire to complete their life cycle. Both native plants and wildlife species are dependent upon wildland fire to create or maintain suitable habitat. Due to the fire-adapted landscape, prescribed fire, a planned wildland fire used to achieve management objectives, is a natural ecosystem restoration tool (Oklahoma State University 2021). Prescribed burning is also a time-

saving and cost-effective land management tool compared to various mechanical means of vegetation maintenance and habitat manipulation.

The US Forest Service (USFS) *Guidance for Implementation of Federal Wildland Fire Management Policy* (USFS 2009) establishes guiding principles for wildland fire management actions on federal lands when consistent with DoD policies (DAFMAN 32-7003, Section 3.76). Pursuant to DoDI 6055.6, *DoD Fire and Emergency Services Program*, and DAFI 32-2001, *Fire and Emergency Services Program*, all DAF installations with burnable acreage must have a current WFMP to reduce wildfire potential, establish firefighter and public safety protocols, implement ecosystem resiliency goals, and protect and enhance valuable infrastructure and natural resources (DAFMAN 32-7003, Section 3.78). The WFMP supports the DAF's Wildland Fire Program mission of using wildland fire for ecosystem management, promoting long-term range sustainment, providing valuable fire-related information to decision-makers, and leveraging partnerships with federal or state agencies (DAFMAN 32-7003, Section 3.77.2).

EO 13855, *Promoting Active Management of America's Forests, Rangelands, and other Federal Lands to Improve Conditions and Reduce Wildfire Risk*, encourages federal agencies to collaborate with state and local governments to manage lands for fire. The NRM, Altus AFB FES, and the AFCEC/CZOF collaborated on the development of the 2025 WFMP (Tab 1). 97 CES/CEIE, Altus AFB FES, and AFCEC/CZOF should annually review the plan. Updates to the WFMP should incorporate new data, strategies, and wildland fire goals on a 5-year basis. The WFMP works in tandem with the Prescribed Burn Plan (Tab 6) for Altus AFB, which is also written in collaboration between 97 CES/CEIE, Altus AFB FES, and AFCEC/CZOF.

The Bureau of Land Management conducts all prescribed burning efforts under contract by AFCEC (D. Kelley, personal communication, 2024). The Prescribed Burn Plan outlines all standards required for prescribed fire operations on Altus AFB. IAW the Prescribed Burn Plan, the DAF Wildland Fire Branch's JBSA WSM annually conducts prescribed burning along the Altus AFB flightline in preparation for the Tora Tora Tora airshow event, in which the installation uses pyrotechnics to reenact the 1941 attack on Pearl Harbor. As previously mentioned, the installation does not conduct prescribed burns from 1 April through 1 August to avoid harming migratory birds during nesting season.

The WFMP (Tab 1) details fire management methods, including a combination of wildland fire and non-fire fuels treatments, to meet natural resources objectives outlined in the INRMP, including native habitat management on the installation. Prescribed burns control the growth of invasive plants and enable nutrients from dead plant materials to nourish the soil. Additionally, routine prescribed burning reduces the risk of catastrophic wildfires by reducing fuel loads such as dead vegetation.

In March 2023, the JBSA WSM burned approximately 20.5 acres of semi-improved, degraded grassland on the main base (Figure 17 in Tab 7) dominated by invasive Bermudagrass. This prescribed burn also removed an extensive buildup of dead fuels left from years of mowing and rejuvenated the soil through nutrient cycling. The NRM has proposed this area as a potential site for complete prairie restoration through vegetation removal and seeding beginning in FY26.

By establishing a natural fire regime through the WFMP and the Prescribed Burn Plan, Altus AFB directly support native flora and fauna that are adapted to these natural disturbances. As discussed in Section 7.2, 97 CES/CEIE is establishing approximately 22 acres of mixed-grass prairie habitat around the new fishing pond at Excellence Park. Once the new plantings establish, 97 CES/CEIE will burn the area every 3 to 5 years to maintain this regime. All prescribed burning actions must follow the BMPs outlined in the DoD's 7(a)(a) Conservation Strategy for the Monarch butterfly (Natural Resources Institute 2024):

- Conduct prescribed burns when monarchs are not present (i.e., November to April).
- Leave unburned patches (at least one-third the area of the proposed burn footprint) that provide refugia (i.e., nectar and breeding sites) for monarchs that can then recolonize the burned area the next season.
- For post-prescribed fire restoration, implement Grassland Restoration Activity BMPs (Section 7.1).

To reduce fuel load on the installation, 97 CES/CEIE uses mechanical fuel treatment to maintain healthy forests. Mechanical fuel treatments include the use of machinery or tools to physically remove or alter the fuel structure and density in an area and reduce the amount of flammable material in forest stands (USFS 2024). 97 CES/CEIE conducts mechanical treatment in combination with chemical herbicide application to manage vegetation (Section 7.9). For example, 97 CES/CEIE implements prescribed burns at the SDZ to control the growth and spread of woody vegetation (Figure 18 in Tab 7; Altus AFB 2022*c*).

The WFMP also establishes prevention measures to protect military personnel, operations, and natural resources on the installation in case of a wildfire. Wildfires can disrupt mission operations by reducing visibility and destroying the natural landscape required for the military mission. Most areas of the installation are developed lands (Section 2.4.2), limiting the potential for a severe fire to occur. However, the WFMP provides guidelines, such as fire breaks and trained personnel requirements, to ensure Altus AFB is prepared and able to protect all of its assets.

The mission of Altus AFB does not include activities that are highly fire prone, such as live-fire training. However, the Altus AFB region is experiencing increasing risk of wildland fires, particularly during periods of drought (NOAA National Centers for Environmental Information 2022, Jackson County Department of Emergency Management 2024, Oklahoma Department of Emergency Management). Periods with high temperatures can lead to reduced relative humidity, particularly during the hottest parts of the day, and thus overall drier conditions. For example, after a prolonged drought in the region, a severe wildfire broke out in the adjacent Wichita Wildlife Refuge on 24 October 2024, causing a high fire-alert state at Altus AFB, with high rates of smoke that impacted visibility in the area (NOAA 2024, USFWS 2024*g*).

Additionally, wildland fires may spread more rapidly and produce more intense fire behavior due to invasive species and tall grasses, which contribute to high fuel load, in tandem with high-wind events. High quantities of grass fuels may make firefighting more difficult due to both navigability and, potentially, a greater fire intensity. In aggregate, wildland fires will continue to be a potential issue on the installation. An active wildland fire management program at Altus AFB can reduce the wildland fire risk on the installation by reducing the fuel load.

7.10 Agricultural Outleasing

Installation Supplement

Applicability Statement

This section applies to DAF installations that lease eligible DAF land for agricultural purposes. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Altus AFB leases approximately 14.58 acres of land for crop production (primarily, cotton and wheat) to private farmers. This land is located west of the installation, south of Falcon Road and east of Veterans Drive (Figure 19 in Tab 7). 97 CES/CEIE annually collects the agricultural outgrant revenue, which the program uses to support its natural resources initiatives (DAFMAN 32-7003, Section 3.55).

The USACE is the primary supporting agency for administering agricultural outgrants on DAF lands. The NRM, 97 AMW/SEF, and Range Operating Agency provide technical oversight during the review and approval of the outgrant documents and their associated land use. Actions on the Altus AFB cropland lease must follow the guidance of the written land use rules to ensure compatibility with the military mission and the natural resources management objectives outlined in the INRMP (DAFMAN 32-7003, Section 3.49.1 and Section 3.49.2).

In addition to the land use rules, the lessee must take all feasible actions to protect the environment and natural resources of the property IAW all applicable laws and regulations pertaining to their cropland operations. Pursuant to the CWA and ODEQ environmental quality standards, the lessee must act IAW the guidelines established by the installation's Hazardous Waste Management Plan and SWPPP. These plans prohibit the disposal of toxic or hazardous materials on the property, including discharge of waste or effluents that may contaminate surface waters, groundwater, or air.

Land use rules are based on BMPs for natural resources protection, including sedimentation and erosion control, as established by the USDA NRCS and Oklahoma Department of Agriculture guidelines (Altus AFB 2023*b*). To verify compliance with the technical terms of the outgrant and the land use rules, the NRM conducts annual scheduled inspections of the cropland lease operations IAW Air Force Instruction (AFI) 32-9003 and the INRMP (DAFMAN 32-7003, Section 3.50.5 and Section 3.53). During the annual monitoring, the NRM uses a checklist based on the land use rules to inspect outgrant operations. The NRM then submits annual inspection reports to the administering real property office.

Annual monitoring of the cropland outgrants also ensures that the outgrant operations are not creating unacceptable soil losses from erosion or causing point-source or non-point pollution to any natural water body. In the 2022 and 2023 annual inspections, the NRM determined that the lessee was not taking measures to prevent or control soil erosion, despite identifying areas where the operations are likely causing soil loss from erosion (Altus AFB 2022*d*, 2023*b*). To minimize and prevent or minimize soil erosion and non-point sources of water, the lessee must follow the following BMPs, as mandated by the land use rules:

- Maintain the land in good condition and free from weeds, brush, washes, gullies, and other erosion that is detrimental to the agricultural value of the land.
- Maintain all soil and water conservation structures that existed at the start of the lease or the lessee constructs.
- Erosion control structures such as water ways and filter strips may not be cut for hay, disked, or otherwise disturbed.
- The lessee must use conservation tillage to the maximum extent possible. Conservation tillage includes any method of crop production that minimizes cultivation and leaves 30.0% ground cover following harvesting.
- When the lessee is growing row crops, the lessee must limit fall tillage to light chiseling of the ground.
- The lessee must harvest crops in a manner that leaves the stubble as tall as practical, and the lessee cannot harvest stubble for feed or burned.
- As directed by 97 CES/CEIE, the lessee shall be correct any soil erosion occurring outside the premises resulting from outlease activities.

The NRM may also monitor other direct and indirect impacts of agriculture outgrant activities on surrounding land and water resources. 97 CES/CEIE monitors water runoff from cropland outgrants as needed to detect levels of pesticides or fertilizer that exceed state regulatory requirements (DAFMAN 32-7003, Section 3.53). Water runoff from the property drains east into the wet woodland area of the

installation, adjacent to an unnamed tributary to Stinking Creek. The 2022 inspection did not include sampling water from the unnamed tributary to Stinking Creek. The 2023 inspections did not detect pollution from the outgrant in the adjacent Stinking Creek. The NRM's inspections in 2022 and 2023 confirmed that the outgrant operations complied with EO 11988 (Altus AFB 2022*d*, 2023*b*).

IAW the land use rules, the lessee uses US EPA-registered herbicides and fertilizer. Lessees applying pesticides must maintain state certification requirements and comply with the application guidelines stated in AFMAN 32-1053, *Integrated Pest Management Program*. The lessee must report all pesticide usage (in pounds of active ingredient) to the installation's 97 CES/CEOI. However, in 2022 and 2023, the lessee did not receive approval from the 97 CES/CEOI before herbicide application and failed to report the total herbicide usage to the shop, violating the land use rules (Altus AFB 2022*d*, 2023*b*). Due to this violation, 97 CES/CEIE notified the lessee of this mandatory action as required by DAFMAN 32-7003, Section 3.54.1 and AFMAN 32-1053 (Altus AFB 2023*b*). The 2022 and 2024 annual monitoring determined that the cropland outgrant operations was in compliance with the Federal Noxious Weed Act (Altus AFB 2022*d*). However, in 2022 and 2023, the NRM noted that the lessee was not conducting any pest management actions to control the invasive Chinese tamarisk (*Tamarix chinensis*) and Johnsongrass located on the edge of the outgrant property (Altus AFB 2022*d*, 2023*b*).

Monitoring the site ensures ongoing compliance with federal and state regulations like US EPA standards. The annual monitoring also ensures outgrant operations do not attract wildlife that pose a risk to airfield operations (DAFMAN 32-7003, Section 3.53.4). The Altus AFB cropland lease is outside of the BASH Wildlife Exclusion Zone. The 2022 and 2023 inspections verified the outgrant program is consistent with the installation's BASH program.

7.11 Integrated Pest Management Program

Installation Supplement

Applicability Statement

This section applies to DAF installations that perform pest management activities in support of natural resources management (e.g., invasive species, forest pests). This section **IS** applicable to this installation.

Program Overview/Current Management Practices

IAW the DoD Pest Management Program; DoDI 4150.07, *Pest Management Program*; and AFMAN 32-1053, Altus AFB maintains an IPMP to guide pest management actions on the installation (Tab 5). AFMAN 32-1053 defines pests as plants, animals, bacteria, invasive/exotic organisms, or other organisms that pose a risk to the installation's military readiness and operations by adversely affecting the morale, welfare, and health of installation personnel and/or damaging real property, supplies, equipment, or vegetation.

The installation implements the IPMP pursuant to EO 13112 and the 2016–2018 National Invasive Species Council Management Plan (National Invasive Species Council 2016), which includes DoD objectives to prevent and control invasive species and conduct restoration with native species. The 97 CES/CEOI maintains and implements the IPMP through a program of inspections and integrated pest management techniques. IAW DoDI 4150.07, integrated pest management is the sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a manner that minimizes economic, health, and environmental risks. Pest management operations on Altus AFB use targeted sustainable methods to control pests, including the use of the least hazardous pesticides available (Tab 5).

The IPMP ensures the responsible handling, storage, use, and disposal of pesticides IAW local, state, and federal regulations. The Environmental Hazardous Materials Program Manager monitors pesticide storage and inventories IAW applicable legal requirements. Personnel apply pesticides on Altus AFB IAW DoD policy and state and federal regulations. The IPMP and INRMP are mutually supportive, establishing BMPs for pest management that support the ecological integrity of the installation. Coordination between the 97 CES/CEIE and the 97 CES/CEOI is necessary to conduct quality assurance of the grounds maintenance contracts for the purpose of minimizing herbicide and insecticide use on the base, particularly for the protection of monarchs and other pollinator species. All pesticide use must follow the BMPs outlined in the DoD's 7(a)(1) Conservation Strategy for the Monarch Butterfly (Natural Resources Institute 2024):

- Use pesticides IAW DoD policies and by following lab directions.
- Reduce or eliminate the use of pesticides in areas with known monarch presence.
- Limit insecticide exposure where possible and avoid the use of neonicotinoids any time of the year in monarch habitat.
- Apply pesticides with targeted methods to reduce drift into non-target areas.
- Apply herbicides only when monarchs and other pollinators are less likely to be nectaring on the plants and when plants are more responsive to treatment.
- Ensure all staff and contractors are knowledgeable in plant identification to protect non-target plants.

Altus AFB's pest management program prioritizes control of pests that pose a higher risk to human health, including bees (Anthophila clade), wasps (*Vespula* spp.), hornets (*Vespa* spp.), fleas (*Siphonaptera* spp.), ticks (*Ixodida* spp.), bed bugs (*Cimex lectularius*), and mosquitoes. Other targeted pests include nuisance pests (ants, spiders, millipedes, centipedes, gnats, crickets, and mice), structural pests (termites), noxious or invasive vegetation, and vertebrate species that present a risk to property or human health. The 97 CES/CEOI implements ongoing inspection and monitoring of the base to identify potential pest issues and exercise control measures (Tab 5). Common pest issues on the installation include controlling feral dogs and cats, weeds, birds roosting in hangars, and ants and mice in installation facilities.

A major pest management objective of Altus AFB is controlling mosquitoes on the installation, particularly in the summer when mosquito numbers are at their peak. The primary method of mosquito control includes larvicide dunks in standing water. Larvicide application begins when the 97 CES/CEOI detects larvae during larvae surveys. The Bioenvironmental and Public Health unit also uses light traps and Mosquito Magnet traps to survey mosquitoes throughout the installation. The unit sends the collected mosquitoes to a lab for identification. Results from the trap survey help establish a route for mosquito fogging (Tab 5).

The 97 CES/CEOI conducts mosquito fogging on Altus AFB when deemed necessary by the Bioenvironmental and Public Health Unit and IAW the unit's annual threshold for control based on the number and species of mosquitoes collected in the light traps that year. Mosquito fogging occurs only from dusk to dawn. The 97 CES/CEOI often fogs the entire industrial side of base, primarily focusing on the Youth Center, dormitories, the Windy Trails Golf Course, hangars and the flightline, and the baseball and softball fields. No fogging occurs at base housing, nor Excellence Park. The 97 CES/CEOI avoids fogging near flowering plants to minimize potential drift. Fogging ends once the Public Health Unit surveys reveal that the mosquito population is dying off and the 97 CES/CEOI surveys detect no larvae.

The installation informs 97 CES/CEIE of all mosquito control actions so the NRM can ensure that the use does not impact other terrestrial or aquatic invertebrates. The 97 CES/CEOI must inform the NRM before any fogging can occur to ensure that fogging does not impact pollinator species. The 97 CES/CEOI cannot conduct mosquito fogging within 300 feet of the monarch waystation to protect the pollinator species

present, including monarch butterflies (Section 7.4). The 97 CES/CEOI should avoid fogging in the mixed-grass prairie restoration site surrounding the new fishing pond to protect the establishing pollinator habitat. The Bioenvironmental Health Unit tests for West Nile Virus and other mosquito viruses on Altus AFB quarterly.

97 CES/CEIE is coordinating with the 97 CES/CEOI on the BMPs to mitigate the elm leaf beetle outbreak on the installation. This nonnative pest is targeting Siberian elm and hybrid elm trees on the installation. Effective management of this pest requires consideration of the potential impacts that insecticide application may have on the health of the trees and survival of other invertebrates.

Invasive Species Management

IAW EO 13112 and EO 13751, 97 CES/CEIE manages invasive species to limit potential interference with the military mission, as invasives can damage property, increase maintenance costs, and impair the ecological integrity of the landscape by outcompeting native species. Management of noxious or invasive plants on the installation is conducted IAW the requirements listed in the Federal Noxious Weed Act. 97 CES/CEIE ensures all natural resources supplies (i.e., trees, soil, seed, plants) brought onto the installation are free of invasive or noxious species. Invasive or exotic vegetation species found on Altus AFB include common reed, Johnsongrass, Bermudagrass, saltcedar, field bindweed, and Russian thistle. These species may outcompete native species, which may eventually reduce the resiliency of the landscape.

IAW the IPMP, the NRM works with the 97 CES/CEOI to identify and implement control measures for invasive species. The NRM and the 97 CES/CEOI can collaborate on identification surveys of noxious or invasive species to subsequently plan targeted control applications. Assessing the presence and extent of invasive species on the installation with continued monitoring will ensure that the IPMP will support the INRMP with up-to-date invasive species data to guide appropriate management (DAFMAN 32-700, Section 3.36.1).

The IPMP outlines management initiatives to reduce the presence of invasive or noxious animals on the installation for the protection of base assets and personnel health. Invasive animals include European starlings, house sparrows (*Passer domesticus*), Eurasian collared doves, rock pigeons, Norway rats, and house mice (Altus AFB 2022*e*). The IPMP mandates the immediate removal of these species after identification through live trapping or lethal removal. 97 CES/CEOI personnel coordinate with USDA–APHIS–WS on implementing control measures for noxious or invasive pests.

To limit the spread or introduction of invasive plant species on the installation, all plantings and landscaping must follow the native species plant list developed by the NRM (Table 7-1). All habitat enhancement and restoration efforts on the installation are IAW the IPMP to control potential introduction of exotic and invasive species.

Invasive species are able to thrive in unstable conditions such as warming temperatures and altered precipitation patterns, often expanding their range and abundance. The combination of more severe wildland fires and drier conditions is placing considerable stress on native species and allowing invasive species to outcompete them. Wildland fire may allow nonnative grasses to replace native grasses and woody plants, as these nonnative grasses can become established more readily post-fire (Hunter et al. 2006). Monitoring of an area after a prescribed or wildland fire may be necessary to identify and remedy potential invasive establishment.

As discussed in Section 7.1, changing environmental conditions are facilitating the establishment and spread of pest species, including mosquitoes and ticks. Minimization of stagnant water in and around the

cantonment area will help to reduce mosquito-related infections. Hotter temperatures and milder winters are leading to increased range of tick species and an increase in their populations (Bacon et al. 2022). The installation can minimize tick populations in urban settings by keeping lawns mowed and preventing an overabundance of hosts such as deer and rodents.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Installation Supplement

Applicability Statement

This section applies to DAF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Wildlife–aircraft strikes are a serious flight safety concern and can cause significant monetary loss from aircraft damage. The installation has a higher annual strike rate than any other AETC wing due to its location and the type of flying operations that often incur high strike risk (low-level flying and nighttime flight operations). The objective of the DAF BASH program is to prevent wildlife-related aircraft strikes and minimize the potential for wildlife hazards to aircraft operations (DAFMAN 32-7003, Section 3.62).

The installation manages BASH under a cooperative agreement with USDA–APHIS–WS, which instates a full-time USDA–APHIS–WS wildlife biologist and supporting technicians to mitigate BASH risk at the installation. The BASH Plan (Tab 2) and the Wildlife Hazard Assessment (WHA; Altus AFB 2020*c*) guide the Altus AFB BASH program. The BASH Plan incorporates guidance from DAFI 91-202, *US Air Force Mishap Prevention Program*, and DAFI 91-212 to establish procedures and actions that minimize the potential of aircraft bird strikes. The BASH Plan and its implementation are moderated through the Bird Hazard Working Group (BHWG), which is chaired by the Wing Commander (or Vice Wing Commander when Wing Commander unavailable) and is composed of representatives from the 97 CES/SEF, 97 CES/CEIE, airfield management/base operations, air traffic control, and other organizations interested in BASH concerns and coordinated efforts to reduce risks (Tab 2).

The NRM annually reviews the BASH Plan to ensure it is mutually supportive with the INRMP with respect to Altus AFB's objectives for wildlife management. The NRM also provides technical expertise on continued development and implementation of the BASH Plan to reduce wildlife risks to base personnel and property. Similarly, the NRM works collaboratively with USDA–APHIS–WS biologists on natural resource projects, prior to implementation, to ensure there are no conflicts with the BASH program (DAFMAN 32-7003, Section 3.62.2).

To reduce wildlife presence in and around the airfield, USDA–APHIS–WS biologists are responsible for direct wildlife management actions, including depredation, hazing, and nonlethal removal (Altus AFB 2020*c*). Whenever wildlife poses a hazard to aircraft operations, USDA–APHIS–WS biologists disperse the individuals from the airfield using vehicles, pyrotechnics, propane cannons, sirens, and horns. They operate a raptor banding and relocation program in which they set raptor traps (e.g., goshawk traps) throughout the airfield to capture raptors, including red-tailed hawks (*Buteo jamaicensis*), cooper's hawks (*Accipiter cooperii*), and owls (*Strigiformes* spp.). Other trapping mechanisms for raptors, particularly American kestrel (*Falco sparverius*) and prairie falcon (*Falco mexicanus*), include Bal-chatri and pole traps.

The USDA–APHIS–WS biologist annually submits a depredation report and permit renewal application to the USFWS for wildlife depredation and salvage (Tab 2). The NRM reviews the depredation report and application prior to submittal. The 97 AMW/SEF and the USDA–APHIS–WS biologists are responsible for all federal and state permit reporting requirements (DAFMAN 32-7003, Section 3.63.2.2).

IAW the BASH Plan, 97 CES/CEIE ensures all BASH management activities are IAW federal and state regulations for protected wildlife and their habitats (Tab 2). Pursuant to the MBTA, the 97 AMW/SEF maintains a federal USFWS migratory bird depredation permit for the intentional take of migratory birds in support of the BASH program. The installation may warrant emergency wildlife control measures if unanticipated wildlife problems endanger base operations or threaten public health. In the event of emergency take of migratory birds, the USDA–APHIS–WS biologists notify the USFWS Region 2 Migratory Bird Permit Office within 48 hours via email and provides a description of the emergency, the species and number of birds taken, and the method of take. The NRM coordinates with the USDA–APHIS–WS biologists to assist with migratory bird habitat management efforts, such as assisting with raptor banding and relocation efforts and assisting the USDA–APHIS–WS biologists as needed with projects to reduce wildlife attractants on the airfield and in the Wildlife Exclusion Zone (Altus AFB 2020*c*).

97 CES/CEIE and USDA–APHIS–WS coordinate depredation activities with ODWC to mitigate dove presence on the airfield through the annual 1-day dove hunt (Section 7.2; DAFMAN 32-7003, Section 3.63.2.2.3). The organized hunt occurs along the perimeter of the airfield. Increased participation in this event will contribute to a reduced BASH risk, as doves are among the most commonly struck species at the installation (Altus AFB 2020*c*).

IAW DAFI 91-212, USDA–APHIS–WS biologists conducted a WHA in 2020 to identify wildlife hazards to improve mitigation. Pursuant to the BASH Plan, the WHA implemented routine surveys to collect information on wildlife that pose a BASH risk in and around the airfield (Figure 20 in Tab 7). IAW DAFI 91-202, Section 7.3.1.5.9, maintaining these surveys in and around the airfield is crucial to maintaining a data-driven BASH program, as the information can guide mitigation technique innovation and adaptability (Altus AFB 2020*c*). The Motus system is particularly important and must remain operational, as it is a cost-effective, efficient method for tracking wildlife. Additionally, the Motus system will also assist in the detection of other species of conservation concern such as migratory SGCN like the chestnut-collared longspur (*Calcarius ornatus*).

Routine monitoring has contributed to Altus AFB's well-informed BASH management program, revealing the resident and migratory species that pose the greatest risk to aircraft every season (USDA–APHIS–WS 2024). Through routine monitoring, the BASH program was able to determine that the most commonly struck species year-round are mourning doves and Brazilian free-tailed bats (Section 7.4). The Brazilian free-tailed bat presents a risk during low-level flight operations, particularly where the low-level flight routes occur directly over a nursery cave in Reed, Oklahoma, which is inhabited by an estimated 500,000 bats. Flight operations above this cave occur at slightly higher levels to reduce BASH risk; however, locally on the airfield, aircraft still strike bats at high rates (Altus AFB 2020*c*).

The monitoring surveys conducted by the USDA–APHIS–WS biologists also determined that the other species of greatest BASH risk on the installation are Canada geese (*Branta canadensis*), European starlings, raptors, brown-headed cowbirds (*Molothrus ater*), eastern meadowlarks, western meadowlarks, and coyotes (Altus AFB 2020*c*, USDA–APHIS–WS 2024). Coyotes are a common BASH species at Altus AFB, and approximately 50 coyotes lethally removed from the airfield annually (A. Kohler, personal communication, 2024). Coyotes are present on the airfield because the airstrip acts as a major movement

highway for them, and denning is common on the airfield. To reduce coyote presence, USDA–APHIS–WS biologists mainly haze the animals off the airfield and install foothold and snare traps around the airfield.

In the future, 97 CES/CEIE and the BHWG may mitigate coyote use of outfalls and enhance the current perimeter fence line to limit coyote movement and base access. The WHA documented the instability of the perimeter fencing, as the fence has fallen multiple times, particularly during flooding events, allowing larger wildlife species to enter. Moreover, USDA–APHIS–WS documented that mammal species, including coyotes, commonly dig under the fencing to enter the installation (Altus AFB 2020*c*). Additionally, further investigation into potential attractants for coyote denning on the airfield will help future management of this species. 97 CES/CEIE should continue to monitor other medium and large mammals, such as the commonly present American badger and bobcats, in coordination with USDA–APHIS–WS to ensure their deterrence from the airfield (Altus AFB 2020*c*).

The vast database from the routine surveys has also contributed to the installation's understanding of areas with high BASH risk, which can subsequently guide appropriate mitigation actions. For example, to reduce BASH risk, USDA–APHIS–WS biologists and 97 CES/CEIE coordinated the removal of the old fishing pond adjacent to the airfield and located the new fishing pond near base housing, away from the airfield (DAFMAN 32-7003, Section 3.63.2.1). The former fishing pond was a major wildlife attractant, acting as a stopover site for migrating birds, creating some of the greatest BASH risk on the installation (Figure 20 in Tab 7). The removal of this attractant, mitigation of pooling on the airfield, and management of airfield drainage ditches to reduce attractiveness to wildlife are necessary to reduce BASH risk (DAFMAN 32-7003, Section 3.63.4).

Altus AFB conducts additional habitat modification to control BASH risk, as the installation contains favorable habitat for feeding, loafing, breeding, and roosting for resident and migratory birds. The installation does not have an Airfield Vegetation Management Plan; however, the BASH Plan outlines habitat modifications to reduce BASH risk (Tab 2). Pursuant to the grass height requirements of DAFI 91-202, the grounds maintenance PWS for airfield maintenance requires grass heights to be between 7 to 14 inches (Section 7.7). IAW the BASH Plan, the PWS also mandates maintaining a monoculture on the airfield to reduce attractiveness to wildlife (Altus AFB 2024*h*). Additional vegetation modification measures include eliminating broad-leaf weeds, removing perch sites and brushy or forested areas, reducing/eliminating standing water, and planting non-seeding grasses or mowing before seed heads develop.

USDA–APHIS–WS provides recommendations and data for management of the installation's BASH program for airfield safety compliance (DAFMAN 32-7003, Section 3.44 and Section 3.62). The UFC 3-260-01, *Airfield and Heliport Planning and Design*, mandates the removal of all trees within the lateral clearance distances of the runway, taxiway, and apron, as well as within the graded area of the clear zone. Additionally, IAW UFC 3-260-01, DAFMAN 32-7003 (Section 3.44.7) mandates the removal of trees in these areas that are within the imaginary glideslope to support airfield safety and operations. The installation permits trees near the airfield if they do not interfere with airfield operations nor cause a BASH risk. The USDA–APHIS–WS biologists in the BASH program annually assess trees in the vicinity of the airfield to determine maintenance or removal need per BASH and occupational safety requirements. USDA–APHIS–WS provides recommendations for review and approval by the BHWG.

During the annual assessments, USDA–APHIS–WS identified the areas north of Runway 18R and east of 36R (otherwise known as Unit 6) as containing substantial woody vegetation that strongly attracts wildlife. Additionally, these areas pose a security risk, as the trees can grow taller than the fence, facilitating potential trespass opportunities as described in UFC 4-022-03. These areas are not on installation property; however,

they are in the immediate proximity to runway operations, and USDA–APHIS–WS recommended the maintenance of these areas to ensure airfield safety (Altus AFB 2020*c*). Altus AFB coordinated with the private landowner to discuss possible solutions. Due to the proximity and land type, these areas may contain easements for habitat modification. Investigation by 97 CES/CEIE into the feasibility of obtaining a conservation easement or assisting in mechanical and chemical treatments to reduce mesquite cover will support the BASH program.

The PWS prohibits the planting of vegetation that could attract wildlife around the airfields and advises the removal of any such plants in the vicinity of the airfield (DAFMAN 32-7003, Section 3.63.5).

USDA–APHIS–WS biologists and the BHWG also provide recommendations to adjust flight operations for the reduction of BASH risk. To reduce strikes with aircraft moving between airfields, the BHWG instated the Altus AFB Go and No-Go Program, which restricts transition movements to airfields in the winter that have no BASH management (A. Kohler, personal communication, 2024). Altus AFB also conducts aircraft operations at particular hours to avoid peak bird flying times.

USDA–APHIS–WS biologists identified artificial lighting as a potential factor that could be influencing strike potential at the installation during bird migration seasons (Altus AFB 2024*f*). The biologists conducted a study during migratory periods beginning in fall 2022 to determine if light on the installation was attracting migrating birds. This study is ongoing and will continue during every spring and fall migratory period. For completed periods of the study, they assessed the rate of bird strikes when the installation turned off the airfield's north ramp lighting for a month during the migration period, and they recorded a 20.0 to 50.0% reduction in bird strikes when the ramp lighting was off (Altus AFB 2024*f*). Based on this study, reducing or stopping the use of this ramp lighting and other artificial lighting sources at night will reduce BASH risk, particularly during the migratory period.

The USDA–APHIS–WS biologists also conduct a non-lethal winter waterfowl program at the City of Altus reservoir, in which biologists haze birds off that waterbody (Altus AFB 2020*c*). Due to these actions, in 2024, Altus AFB observed only 5 strikes and less than $10,000 in damages, as opposed to the historical average of 35 strikes with over $2 million in damages (A. Kohler, personal communication, 2024).Natural hazards are increasing BASH risk at the installation. Since climate drives bird migration periods, changes in temperatures and precipitation rates are altering the timing of migrations (National Aeronautics and Space Administration 2022). Thus, BASH mitigation actions will need to monitor and adjust seasonal management efforts to ensure the installation correctly times its BASH mitigation efforts with migration periods. As discussed in Section 7.11, increased drought conditions and severe storm events are leading to the expansion of invasive species distribution and abundance, increasing the need for airfield vegetation management to maintain a monoculture that deters BASH-prone species.

7.13 Coastal Zone and Marine Resources Management

Installation Supplement

Applicability Statement

This section applies to DAF installations that are located along coasts and/or within coastal management zones. This section **IS NOT** applicable to this installation.

7.14 Cultural Resources Protection

Installation Supplement

Applicability Statement

This section applies to DAF installations that have cultural resources that may be impacted by natural resource management activities. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

The ICRMP (Tab 4) guides cultural resources management at Altus AFB. The installation's Cultural Resources Manager (CRM) is responsible for the implementation and development of the ICRMP in consultation with the Oklahoma State Historic Preservation Office, Oklahoma Archeological Survey, Installation Tribal Liaison Office, and affiliated tribes. The ICRMP integrates cultural resources program management and legal requirements with ongoing mission activities and other planning documents such as the INRMP (DAFMAN 32-7003, Section 2.24).

The ICRMP provides the standard operating procedures for project planning and coordination to maintain compliance with federal and state cultural resources management and historic preservation laws and regulations (Section 14.1.1). Cultural and natural resources management must comply with the NEPA, National Historic Preservation Act (NHPA), American Rescue Plan Act, Native American Graves Protection and Repatriation Act, American Indian Religious Freedom Act, and all EOs relating to historic properties, sacred sites, and intergovernmental relations between the DAF and tribes (DAFMAN 32-7003, Section 2.25.1). The ICRMP integrates the natural resources management goals of the INRMP to ensure that both cultural resources and natural resources management actions occur on the installation (DAFMAN 32-7003, Section 2.24.2). Natural resources management may involve activities that could adversely affect historic properties and other cultural resources. Potential natural resources management activities that may trigger a NHPA Section 106 (54 USC § 306108) consultation process include ground-disturbance activities associated with:

- Habitat management (e.g., soil preparation for food plots, cover plantings, and pond and wetland restoration)
- Forest management (e.g., harvesting and planting)
- Cantonment area landscaping
- Soil surveys
- Land maintenance and rehabilitation (e.g., erosion control and contour restoration)

The installation has not identified any significant historical or cultural sites at the installation (Tab 4). Researchers have conducted several cultural resources surveys on the installation (Baugh 1987; De Vore 1989, 1991, 1995; AETC 1993), with no cultural resources detected in any survey (Figure 21 in Tab 7). The National Park Service conducted the last detailed installation cultural resources inventory survey in 1995, with archeologists concluding that the installation has an extremely low probability of intact archaeological resource presence within base boundaries. The National Park Service added that the installation does not require further archeological investigations (De Vore 1995). However, an updated inventory is necessary, as the installation is 82 years old, as of 2025, and its assets may now qualify for historical preservation consideration under the National Register of Historic Places (NRHP) criteria. Thus, 97 CES/CEIE contracted out a cultural resources inventory of the installation for FY26. 97 CES/CEIE will integrate results from the updated inventory into natural resources management to ensure that all of the INRMP's management actions are IAW the state and federal cultural resources management regulations (DAFMAN 32-7003, Section 2.25.1).

De Vore (1995) also stated that installation personnel must consider the development of a historic preservation plan to inventory, assess, preserve, and maintain buildings and structures constructed between 1942 and 1955 that relate to World War II, the Korean conflict, and the Cold War. In 2003, Geo-Marine,

an environmental consulting firm, assessed installation buildings and structures that may be associated with the Cold War that may qualify for protection as a cultural resource under NRHP criteria (Salo et al. 2003). The scheduled cultural resources inventory of the installation will assess these assets to determine their eligibility. Additionally, in 2016, the Oklahoma State Historic Preservation Office listed the Altus AFB water tower as eligible under the NRHP as it has local level significance: Criteria A, for Community Planning and Development. This listing requires a formal assessment for a final determination (Oklahoma Historical Society 2024).

The cultural resources inventory will also include an assessment of SDZ property, as the installation's former Cultural Resources Specialist and an archeologist from the Air Force Center for Environmental Excellence (superseded by AFCEC) conducted the last survey at that GSU in 1996. The 1996 survey determined that no cultural remains or archaeological resources are present on the GSU (Air Force Center for Environmental Excellence 1996).

Due to the limited up-to-date knowledge of cultural resources on the installation, the installation manages cultural resources on a case-by-case basis when development or disturbance may affect any cultural resources potentially present (Tab 4). The ICRMP details the consultation and management procedures that the installation must implement in the event of a cultural resources discovery. The CRM reviews all construction plans for possible effects on any cultural resources if present. The CRM will consult with the State Historic Preservation Officer, Oklahoma Archeological Survey, and any affected tribes if any projects may affect cultural resources.

Pursuant to the American Indian Religious Freedom Act and EO 13007, *Indian Sacred Sites*, the installation has not identified any Traditional Cultural Properties or Sacred Sites at Altus AFB (Tab 4). Altus AFB maintains an ICRMP due to overflight paths that occur over tribal lands. IAW EO 13175, *Consultation and Coordination with Indian Tribal Governments*, Altus AFB aims to maintain meaningful and regular consultation and collaboration with tribes in the development of policies that might have significant direct effects on them. Altus AFB will coordinate with local tribes and the Oklahoma Historical Society, under the State Historic Preservation Office, to identify, preserve, and protect significant cultural resources under its stewardship (DAFMAN 32-7003, Section 2.22).

7.15 Public Outreach

Installation Supplement

Applicability Statement

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

Program Overview/Current Management Practices

97 CES/CEIE conducts outreach efforts through educational events that improve the quality of life of base personnel by facilitating their connection with the natural world (DAFI 34-101). 97 CES/CEIE collaborates with Altus AFB Public Affairs (97 AMW/PA) office representatives when conducting public outreach initiatives (DAFMAN 32-7003, Section 3.70). 97 CES/CEIE and 97 AMW/PA publish outreach materials on the Altus AFB website and RecAccess to inform base personnel of natural resources information and 97 CES/CEIE projects and accomplishments. 97 CES/CEIE also holds quarterly Cross-Functional Team meetings, which includes information on current INRMP projects. Natural Resources also has a private garden club Facebook page, where members can request to join the gardening community tailored specifically to Altus AFBs' community and pollinator gardens.

97 CES/CEIE has installed interpretive signage throughout the installation to educate base personnel on natural resources. For example, 97 CES/CEIE installed a sign at the monarch waystation, describing how the space benefits monarchs. Additionally, to help mitigate nuisance wildlife conflict, 97 CES/CEIE installed signs along the Windy Trails Golf Course walking trails to warn pedestrians of Mississippi kite aggression during nesting season. The 97 AMW/PA will also post a notice on the Altus AFB website during the Mississippi kite nesting period to promote awareness of this species and help mitigate this human–wildlife conflict.

With the addition of the new fishing pond and the surrounding mixed-grass prairie habitat, there is an opportunity to create a Watchable Wildlife space with a walking trail around the pond. 97 CES/CEIE can place interpretive signs throughout the trail, educating trail users on the details and purpose of the restoration effort and the native flora and fauna observable along the trail. Educating base personnel on the natural resources management efforts, especially those outlined in the INRMP, boosts 97 CES/CEIE's public relations and heightens public awareness of natural resources conservation (DAFMAN 32-7003, Section 3.70.3).

Altus AFB sponsors educational events on the installation to promote natural resources education (DAFMAN 32-7003, Section 3.70.3). Pursuant to the Tree City USA designation, 97 CES/CEIE hosts an annual Arbor Day celebration. In 2022, the celebration consisted of a trash cleanup at the installation's waterways and giveaways of educational outreach items and 100 native tree seedlings. The 2024 Arbor Day celebration focused on educating local youth on forestry, with events such as painting blocks of wood collected by the Altus AFB Outdoor Recreation Center, analyzing tree cross-sections under microscopes, and having designated a reading area for younger kids to read books about trees provided by the Altus AFB Library (D. Kelley, personal communication, 2024). In coordination with the ODWC, 97 CES/CEIE also hosts an annual fishing derby at the base fishing pond to encourage installation personnel to participate in a day of free recreational fishing on the installation (Section 7.2). A hundred installation personnel attended the 2024 fishing derby. The 1-day dove hunt also facilitates natural resources education opportunities (Section 7.2).

97 CES/CEIE also conducts outreach efforts off of the installation. 97 CES/CEIE participates in immersion events for local community members and Science, Technology, Engineering, and Math outreach events for local schools. 97 CES/CEIE also holds outreach events for local community members and military spouses to learn about 97 CES/CEIE's role on the installation. For example, the NRM and a USFWS biologist demonstrate wildlife tracking equipment to teach about the base's Texas horned lizard study.

Public outreach can contribute to the installation's understanding of species diversity and distribution on Altus AFB. 97 CES/CEIE established a project on iNaturalist for citizen scientists or base personnel to document plant and wildlife observations with identification photos and GPS coordinates, which a professional verifies (iNaturalist Community 2024). This citizen science application contributes to flora and fauna management on Altus AFB and encourages involvement of installation personnel in natural resources monitoring and outdoor recreation. Similarly, 97 CES/CEIE can host BioBlitz events, in which citizen scientists record as many species as possible in a specific location for a certain period of time. Data collected from this event can directly contribute to 97 CES/CEIE's understanding of local flora and fauna, increase natural resources outreach at the installation, and contribute to the installation's specimen collection.

7.16 Natural Hazards

Installation Supplement

Applicability Statement

This section applies to DAF installations that have identified natural hazard risk, vulnerabilities, and adaptation strategies using authoritative region-specific tools. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Natural hazards impact the function, composition, and dynamics of natural resources at Altus AFB. As outlined in the Installation Climate Resilience Plan (Altus AFB 2024*e*), the installation is especially vulnerable to high winds, extreme cold, and tornadoes. Pursuant to DoDI 4715.28, installations must be able to adapt mission operations to natural hazards to ensure effective and efficient military operations. Altus AFB is employing infrastructure design standards outlined in the UFC system IAW DoDI 4270.5, *Military Construction*, to mitigate or address the impacts of natural hazards (Altus AFB 2024*e*). Healthy natural resources further protect infrastructure from weather-related risks and natural hazards in numerous capacities.

Altus AFB is at a high risk of extreme cold events, which have the potential to impede or disrupt mission operations (Altus AFB 2024*e*, Jackson County Department of Emergency Management 2024). Extreme cold events, ice storms, and snow can cause power loss, road closures, burst pipes, and switching station failure, and they can halt flying missions. In the winter of 2020 to 2021, a freeze event caused power disruption and led to burst pipes in buildings and in the fire suppression systems in hangars. Personnel living in on-base housing had to stay in the on-base clinic, as it was the only building with electricity and heat. Since Altus AFB does not have purpose-built winter maintenance equipment, the installation instead outfits existing equipment for winter maintenance. Altus AFB personnel report that retrofitted equipment is not as effective as purpose-built winter maintenance equipment (Altus AFB 2024*e*). Natural resources are necessary components in mitigating the impacts of extreme cold. Urban forests and wetlands reduce wind speed and snow accumulation, protecting infrastructure and personnel (Wamsley et al. 2009, Meili et al. 2021). Additionally, wetlands and urban forests regulate water flow, an important factor for preventing water pipes from freezing during extreme cold events (Gohr et al. 2021). Altus AFB has a Snow and Ice Control Plan (Altus AFB 2021*b*) to properly manage and handle extreme snow and ice conditions on the installation in support of safe mission operations.

High heat days can also affect the reliability of power service, with HVAC equipment often malfunctioning when temperatures reach 105.0 °F. Additionally, high temperatures can damage roads and parking lots, as extreme heat can cause buckling and shifting due to contracting soils. Flat, tar roofing is also vulnerable to extreme heat conditions that can cause blistering and cracking (Jackson County Department of Emergency Management 2024). At the same time, high heat days also pose a risk to human health and safety, both through direct impacts on human physiology, as the body loses the ability maintain safe temperatures, and through indirect impacts related to impaired work efficiency and cognitive declines associated with protracted extreme heat exposure. These impacts from high heat events worsen during periods of high humidity, which, although rare at Altus AFB, can occur prior to and after storm events. IAW DAFI 48-151, *Thermal Stress Program*, Altus AFB can issue Black, Red, or Yellow Flag days, which guide what mission operations can safely occur depending on the ambient temperature and high heat index that day. Flag days can require schedule changes to accommodate heat stress, as most mission operations are outdoors (Altus AFB 2024*e*).

Natural resources help to buffer the impact of heat waves by reducing the “heat island” effect from human-built environments; natural surfaces tend to have more shade and moisture and therefore support lower surface and air temperatures. Wetlands and urban forests moderate and mitigate local temperatures (Gohr et al. 2021). Protecting and enhancing the existing wetlands on the installation will promote the wetlands’

natural ability to cool the landscape, particularly during high heat events (Gohr et al. 2021). Additionally, a robust, healthy urban forest increases installation resilience, as tree shade prolongs the life of tarmac, reduces heat stress on installation personnel, and reduces energy consumption (Zhao et al. 2017).

The Jackson County area has seen particularly severe and extended droughts during the period of 2014 to 2024 (Jackson County Department of Emergency Management 2024). Drought conditions have several impacts on the health of the landscape and local infrastructure. Additionally, the water levels of Altus-Luger Lake are known to decrease in exceptional, prolonged drought events (Jackson County Department of Emergency Management 2024). Maintaining healthy wetlands and floodplains on the installation increases water storage capacity, an increasing necessity as the Jackson County region experiences prolonged drought conditions (US EPA 2025). As discussed in Section 7.9, severe droughts increase the risk of wildfires, a natural hazard that is increasingly frequent and severe in Oklahoma (NOAA National Centers for Environmental Information 2022, Oklahoma Department of Emergency Management 2024). The WFMP (Tab 1) outlines strategies for reducing installation vulnerability to this hazard, including a prescribed burn program that reduces fuels in the surrounding environment.

Altus AFB also faces significant risk of high wind events and tornadoes, which can cause mission delays and stoppages, falling of dead or dying trees (Section 7.8), and physical damage to infrastructure such as buildings and above-ground power transmission lines (Altus AFB 2024*e*). Currently, tornado events have been decreasing in their normal spring and summer season and increasing in the fall and winter; there is greater probability of off-season tornadoes associated with unseasonably warm weather (Jackson County Department of Emergency Management 2024). During extreme weather events, Altus AFB has to relocate all planes to other bases in the region to mitigate potential damage. This process occurred in April 2024, when extreme wind and tornadic activity prompted evacuation of many of the installation's mobility aircraft (Tirpak 2024). This relocation effort can cost approximately $100 million. Altus AFB has established procedures to protect installation personnel and assets from extreme weather events, including the use of a "WATCH" designation that is issued when conditions are favorable for a severe thunderstorm, requiring personnel to secure all outside supplies and equipment and place recovery personnel on standby. Maintaining a healthy urban forest stand will provide resilience to high wind events, dissipating the velocity of wind for the protection of installation assets.

IAW DoDI 4715.28, developing an Emergency Response Plan that incorporates natural resources management to increase installation resilience will ensure that Altus AFB undertakes appropriate mitigation actions to natural hazards. As discussed in Section 7.7, an Emergency Response Plan can reduce potential hazards by establishing standards for electrical systems, hazardous trees, infrastructure development, and winter maintenance procedures to ensure the installation is prepared and protected against severe conditions. The removal and mitigation of pre-existing threats such as hazardous trees significantly reduces the probability of damage during a major weather event, thus increasing installation resilience (DoDI 4715.28). Ongoing urban forestry surveys will contribute up-to-date data on hazardous trees on the installation and guide responsible management actions for the urban forests that regulate heat and extreme cold and protect the base from high wind (James and Hallam 2013).

Altus AFB is currently siting facilities outside of the known 100-year and 500-year floodplain zones to mitigate potential flooding issues. Healthy natural resources, including wetlands and urban forests, protect infrastructure from flooding events by controlling erosion. Protection and enhancement of wetlands and floodplains are increasingly necessary as extreme storm events and off-base development upstream of the installation increases stormwater runoff and flooding on Altus AFB. For example, protecting the wetland ecosystem just south of the main gate will help mitigate potential flooding of Falcon Road, ensuring access to the installation to maintain mission operations. Wetlands and floodplains naturally control floods, acting

as more cost-effective methods of flooding mitigation in comparison to intensive dredging operations (US EPA 2025). As such, green infrastructure projects (e.g., vegetated buffers) in areas of high erosion are essential for improving installation resilience.

Altus AFB has agreements with the surrounding communities to enhance installation resilience and help mitigate the risks of natural hazards to community resources outside of the installation boundaries. Altus AFB maintains the existing Mutual Aid Agreement in Fire Emergency Services for emergency response collaboration and an Inter-Governmental Support Agreement between the Oklahoma Space Industry Development Authority and the DAF, which is an airport joint-use agreement that allows Altus AFB to use the Clinton Sherman Airport based in Foss, Oklahoma. Effective natural hazard mitigation will require ongoing collaboration with surrounding communities and agencies to ensure proper actions are taking place on a regional-scale to support all those potentially impacted by natural hazards. Pursuant to DoDI 4715.28, future efforts to further mitigate riverine flood risk at the base will likely require coordination with authorities responsible for stormwater runoff management in civilian areas upstream of the base, including both municipal and private land managers.

Response measures must also continue to expand as the frequency and severity of natural hazards increase. INRMP goals and objectives for ecosystem management and biodiversity conservation must employ an adaptive, ecosystem-based management approach to enhance ecosystem resiliency and protect the military mission (DAFMAN 32-7003, Section 3.10.3). Additional resources for planning and strengthened regional collaborations will be essential to ensure the installation is taking effective actions to mitigate natural hazard vulnerabilities at Altus AFB.

7.17 Geographic Information Systems (GIS)

Installation Supplement

Applicability Statement

This section applies to all DAF installations that maintain an INRMP, since all geospatial information must be maintained within the DAF Installation Geospatial Information and Services (GeoBase) system. The installation is required to implement this element.

Program Overview/Current Management Practices

Geographic information system (GIS) is a collection of geographic, hardware, and computer software data for creating, storing, analyzing, managing, and displaying spatial data and associated attributes. GIS is a management tool for NRMs to examine ecosystem components as layers in a spatial format. The Installation Environmental GIS Support Analyst develops and maintains GIS data for Altus AFB natural resources. The Environmental GIS Support Analyst stores the data within ArcGIS and the Air Force Geospatial Information Management System. ArcGIS software allows 97 CES/CEIE to store and manipulate data for analysis and create digital maps.

Altus AFB is part of a DAF-wide effort to standardize GIS data that follows the DAF GeoBase Program guidelines. The GeoBase Program provides geospatial, tabular, and temporal information integration to enable the management of an installation's natural and built infrastructure in support of military readiness (DAFI 32-10112, *Installation Geospatial Information and Services [IGI&S]*). GeoBase is based on the most recent version of the Spatial Data Standards for Facilities, Infrastructure, and Environment format. Altus AFB follows the GeoBase Program's initiative of the shared, long-term use of geospatial information or digital maps to support the military mission.

GIS contributes to the planning and decision-making processes for the military mission at Altus AFB. The NRM provides geospatial natural resource data to the Environmental GIS Support Analyst to update the installation GIS database quarterly. 97 CES/CEIE will provide ongoing natural resources information collected during surveys or management efforts to the Environmental GIS Support Analyst for archiving. Up-to-date GIS data are vital for accurate visual representation of natural resources at Altus AFB, including the floodplain areas, land cover, and vegetation classifications, to guide appropriate management decisions.

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 or over multiple years. In cases where off-installation land uses may jeopardize DAF 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

GOAL 1 SUPPORT THE 97TH AIR MOBILITY WING (97 AMW) MISSION THROUGH REGULATORY COMPLIANCE, STAKEHOLDER COORDINATION, AND ECOLOGICAL STEWARDSHIP OF THE LAND TO MAINTAIN AND STRENGTHEN ITS CAPABILITY TO SUSTAIN MILITARY OPERATIONS.

Objective 1.1 Provide a proactive and responsive natural resource analysis and consultation process to ensure compliance with applicable federal, state, and local laws, and Department of the Air Force (DAF) policies.

Project 1.1.1 Continually provide environmental review and input for installation plans and proposed activities to ensure regulatory compliance and Integrated Natural Resources Management Plan (INRMP) compatibility, and identify potential impacts to wetlands, floodplains, waterways, and species of management concern.

Project 1.1.2 Conduct an annual review and checklist assessment of the Natural Resources Program to verify compliance with Department of the Air Force Manual (DAFMAN) 32-7003.

Project 1.1.3 Provide geospatial natural resource data to Center for Environmental Management of Military Lands Environmental Geographic Information Systems (GIS) Support Analyst to update the installation GIS database quarterly.

Objective 1.2 Enhance the long-term sustainability of installation natural resources through implementation of an adaptive wildland fire program that minimizes risks while meeting ecological and land management objectives, per Department of Defense Instruction (DoDI) 6055.6 and Department of the Air Force Instruction 32-2001.

Project 1.2.1 Update the Wildland Fire Management Plan (WFMP) every 5 years, with annual plan reviews as detailed in DAFMAN 32-7003, Section 3.78.

Project 1.2.2 Maintain the Prescribed Burn Plan, review the plan annually, and serve as the Agency Administrator to coordinate burns for Altus Air Force Base (AFB).

Project 1.2.3 Implement prescribed burns at the Sooner Drop Zone (SDZ) (Ignition Units 1 to 3) to restore the natural fire regime and revive the grassland.

Project 1.2.4 Implement prescribed burns on Altus AFB (Ignition Units 6 to 10) to remove wildlife habitat near the airfield and reduce the potential for bird/wildlife aircraft strikes.

Project 1.2.5 After native mixed-grass prairie species establish at the 22-acre habitat restoration site surrounding the new fishing pond, implement a 3- to 5-year prescribed fire interval.

Project 1.2.6 Coordinate with the private landowners of Units 6, 7, 8, 9, and 10 for potential prescribed burn management to address a security issue and ensure compliance with Unified Facilities Criteria 4-022-03, *Security Fences and Gates*.

Objective 1.3 Support the Bird/Wildlife Aircraft Strike Hazard (BASH) program and nuisance wildlife control in accordance with (IAW) DAFMAN 32-7003, Sections 3.62 and 3.36.

Project 1.3.1 Participate in the Bird Hazard Working Group to support BASH program activities while incorporating INRMP requirements.

Project 1.3.2 Annually review installation depredation permits, depredation permit reports, and permit renewal applications.

Project 1.3.3 Assist the US Department of Agriculture–Animal and Plant Health Inspection Service–Wildlife Services (USDA–APHIS–WS) with habitat management to reduce BASH risk.

Project 1.3.4 Assist USDA–APHIS–WS biologists with raptor banding and relocation efforts.

Project 1.3.5 Continually review BASH survey and Motus tracking system data.

Project 1.3.6 Work with Public Affairs (97 AMW/PA) and Balfour Beatty Communities base housing company to promote the “Lights Out for Birds” campaign during peak migratory periods in the fall and spring to support BASH risk reduction and protect migrating bird species IAW the Endangered Species Act (ESA) and Migratory Bird Treaty Act (MBTA).

Project 1.3.7 Monitor medium and large mammals in coordination with USDA–APHIS–WS to support nuisance species control and BASH risk reduction.

Project 1.3.8 Reduce standing water surrounding the airfield to support the BASH reduction.

GOAL 2 CONSERVE NATIVE BIODIVERSITY BY RESTORING AND MAINTAINING NATIVE HABITAT, WILDLIFE POPULATIONS, AND ECOLOGICAL PROCESSES.

Objective 2.1 Restore or maintain ecological processes in native communities that are damaged or otherwise impacted by human activities or invasive species.

Project 2.1.1 Convert small patches of exotic turf grass to native prairie/pollinator plants and/or xeriscaping where feasible IAW the Presidential Memorandum, *Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* (60 Federal Register [FR] 40837).

Project 2.1.2 Per 60 FR 40837, integrate more xeriscaping into landscaping and grounds maintenance contracts, as consistent with the mission.

Project 2.1.3 Coordinate with pest management personnel to ensure the INRMP and the Integrated Pest Management Plan (IPMP) are mutually supportive, and revise the IPMP every 5 years IAW Air Force Manual (AFMAN) 32-1053.

Project 2.1.4 Continue annual removal of invasive and noxious vegetation from the installation IAW Executive Order (EO) 13112.

Project 2.1.5 Establish native turfgrass buffer around the new fishing pond to support recreational access.

Project 2.1.6 Restore native mixed-grass prairie in the open space around the new fishing pond by removing exotic plants through herbicide application, sowing native seeds, and implementing routine monitoring and maintenance measures for site management.

Project 2.1.7 Assess, monitor, and support management of the restored native mixed-grass prairie sites (Project 2.1.6) and provide technical assistance on site management requirements.

Project 2.1.8 Annual, ongoing control of invasive species on main base.

Project 2.1.9 Work with the 97th Civil Engineer Squadron, Pest Management (97 CES/CEOI) and the Bioenvironmental Health Unit to incorporate pollinator health measures into plans as recommended in the DoD Pollinator Conservation Reference Guide, Section 3, avoiding vehicular mosquito fogging near the pollinator patches at the community garden and the adjacent mixed-grass prairie restoration site.

Project 2.1.10 Establish a routine with the 97 CES/CEOI and the Bioenvironmental Health Unit to apply approved aquatic pesticides to the water of the new 2.5-acre pond for mosquito control to minimize need for fogging in this area, and integrate this practice into the IPMP during its next update.

Objective 2.2 Inventory, monitor, and develop management strategies to conserve native plant populations.

Project 2.2.1 Continuously maintain plant data on the installation shared drive as data are collected.

Project 2.2.2 Incorporate data from the recently completed urban tree inventory into other relevant management plans, including an Urban Forest Management Plan (UFMP), with consideration for climate resiliency, per DoDI 4715.28. Continuously update urban tree inventory as trees are removed and planted at the installation.

Project 2.2.3 After completion, conduct an annual review of the UFMP.

Project 2.2.4 Conduct a basewide vegetation survey of Altus AFB and SDZ to develop a comprehensive inventory of all flora species present, for incorporation into other management plans.

Project 2.2.5 As a part of Project 2.2.4, survey to identify and map invasive and noxious vegetation on the installation, and use these data to develop an Invasive Plant Management Plan IAW EO 13112 and in support of Project 2.1.8.

Project 2.2.6 Survey, map, and perform mesquite control at the SDZ.

Project 2.2.7 Survey, map, and perform saltcedar control on the main base and the SDZ.

Objective 2.3 Monitor and manage for state- and federally listed threatened and endangered (T&E) species, species of special concern, and proposed species IAW the ESA and MBTA.

Project 2.3.1 Restrict burning and tree trimming/removals during bird nesting season to protect migratory birds IAW the MBTA.

Project 2.3.2 Annually maintain the monarch waystation by adding or maintaining native plants, including milkweed, to support the monarch butterfly, which is proposed to be listed as threatened under the ESA, as well as other pollinators listed as Species of Greatest Conservation Need (SGCN) for Oklahoma.

Project 2.3.3 Tag monarch butterflies annually during their fall migration, following Monarch Watch protocols. Ensure the installation conducts monarch tagging under new US Fish and Wildlife Service (USFWS) guidelines for monarch take.

Project 2.3.4 Participate annually in the Monarch Joint Venture Integrated Monarch Monitoring Program.

Project 2.3.5 Conduct annual surveys using multiple survey techniques to develop a baseline list of pollinator species, monitor for species listed under the ESA or SGCN such as the American bumble bee, and evaluate improvement of pollinator habitats on the base related to restoration efforts.

Project 2.3.6 As directed in the DoD's 7(a)(1) Conservation Strategy for the Monarch Butterfly and the Presidential Memorandum 14946, *Creating a Federal Strategy To Promote the Health of Honey Bees and Other Pollinators*, coordinate with the 97 CES/CEOI and grounds maintenance contractors to continually minimize herbicide and insecticide use on the base to protect ESA-proposed monarch butterflies, SGCN-listed American bumble bees, and other pollinators. Integrate changes into the next update of the IPMP.

Project 2.3.7 Conduct small mammal surveys every other year at the main base and SDZ; coordinate with USFWS for targeted surveys for the proposed endangered Texas kangaroo rat on SDZ.

Project 2.3.8 Conduct reptile and amphibian surveys every 5 years at the main base and SDZ; coordinate management strategies with 97th Civil Engineer Squadron, Environmental Element (97 CES/CEIE) for potential discovery of SGCN.

Project 2.3.9 Install acoustic recording units (ARUs) for vocalizing amphibian, mammal, and bird monitoring; coordinate management strategies with USFWS for any T&E species or SGCN that are detected.

Project 2.3.10 Annually monitor Texas horned lizard populations via RECCO and radiotelemetry tracking.

Project 2.3.11 Coordinate with airfield operations to protect and add signage to the "Lizard Highway" to protect Texas horned lizards.

Project 2.3.12 Conduct annual stream fish surveys in Stinking Creek and its tributaries on the installation.

Project 2.3.13 Conduct annual acoustic bat surveys following the North America Bat Monitoring Program (NABat) protocol, including for the ESA-proposed endangered tricolored bat; submit survey results to NABat.

Project 2.3.14 Coordinate with USFWS to conduct mist-netting surveys and acoustic monitoring efforts for bats every 5 years; submit survey results to NABat.

Project 2.3.15 Where feasible, reduce artificial light at night basewide to minimize impacts to migrating and breeding birds.

Project 2.3.16 Review annual USFWS reports on whooping cranes tracked near the installation and collaborate on conservation actions as needed.

Project 2.3.17 Maintain wildlife and invertebrate data on the installation shared drive, and for bird data, on both the shared drive and the DoD Avian Knowledge Network.

Objective 2.4 Enhance water resource management and mitigate flood risks through targeted restoration efforts, cross-agency collaboration, and improved infrastructure solutions, ensuring long-term resilience for the installation and surrounding community.

Project 2.4.1 In collaboration with 97 CES/Engineer Flight (97 CES/CEN), after the main gate construction effort is complete, implement targeted drainage enhancements near the main gate to mitigate flooding risks, focusing on hydrological flow improvements and sediment control IAW EO 11990.

Project 2.4.2 Conduct comprehensive surveys of base waterways to identify and document areas of significant erosion and sedimentation, providing a baseline for targeted restoration efforts IAW DAFMAN 32-7003, Section 3.58.5.

Project 2.4.3 Collaborate with 97 CES/CEN and US Army Corps of Engineers (USACE) to evaluate and implement nature-based solutions that reduce flood hazard impacts and enhance resiliency IAW EO 14030 and DAFMAN 32-7003, Section 3D. Ensure all measures emphasize mission compatibility and sustainability while minimizing BASH risk.

Objective 2.5 Conserve and restore important native habitats while improving ecological health and biodiversity on and around the installation, balancing mission needs with environmental stewardship IAW DAFMAN 32-7003, Sections 3.10.2 and 3.58.5.

Project 2.5.1 Develop and implement a habitat management plan for the on-base wetland south of the main gate to protect ESA-proposed endangered tricolored bat and Oklahoma SGCN Brazilian free-tailed bat habitat, incorporating habitat-specific conservation measures and annual monitoring for effectiveness.

Project 2.5.2 Explore the feasibility of using environmental DNA (eDNA) sampling techniques to conduct a comprehensive inventory of aquatic species to monitor biodiversity, ecosystem health, and water quality within aquatic habitats.

Project 2.5.3 Annually remove trash and debris from fishing pond banks and plant or maintain riparian vegetation to improve water quality, aesthetics, and erosion control.

Objective 2.6 Reduce erosion, improve water quality, and enhance infrastructure sustainability by leveraging nature-based solutions and green infrastructure across the installation IAW DAFMAN 32-7003, Sections 3.10 and 3.58.5, and Section 404 of the Clean Water Act

Project 2.6.1 Restore degraded stream and riparian zones by removing debris and exotic vegetation, with native seeds, and implementing erosion controls.

Project 2.6.2 Collaborate with the Water Quality Program Manager to monitor water quality improvements from Project 2.6.3 semi-annually.

Project 2.6.3 In collaboration with 97 CES/CEN, design and implement erosion-mitigation strategies, focusing on installing bioswales, vegetated buffers, and other green

infrastructure solutions to stabilize banks, reduce runoff, and enhance water quality in priority areas.

Project 2.6.4 Coordinate with 97 CES/CEN and USACE to evaluate the feasibility of implementing green infrastructure projects in non-industrial areas, aiming to reduce surface runoff and support sustainable stormwater management practices.

GOAL 3 PROVIDE FOR AND PROMOTE THE SUSTAINABLE MULTI-PURPOSE USE OF NATURAL RESOURCES TO IMPROVE MORALE AND QUALITY OF LIFE FOR THE BASE POPULACE.

Objective 3.1 Enhance existing outdoor recreation areas and provide natural resource educational opportunities IAW DAFMAN 32-7003, Section 3.70.

Project 3.1.1 Maintain and enhance the community garden. Collect annual plot rental fees for the Reimbursable Conservation Program and use the revenue for wildlife/habitat management.

Project 3.1.2 Host an annual Arbor Day celebration pursuant to the Tree City USA designation from the Arbor Day Foundation.

Project 3.1.3 Conduct an annual BioBlitz to gather native pollinator specimens for the scientific collection, build a baseline pollinator species list for the installation, and raise awareness of pollinator diversity and conservation.

Project 3.1.4 Maintain passive rainwater collection system to water potted plants and provide water to gardeners during winter, when water lines are shut off.

Project 3.1.5 Install interpretive signage around the Windy Trails Golf Course, educating base personnel on the presence of Mississippi kite and how to avoid potential aggression.

Project 3.1.6 Install interpretive signs around the new fishing pond to highlight Watchable Wildlife opportunities.

Project 3.1.7 Maintain the installation specimen collection and preserve specimens for vouchers, study skins, and outreach.

Project 3.1.8 Submit an annual scientific collection report to the Oklahoma Department of Wildlife Conservation (ODWC) to maintain and renew the Letter of Authorization permitting the collection efforts.

Objective 3.2 Provide sustainable opportunities for outdoor recreation that uses natural resources IAW DAFMAN 32-7003, Section 3.56.

Project 3.2.1 Stock the installations pond and host an annual Earth Day fishing derby in collaboration with ODWC.

Project 3.2.2 Implement an annual 1-day airfield dove hunt in collaboration with ODWC.

Objective 3.3 Improve the aesthetic value of the installation through beautification efforts to enhance morale and welfare while using measures to conserve resources, as detailed in DAFMAN 32-7003, Sections 3.56 and 3.58.

Project 3.3.1 Plant native trees, shrubs, grasses, and forbs that are suited to the local site conditions for conservation landscaping, as feasible. Refer to the recommended native plants table (Table 7-1) for plant selection, IAW 60 FR 40837.

Project 3.3.2 Review and advise on requests for landscaping and tree removals, retaining a 1:1 ratio of new tree planting per tree removal. Prioritize the use of native, drought-resistant plants IAW 60 FR 40837.

Project 3.3.3 Maintain 97 CES/CEIE native tree plantings, including watering, mulching, staking, and pruning, for a minimum of 2 years after planning. Use drip irrigation when feasible to conserve water.

Project 3.3.4 Annually apply for Tree City USA recognition; meet requirements by maintaining a tree board and ordinance, spending $2 per capita on trees, having a signed proclamation, and celebrating Arbor Day.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

The 97 AMW/CC has the overall responsibility for the implementation of this INRMP. Additionally, all Altus AFB organizations, including tenant commands, collaborate on and support the implementation of the INRMP to ensure mission readiness. The installation plans all natural resource management activities in coordination with all affected installation organizations.

The Altus AFB Natural Resources Program is administered by the professionally trained NRM, with support from 97 CES/CEIE staff to help oversee implementation (DAFMAN 32-7003, Section 3.11). Pursuant to the Sikes Act, Section 101(a)(2), the NRM is responsible for the preparation, sustainment, and implementation of the INRMP through the following actions (DAFMAN 32-7003, Section 1.13.2):

- Implement DAFMAN 32-7003
- Maintain natural resources management records
- Coordinate with federal, state, and local governments and conservation organizations relative to the Altus AFB natural resources management program
- Review environmental documents (e.g., remedial actions plans and environmental impacts assessments) and construction proposals to ensure the responsible party is adequately considering natural resources under the technical guidance of the INRMP (DAFMAN 32-7003, Sections 3.1.13 3.12.2, and 3.13.2)
- Ensure the INRMP, BASH Plan, IPMP, and ICRMP are mutually supportive and not in conflict (DAFMAN 32-7003, Section 3.12.3)
- Coordinate with the Cultural Resources Program on compliance with NHPA Section 106

The INRMP implements ecosystem management on Altus AFB by setting goals for attaining a desired land condition that can support the mission (DAFMAN 32-7003, Section 3.10). The installation develops the management goals and objectives of the INRMP through an advanced evaluation of natural resources on the installation. The INRMP mandates the implementation of adaptive ecosystem management through specific projects and ideas developed by an interdisciplinary team of professional experts including ecologists, geologists, biologists, planners, GIS analysts, and environmental scientists.

The Council on Environmental Quality (CEQ) within the Executive Office of the President regulates the adoption of an INRMP, pursuant to Section 1508.18 of the CEQ regulations. This regulation requires the analysis of potential environmental impacts for the implementation of an INRMP, subject to NEPA requirements. If a proposed action has the potential to impact the environment, NEPA requires 97 CES to complete AF Form 813, *Request for Environmental Impact Analysis*. This form mandates an assessment to identify potential environmental impacts of any action that may require an EA or EIS. If the assessment identifies potential significant impacts either through AF Form 813 or the EA, an EIS is prepared.

Pursuant to CEQ regulations, Altus AFB conducts intergovernmental notification prior to making any detailed statement of environmental impacts in compliance with the Interagency Intergovernmental Coordination for Environmental Planning process. Through this process, relevant federal, state, and local agencies can provide comments and/or concerns for incorporation into the environmental impact analysis IAW EO 12372, *Intergovernmental Review of Federal Programs*. The DAF also requires public participation in decision-making for new proposals. The installation did not conduct a NEPA review for this INRMP update.

97 CES/CEIE must review and approve any construction plans or work requests for activities that may affect natural resources on the installation. The NRM routinely reviews work requests, activity proposals, and installation plans that may adversely affect natural resources to ensure their compatibility with the INRMP. Proponents of such actions must coordinate with 97 CES/CEIE throughout planning and implementation. The installation Environment, Safety, and Occupational Health Council reviews any actions that would substantially affect natural resources or require changes to the INRMP. Such actions will proceed only when compatible with the INRMP or after an update to the proposed plans occurs.

Implementation of the Altus AFB INRMP also involves the combined efforts of federal and state agencies such as the USACE (permits), USFWS (cooperating agency, INRMP signatory), ODWC (cooperating agency, INRMP signatory), ODEQ (permits), USFS (urban forest inventory and management recommendations), and USDA (BASH program management). Moreover, independent consultants conduct several natural resource monitoring and assessment projects at Altus AFB on a contractual basis. Implementation of the management actions outlined in the INRMP may also require the NRM to conduct consultation with these federal and state natural resources agencies. Management of federally listed species may require an ESA Section 7 consultation with the USFWS. Similarly, state-protected species and game species management may require consultation with ODWC. Management actions that fall under the jurisdiction of Section 404 or Section 401 of the CWA require permitting from ODEQ and/or USACE. Additionally, all federal actions, except those specifically excluded, must meet the NHPA Section 106 consultation requirements.

The NRM is the only personnel member that administers the natural resources management program at Altus AFB; thus, expansion of the program's operations would require additional staffing. An increase in T&E species and SGCN on the installation, in tandem with increasing vulnerabilities from natural hazards, has augmented 97 CES/CEIE's workload in monitoring and managing installation actions to ensure compliance with appliable regulations. Additional personnel would assist in a broader scope of management, including more thorough surveys, habitat restoration, and management actions that DAFMAN 32-7003 requires to support the military mission. Through CEMML's AFCEC-funded seasonal staff support agreement, 97 CES/CEIE has a seasonal natural resources technician to support program operations and INRMP actions. The seasonal technician has improved the program's capacity to conduct additional management actions to ensure the program's compliance with state and federal regulations.

Moreover, additional personnel contributing to natural resources management on the installation will support the continued partnership with various stakeholders, including ODWC, USFWS, and local communities and tribes. 97 CES/CEIE has good relations with federal and state natural resource agencies, including the USFWS and the ODWC, as these agency personnel obtain required volunteer service hours when working with Altus AFB. However, resource expenditure and limited ability to contribute to long-term projects limits volunteer capability. Thus, the Sikes Act permits the military to enter into interagency agreements with other federal agencies and cooperative agreements with states, local governments, tribal nations, and nongovernmental organizations to assist in implementing actions in support of an INRMP (DAFMAN 32-7003, Section 3.11.2). The Sikes Act Tripartite MOU facilitates coordination between DoD Components, the USFWS, and the state fish and wildlife agency for natural resources expertise through the use of cooperative agreements and Economy Act transfers. Altus AFB has a USFWS employee tasked to assist with work at Altus AFB, providing invaluable expertise and assistance in management programs such as the bat monitoring program.

Pursuant to the Sikes Act, Section 107, Altus AFB should assess the level of additional resources needed to fully implement this INRMP during the annual review process (Section 9.3) to determine the extent to

which program may require outside assistance. 97 CES/CEIE will consider the expansion of current agreements and programs to bolster the management capabilities on the installation.

9.2 Monitoring INRMP Implementation

97 CES/CEIE will monitor and assess the implementation of the INRMP to ensure the installation is meeting the legal requirements of the SAIA. Monitoring, coordination with stakeholders and regulators, and recordkeeping are the primary responsibility of 97 CES/CEIE Office. The AFCEC Installation Support Section tracks INRMP Sikes Act compliance for Altus AFB and assists 97 CES/CEIE with INRMP implementation.

The successful implementation of the INRMP would equate to a no net loss in the capability of installation lands to support the military mission as a result of effective natural resources management. The installation should assess the effectiveness of the Natural Resources Program not by measuring the quantity of projects initiated or funding levels, but rather, by assessing the ability to conduct a program that maintains sustainable land practices, regulatory compliance, partnerships with natural resources agencies and organizations, and contributes to the protection and conservation of vital natural resources.

AFCEC and 97 CES/CEIE will annually review the effectiveness of the INRMP implementation by monitoring the following natural resources conservation metrics, as applicable (DAFMAN 32-7003, Section 3.15):

- Natural Resources Program budget
- Staff requirements
- Program and project implementation
- Compliance with regulatory requirements
- Impact to/from the military mission
- Feedback from military command, the USFWS, the ODWC, and other relevant stakeholders
- Trends in the health of the species and habitat of the installation, as evidence by recurring biological surveys, land use changes, and opinions of natural resources experts

AFCEC and 97 CES/CEIE may not be able to annually examine some of these metrics due to a lack of information. Mutual agreement of the USFWS and ODWC during INRMP annual reviews (Section 9.3) and/or during review for operation and effect will determine the effectiveness of the INRMP as a mission-supportive conservation tool.

The Sikes Act requires an installation to annually report the status of its INRMP implementation and SAIA compliance with the Defense Environmental Programs Annual Report to Congress. The report should include the following natural resources metrics established by DoDI 4715.03 to assess the overall health and trends of an installation's Natural Resources Program to identify and correct potential funding and other resource shortfalls:

- INRMP status and implementation
- Success of partnerships
- Effective natural resources management decisions
- Effectiveness of conservation and management efforts
- Support of no net loss of military testing and training lands, airspace, and waters

Pursuant to the Sikes Act, the Office of Management and Budget considers funding for the preparation and implementation of this INRMP to be a high priority. AFCEC Environmental Quality funding is the primary

source of funding to support natural resources management at Altus AFB, including natural resources surveys, compliance-related projects, and environmental monitoring projects.

Implementation of the INRMP includes recurring cost requirements for project personnel, administrative support, and other costs necessary to meet applicable compliance requirements or support the military mission. Recurring costs include training, supplies, and labor. Maintenance cost requirements include projects that are not currently in violation of compliance but that may become so if timely execution of projects does not occur in time to meet an established deadline beyond the current program year.

Prioritization of projects is necessary to ensure funding is sufficient for timely project execution. Prioritization is on the basis of need, ability to implement the INRMP, and compliance. The installation must accomplish highest-priority projects related to current or recurring compliance first. The installation does not have to accomplish lower-priority projects, such as those that address environmental management goals but are not for compliance and are generally funded after the higher-priority projects.

In addition to AFCEC Environmental Quality funding, other funding sources include the Legacy Resource Management Program and grant and assistance programs administered by other federal agencies for natural resources management on Altus AFB (i.e., ESA management or CWA compliance).

9.3 Annual INRMP Review and Update Requirements

IAW DAFMAN 32-7003 and DoDI 4715.03, the INRMP requires annual review to ensure the achievement of mission goals, verify the implementation of projects, and establish any necessary new management requirements. This process involves the coordination of the NRM and other 97 CES/CEIE personnel, internal base stakeholders, USFWS, and ODWC. The NRM updates the external stakeholders/parties with the end-of-the-year execution report and coordinates future work plans and any necessary changes to management methods. All parties review the INRMP and begin preliminary collaborative work on updating the INRMP (e.g., new policies, procedures, impacts, mitigations), as applicable.

Cooperating agencies should mutually agree that the INRMP presents a natural resources management program that is current for the operation and effect of those elements in the INRMP under the jurisdictional authority of each agency. The NRM documents the findings of the annual review in an Annual INRMP Review Summary and obtains signatures from the coordinating agencies on review findings. By signing the Annual INRMP Review Summary, the collaborating agency representatives assert concurrence with the findings. If any agency declines to participate in an on-site annual review, the NRM submits the INRMP for review along with the Annual INRMP Review Summary document to the agency via official correspondence and request return correspondence with comments/concurrence.

During the annual meeting, all parties involved will also determine the potential requirement of a major INRMP revision based upon whether the Altus AFB mission or any of its natural resources management issues changed significantly after the creation of the original INRMP. If all parties determine updates are necessary, the NRM will initiate the changes acting as the lead coordinating agency.

The installation must annually review the INRMP in coordination with internal and external stakeholders, including the USFWS, ODWC, and tribes, as applicable (DAFMAN 32-7003, Section 3.8). The 97 AMW/CC (or 97 CES when delegated) needs to review and sign the 5-year INRMP updates. At the end of the annual review process, the NRM will submit a report to the 97 AMW/CC (or 97 CES), detailing the outcomes of the review and providing insight into the following areas:

- Specific INRMP accomplishments since the last INRMP annual review

- Identification of any significant issues related to natural resources management or losses of natural resources
- Any required updates to the INRMP determined necessary to keep the INRMP in current operation and effect; or alternatively, a statement that significant changes to the installation mission or natural resource goals require an INRMP revision
- An update of the Annual Work Plan, including a consensus by the collaborating agencies on project priority based upon the significance of the project for attaining INRMP goals and objectives
- A statement asserting whether or not sufficient numbers of qualified natural resources management enforcement personnel, as well as resources, are available to successfully implement the INRMP
- Any projects and activities for the upcoming year, in which the collaborating agencies expressed interest in participating

Not less than every 5 years, the 97 AMW/CC (or 97 CES), Regional Director of the USFWS, and the Director of the ODWC will review the INRMP for operation and effect to determine if the INRMP is in compliance with the SAIA (or otherwise, if requires a revision), if the INRMP is contributing to the management of natural resources on the installation, and if the INRMP needs to include updated mission operations or natural resources information. Technical representatives for each agency may participate in this assessment in place of the designees above. A jointly executed memorandum, meeting minutes, or in another format that reflects mutual agreement will document the conclusion of the review.

If only updates to the INRMP are necessary, then the installation will update the INRMP in a manner on which all parties agree. The local USFWS field office in Oklahoma and the ODWC Director will review the updated INRMP. Once Altus AFB receives concurrence signatures from these external parties, the INRMP update will be complete and implementation will continue. In most instances, the environmental impact analysis will continue to be applicable to updated INRMPs.

If an INRMP revision is determined to be necessary, the existing INRMP will remain in effect until the revision is complete and Altus AFB receives concurrence signatures from the 2 external parties and 97 AMW/CC. There is no set time to complete the revision; however, the NRM will aim to complete the revision within 18 months, depending upon funding availability. Revisions to the INRMP undergo a more thorough review process to ensure the Altus AFB mission is mutually supportive of the concerns and management objectives of the USFWS and ODWC. Revisions of the INRMP will also ensure that it meets the intent of the SAIA.

If not already determined in previous annual meetings, by the fourth-year annual review, all parties must determine whether to continue implementing the existing INRMP with updates or to proceed with a revision. If the parties feel that the annual reviews have not sufficiently assessed the operation and effect of the INRMP and cannot determine if INRMP implementation should continue or undergo revision, the parties will initiate a formal review for operation and effect.

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 4 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 DAF 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 DAF is non-compliant with the Sikes Act; or that the project is specifically tied to an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Section 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. However, the INRMP signatories would not contend that the INRMP is not being implemented if not accomplished within the 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 supports long-term compliance with specific requirements within natural resources law; but it is not directly tied to specific compliance within the proposed year of execution.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
All	1	1.1	Recurring	25+	97th Civil Engineer Squadron, Environmental Element (97 CES/CEIE)	IN-HOUSE	HIGH	INRMP	1.1.1	Continually provide environmental review and input for installation plans and proposed activities to ensure regulatory compliance and Integrated Natural Resources Management Plan (INRMP) compatibility, and identify potential impacts to wetlands, floodplains, waterways, and species of management concern.
All	1	1.1	Recurring	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	1.1.2	Conduct an annual review and checklist assessment of the Natural Resources Program to verify compliance with Department of the Air Force Manual (DAFMAN) 32-7003.
All	1	1.1	Recurring	25+	97 CES/CEIE & Center for Environmental Management of Military Lands (CEMML)	IN-HOUSE Air Force Civil Engineer Center (AFCEC)	MED	INRMP	1.1.3	Provide geospatial natural resource data to CEMML Environmental geographic information systems (GIS) Support analyst to update the installation GIS database quarterly.
Wildland Fire Management (Mgmt.)	1	1.2	Annual and every 5 years	25+	97th Installation Management Flight & 97th Civil Engineering Flight	IN-HOUSE	HIGH	WFMP	1.2.1	Update the Wildland Fire Management Plan (WFMP) every 5 years, with annual plan reviews as detailed in DAFMAN 32-7003, Section 3.78

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Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Wildland Fire Mgmt.	1	1.2	Recurring and annual	25+	97 CES/CEIE & Air Force Wildland Fire Branch (AFCEC/CZOF)	IN-HOUSE	MED	WFMP	1.2.2	Maintain the Prescribed Burn Plan, review the plan annually, and serve as the Agency Administrator to coordinate burns for Altus Air Force Base (AFB).
Wildland Fire Mgmt.	1	1.2	Recurring	26, 27, 28	AFCEC/CZOF	AFCEC	MED	WFMP	1.2.3	Implement prescribed burns at the Sooner Drop Zone (SDZ) (ignition units 1 to 3) to restore the natural fire regime and revive the grassland.
Wildland Fire Mgmt.	1	1.2	Recurring	26+	AFCEC/CZOF	AFCEC	MED	WFMP	1.2.4	Implement prescribed burns on Altus AFB (ignition units 6 to 10) to remove wildlife habitat near the airfield and reduce the potential for bird/wildlife aircraft strikes.
Wildland Fire Mgmt.	1	1.2	Every 3 to 5 years	29 or 30	AFCEC/CZOF	AFCEC	HIGH	WFMP	1.2.5	After native mixed-grass prairie species establish at the 22-acre habitat restoration site surrounding the new fishing pond, implement a 3- to 5-year prescribed fire interval.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Wildland Fire Mgmt.	1	1.2	As needed	25+	97th Air Mobility Wing Flight Safety Office (97 AMW/SEF)/Bird/Wildlife Aircraft Strike Hazard (BASH) & 97 CES/CEIE	IN-HOUSE	MED	WFMP	1.2.6	Coordinate with the private landowners of Units 6, & 9, and for potential chemical and mechanical management of mesquite woodlands adjacent to the installation to address a security issue and ensure compliance with Unified Facilities Criteria 4-022-03, *Security Fences and Gates*.
Fish and Wildlife Mgmt., BASH	1	1.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	1.3.1	Participate in the Bird Hazard Working Group to support BASH program activities while incorporating INRMP requirements.
Fish and Wildlife Mgmt., BASH	1	1.3	Annual	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	1.3.2	Annually review installation depredation permits, depredation permit reports, and permit renewal applications.
Fish and Wildlife Mgmt., BASH	1	1.3	As Needed	25+	97 AMW/SEF, 97 CES/Operations Flight (97 CES/CEO), & 97 CES/CEIE	IN-HOUSE	LOW	INRMP	1.3.3	Assist the US Department of Agriculture–Animal and Plant Health Inspection Service–Wildlife Services (USDA–APHIS–WS) with habitat management to reduce BASH risk.
Fish and Wildlife Mgmt., BASH	1	1.3	As Needed	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	1.3.4	Assist USDA–APHIS–WS biologists with raptor banding and relocation efforts.
Fish and Wildlife Mgmt., BASH	1	1.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	1.3.5	Continually review BASH survey and Motus tracking system data.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Fish and Wildlife Mgmt., BASH	1	1.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	1.3.6	Work with Public Affairs (97 AMW/PA) and Balfour Beatty Communities base housing company to promote the "Lights Out for Birds" campaign during peak migratory periods in the fall and spring to support BASH risk reduction and protect migrating bird species IAW the Endangered Species Act (ESA) and Migratory Bird Treaty Act (MBTA).
Fish and Wildlife Mgmt., BASH	1	1.3	As needed	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	1.3.7	Monitor medium and large mammals in coordination with USDA–APHIS–WS to support nuisance species control and BASH risk reduction.
Fish and Wildlife Mgmt., BASH	1	1.3	As needed	25	97 CES/CEIE & US Fish and Wildlife Service (USFWS)	AFCEC	MED	INRMP	1.3.8	Reduce standing water surrounding the airfield to support the BASH reduction.
Habitat Mgmt., Fish and Wildlife Mgmt., Invasive Species Mgmt., Grounds Maintenance	2	2.1	As needed	25+	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP	2.1.1	Convert small patches of exotic turf grass to native prairie/pollinator plants and/or xeriscaping where feasible IAW the Presidential Memorandum, *Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds* (60 Federal Register [FR] 40837).

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Grounds Maintenance	2	2.1	Recurring	25+	97 CES/Quality Assurance Office (97 CEO/CEOES)	AFCEC	HIGH	INRMP	2.1.2	Per 60 FR 40837, integrate more xeriscaping into landscaping and grounds maintenance contracts, as per 60 FR 40837 as consistent with the mission.
Pest Mgmt.	2	2.1	Every 5 years	25+	97 CES/CEIE & 97 CES/Pest Management (97 CEOI/CEOIE)	IN-HOUSE	MED	INRMP	2.1.3	Coordinate with pest management personnel to ensure the INRMP and the Integrated Pest Management Plan (IPMP) are mutually supportive, and revise the IPMP every 5 years IAW Air Force Manual (AFMAN) 32-1053.
Habitat Mgmt., Invasive Species Mgmt.,	2	2.1	Annual	25+	97 CEOI/CEOIE & USFWS	IN-HOUSE AFCEC		INRMP	2.1.4	Continue annual removal of noxious vegetation from the installation IAW Executive Order (EO) 13112.
Habitat Mgmt., Invasive Species Mgmt.,	2	2.1	Annual	26	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP	2.1.5	Establish native turfgrass buffer around the new fishing pond to support recreational access.
Habitat Mgmt., Invasive Species Mgmt.,	2	2.1	AS NEEDED	26+	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/T&E	2.1.6	Restore native mixed-grass prairie on the 22-acre habitat restoration site around the new fishing pond and 6.5-acre site at the old fishing pond, IAW 60 FR 40837.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Habitat Mgmt., Invasive Species Mgmt.,	2	2.1	ANNUAL	27-30	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/T&E	2.1.7	Assess, monitor, and support management of the restored native mixed-grass prairie sites (2.1.6) and provide technical assistance on site management requirements.
Habitat Mgmt., Invasive Species Mgmt.,	2	2.1	ANNUAL	25+	97 CEOI/CEOIE & 97 CES/CEIE	AFCEC IN-HOUSE	HIGH	INRMP IPMP	2.1.8	Annual, ongoing control of invasive species on main base.
Habitat Mgmt., Fish and Wildlife Mgmt., Pest Mgmt.	2	2.1	Recurring	25+	97 CES/CEIE & 97 CEOI/CEOIE	IN-HOUSE	MED	INRMP	2.1.9	Work with the 97 CES/CEOI and the Bioenvironmental Health Unit to incorporate pollinator health measures into plans as recommended in the DoD Pollinator Conservation Reference Guide, Section 3, avoiding vehicular mosquito fogging near the pollinator patches at the community garden and the adjacent mixed-grass prairie restoration site.
Habitat Mgmt., Pest Mgmt.	2	2.1	Recurring	26	97 CES/CEIE & 97 CEOI/CEOIE	IN-HOUSE	MED	INRMP	2.1.10	Establish a routine with the 97 CES/CEOI and the Bioenvironmental Health Unit to apply approved aquatic pesticides to the water of the new 2.5-acre pond for mosquito control to minimize need for fogging in this area, and integrate this practice into the IPMP during its next update.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Habitat Mgmt.	2	2.2	Recurring	25+	97 CES/CEIE	IN-HOUSE	HIGH	INRMP	2.2.1	Continuously maintain plant and wildlife data on the installation shared drive as data are collected.
Habitat Mgmt.	2	2.2	Recurring	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	2.2.2	Incorporate data from the recently completed urban tree inventory into other relevant management plans, including an Urban Forest Management Plan (UFMP), with consideration for natural hazards, per DoD Instruction 4715.28. Continuously update urban tree inventory as trees are removed and planted on the installation.
Habitat Mgmt.	2	2.2	Annual	26+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	2.2.3	After completion, conduct an annual review of the UFMP.
Habitat Mgmt.	2	2.2	Once	26	USFWS	AFCEC	MED	INRMP	2.2.4	Conduct a basewide vegetation survey of the Altus AFB and SDZ natural resource management units to develop a comprehensive inventory of all flora species present, for incorporation into other management plans.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Habitat Mgmt. Invasive Species Mgmt.	2	2.2	Once	26/27	USFWS	AFCEC	MED	INRMP	2.2.5	As a part of Project 2.2.4, survey to identify and map invasive vegetation on the installation, and use these data to develop an Invasive Plant Management Plan IAW EO 13112 and in support of Project 2.1.8.
Habitat Mgmt. Invasive Species Mgmt.	2	2.2	ONCE	27	USFWS	AFCEC	MED	INRMP	2.2.6	Survey, map, and perform mesquite control at the SDZ.
Habitat Mgmt. Invasive Species Mgmt.	2	2.2	ONCE	27	USFWS	AFCEC	MED	INRMP	2.2.7	Survey, map, and perform saltcedar control on the main base and at the SDZ.
Habitat Mgmt., Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE, 97 AMW/SEF/BASH, & 97 CEO/CEOES	N/A	MED	INRMP/ T&E	2.3.1	Restrict burning and tree trimming/removals during bird nesting season to protect migratory birds IAW the MBTA.
Habitat Mgmt., Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE	IN-HOUSE	HIGH	INRMP/ T&E	2.3.2	Annually maintain the monarch waystation by adding or maintaining native plants, including milkweed, to support the monarch butterfly, which is proposed to be listed as threatened under the ESA, as well as other pollinators listed as Species of Greatest Conservation Need (SGCN) for Oklahoma.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE	AFCEC	HIGH	INRMP/ T&E	2.3.3	Tag monarch butterflies annually during their fall migration, following Monarch Watch protocols. Ensure the installation conducts monarch tagging under new USFWS guidelines for monarch take.
Habitat Mgmt., Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE	AFCEC	HIGH	INRMP/ T&E	2.3.4	Participate annually in the Monarch Joint Venture Integrated Monarch Monitoring Program.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE, USFWS, & 97 AMW/SEF/BASH	AFCEC	HIGH	INRMP/ T&E	2.3.5	Conduct annual surveys using multiple survey techniques to develop a baseline list of pollinator species, monitor for species listed under the ESA or SGCN such as the American bumble bee, and evaluate improvement of pollinator habitats on the base related to restoration efforts.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE & 97 CES/CEOI	IN-HOUSE	HIGH	INRMP/ T&E	2.3.6	As directed in the DoD's 7(a)(1) Conservation Strategy for the Monarch Butterfly and the Presidential Memorandum 14946, *Creating a Federal Strategy To Promote the Health of Honey Bees and Other Pollinators*, coordinate with the 97 CES/CEOI and grounds maintenance contractors to continually minimize herbicide and insecticide use on the base to protect ESA-proposed monarch butterflies, SGCN-listed American bumble bees, and other pollinators. Integrate changes into the next update of the IPMP.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Every 2 years	25+	97 CES/CEIE	IN-HOUSE	HIGH	INRMP/ T&E	2.3.7	Conduct small mammal surveys alternating every other year between main base and SDZ; coordinate with USFWS for targeted surveys for the proposed endangered Texas kangaroo rat on SDZ.

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Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Fish and Wildlife Mgmt.	2	2.3	Every 5 years	27 & 32	USFWS	AFCEC	HIGH	INRMP/ T&E	2.3.8	Conduct reptile and amphibian surveys every 5 years at the main base and SDZ; coordinate management strategies with 97th Civil Engineer Squadron, Environmental Element (97 CES/CEIE) for potential discovery of SGCN.
Fish and Wildlife Mgmt.	2	2.3	Recurring	25+	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/ T&E	2.3.9	Install acoustic recording units (ARUs) for vocalizing amphibian, mammal, and bird monitoring; coordinate management strategies with USFWS for any T&E species or SGCN that are detected.
Fish and Wildlife Mgmt.	2	2.3	Annual	25+	97 CES/CEIE	IN-HOUSE	HIGH	INRMP/ T&E	2.3.10	Annually monitor Texas horned lizard (a SGCN) populations via RECCO and radiotelemetry tracking.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Recurring	26	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/ T&E	2.3.11	Coordinate with airfield operations to protect and add signage to the “Lizard Highway” to protect Texas horned lizards.
Fish and Wildlife Mgmt.	2	2.3	Annual	26, 28, 30	97 CES/CEIE	IN-HOUSE	LOW	INRMP	2.3.12	Conduct annual stream fish surveys in Stinking Creek and its tributaries on the installation.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/ T&E	2.3.13	Conduct annual acoustic bat surveys following the North America Bat Monitoring Program (NABat) protocol, including for the ESA-proposed endangered tricolored bat and SGCN Brazilian free-tailed bat; submit survey results to NABat.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Every 5 years	26+	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/ T&E	2.3.14	Coordinate with USFWS to conduct mist-netting surveys efforts for bats every 2 years; submit survey results to NABat.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Recurring	25+	97 AMW/SEF/BASH & 97 CES/CEIE	IN-HOUSE	LOW	INRMP	2.3.15	Where feasible, request reduction of artificial light at night basewide to minimize impacts to migrating and breeding birds.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Annual	25+	97 CES/CEIE & 97 AMW/SEF/BASH	IN-HOUSE	HIGH	INRMP/ T&E	2.3.16	Review annual USFWS reports on whooping cranes tracked near the installation and collaborate on conservation actions as needed.
Fish and Wildlife Mgmt., T&E Species Mgmt.	2	2.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	HIGH	INRMP	2.3.17	Maintain wildlife and invertebrate data on the installation shared drive, and for bird data, on both the shared drive and the DoD Avian Knowledge Network.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Water Resources Mgmt.	2	2.4	Recurring	30?	97 CES/CEIE & 97 CES/Engineer Flight (97 CES/CEN)	AFCEC	MED	INRMP	2.4.1	In collaboration with 97 CES/CEN, after the main gate construction effort is complete, implement targeted drainage enhancements near the main gate to mitigate flooding risks, focusing on hydrological flow improvements and sediment control IAW 11990.
Water Resources Mgmt. Habitat Mgmt.	2	2.4	Once	27	USFWS, US Army Corps of Engineers (USACE), & Natural Resources Conservation Service (NRCS)	AFCEC	MED	INRMP	2.4.2	Conduct comprehensive surveys of base waterways to identify and document areas of significant erosion and sedimentation, providing a baseline for targeted restoration efforts IAW DAFMAN 32-7003, Section 3.58.5.
Water Resources Mgmt. Habitat Mgmt.	2	2.4	As needed	25+	USACE, USFWS, 97 CES/CEN, 97 AMW/SEF/BASH, & 97 CES/CEIE	AFCEC	MED	INRMP	2.4.3	Collaborate with and support 97 CES/CEN and USACE to evaluate and implement nature-based solutions that reduce flood hazard impacts and enhance resiliency IAW EO 14030 and DAFMAN 32-7003, Section 3D. Ensure all measures emphasize mission compatibility and sustainability while minimizing BASH risk.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Habitat Mgmt., Wetland Mgmt., T&E Species Mgmt.	2	2.5		25/26	97 CES/CEIE & USFWS	AFCEC	HIGH	INRMP/ T&E	2.5.1	Develop and implement a habitat management plan for the protect ESA-proposed endangered tricolored bat and Oklahoma SGCN Brazilian free-tailed bat habitat, incorporating habitat-specific conservation measures and annual monitoring for effectiveness.
Water Resources Mgmt., Fish and Wildlife Mgmt.	2	2.5	Recurring	26	97 CES/CEIE		LOW	INRMP	2.5.2	Explore the feasibility of using environmental DNA (eDNA) sampling techniques to conduct a comprehensive inventory of aquatic species to monitor biodiversity, ecosystem health, and water quality within aquatic habitats.
Water Resources Mgmt., Fish and Wildlife Mgmt., Outdoor Recreation Mgmt., Habitat Mgmt.	2	2.5	Annual	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	2.5.3	Annually remove trash and debris from fishing pond banks and plant or maintain riparian vegetation to improve water quality, aesthetics, and erosion control.
Water Resources Mgmt., Habitat Mgmt.	2	2.6	Recurring	26+	USFWS	AFCEC	MED	INRMP	2.6.1	Restore degraded stream and riparian zones by removing debris and exotic vegetation, with native seeds, and implementing erosion controls.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Water Resources Mgmt., Habitat Mgmt.	2	2.6	Semi-annual	28+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	2.6.2	Collaborate with the Water Quality Program Manager to monitor water quality improvements from Project 2.6.3 semi-annually.
Water Resources Mgmt., Habitat Mgmt.	2	2.6	Recurring	27	USFWS, USACE, & 97 CES/CEIE	AFCEC	MED	INRMP	2.6.3	Support 97 CES/CEN, design and implement erosion-mitigation strategies, focusing on installing bioswales, vegetated buffers, and other green infrastructure solutions to stabilize banks, reduce runoff, and enhance water quality in priority areas
Water Resources Mgmt., Habitat Mgmt.	2	2.6	As needed	25+	USFWS & 97 CES/CEIE	AFCEC	MED	INRMP	2.6.4	Support 97 CES/CEN and USACE to evaluate the feasibility of implementing green infrastructure projects in non-industrial areas, aiming to reduce surface runoff and support sustainable stormwater management practices.
Habitat Mgmt., Fish and Wildlife Mgmt., Outdoor Recreation Mgmt.	3	3.1	Recurring	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.1.1	Maintain and enhance the community garden. Collect annual plot rental fees for the Reimbursable Conservation Program and use the revenue for wildlife/habitat management.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Outdoor Recreation Mgmt., Public Outreach, Habitat Mgmt.	3	3.1	Annual	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.1.2	Host an annual Arbor Day celebration pursuant to the Tree City USA designation from the Arbor Day Foundation.
Outdoor Recreation Mgmt., Public Outreach, Fish and Wildlife Mgmt.	3	3.1	Annual	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.1.3	Conduct an annual BioBlitz to gather native pollinator specimens for the scientific collection, build a baseline pollinator species list for the installation, and raise awareness of pollinator diversity and conservation.
Outdoor Recreation Mgmt.	3	3.1	Recurring	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.1.4	Maintain passive rainwater collection system to water potted plants and provide water to gardeners during winter, when water lines are shut off
Outdoor Recreation Mgmt., Public Outreach	3	3.1	Once	25/26	USFWS	AFCEC	LOW	INRMP	3.1.5	Install interpretive signage around the Windy Trails Golf Course, educating base personnel on wildlife and plant species to include the presence of Mississippi kites and how to avoid potential aggression.
Outdoor Recreation Mgmt., Public Outreach	3	3.1	Once	25/26	USFWS	AFCEC	MED	INRMP	3.1.6	Install interpretive signs around the new fishing pond to highlight Watchable Wildlife opportunities.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Public Outreach, Fish and Wildlife Mgmt.	3	3.1	Once	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.1.7	Maintain the installation specimen collection and preserve specimens for vouchers, study skins, and outreach.
Public Outreach, Fish and Wildlife Mgmt.	3	3.1	Annual	25+	97 CES/CEIE	IN-HOUSE	HIGH	INRMP/ T&E	3.1.8	Submit an annual scientific collection report to the Oklahoma Department of Wildlife Conservation (ODWC) to maintain and renew the Letter of Authorization permitting the collection efforts.
Fish and Wildlife Mgmt., Outdoor Recreation Mgmt., Public Outreach	3	3.2	Annual	26+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.2.1	Stock the installations pond and host an annual Earth Day fishing derby in collaboration with ODWC.
Fish and Wildlife Mgmt., Outdoor Recreation Mgmt., Public Outreach	3	3.2	Annual	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.2.2	Implement an annual 1-day airfield dove hunt in collaboration with ODWC.
Habitat Mgmt., Grounds Maintenance	3	3.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	3.3.1	Plant native trees, shrubs, grasses, and forbs that are suited to the local site conditions for conservation landscaping, as feasible. Refer to the recommended native plants table (Table 7-1) for plant selection, IAW 60 FR 40837.

Table 10-1. Annual Work Plans—Work Plans should extend out to current year plus 4 additional years

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility (OPR)	Funding Source	Priority Level	PB28 Code*	Project Number	Description
Habitat Mgmt., Grounds Maintenance	3	3.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	MED	INRMP	3.3.2	Review and advise on requests for landscaping and tree removals, retaining a 1:1 ratio of new tree planting per tree removal. Prioritize the use of native, drought-resistant plants IAW 60 FR 40837.
Habitat Mgmt., Grounds Maintenance	3	3.3	Recurring	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.3.3	Maintain 97 CES/CEIE native tree plantings, including watering, mulching, staking, and pruning, for a minimum of 2 years after planning. Use drip irrigation when feasible to conserve water.
Habitat Mgmt., Public Outreach	3	3.3	Annual	25+	97 CES/CEIE	IN-HOUSE	LOW	INRMP	3.3.4	Annually apply for Tree City USA recognition; meet requirements by maintaining a tree board and ordinance, spending $2 per capita on trees, having a signed proclamation, and celebrating Arbor Day.

Table 10-2. Natural Resources standard titles by PB28 code (excluding CZT/CZC titles)

INRP	MMA	T&E	MNRA	WTLD
P&F, CN	Mgt, Species	Mgt, Habitat	Compliance Public Notification	Mgt, Wetlands / Floodplains
Interagency/Intraagency, Government, Sikes Act	Interagency/Intraagency, Government, Sikes Act	Mgt, Species	Plan Update, Other	Monitor Wetlands
Interagency/Intraagency, Government, Sikes Act,	Outsourced Environmental Services, CN	Mgt, Invasive Species	Recordkeeping, Other	Interagency/Intraagency, Government, Sikes Act

Table 10-2. Natural Resources standard titles by PB28 code (excluding CZT/CZC titles)

INRP	MMA	T&E	MNRA	WTLD
Outsourced Environmental Services, CN	Supplies, CN	Mgt, Nuisance Wildlife	Outreach	Outsourced Environmental Services, CN
Supplies, CN	Supplies, CN, CLEO	Interagency/Intraagency, Government, Sikes Act	—	—
Supplies, CN,	Vehicle Leasing, CN	Interagency/Intraagency, Government, Sikes Act,	—	—
Equipment Purchase/ Maintain, CN	—	Outsourced Environmental Services, CN	—	—
Vehicle Leasing, CN	—	Supplies, CN	—	—
Vehicle Fuel & Maintenance, CN	—	Supplies, CN,	—	—
Mgt, Wildland Fire	—	Equipment Purchase/ Maintain, CN	—	—
Plan Update, Integrated Natural Resources Management Plan (INRMP)	—	Vehicle Leasing, CN	—	—
Plan Update, Other	—	Vehicle Fuel & Maintenance, CN	—	—
Mgt, Habitat	—	Plan Update, Other	—	—
Mgt, Species	—	Environmental Services, CN	—	—
Mgt, Invasive Species	—	—	—	—
Mgt, Nuisance Wildlife	—	—	—	—
Recordkeeping, Other	—	—	—	—
Environmental Services, CN	—	—	—	—

11.0 REFERENCES

11.1 Standard References (Applicable to all DAF installations)

- DAFMAN 32-7003, *Environmental Conservation*
- Sikes Act
- eDASH Natural Resources Program Page
- *Natural Resources Playbook*
- DoDI 4715.03, *Natural Resources Management*
- DAFI 32-1015, *Integrated Installation Planning*
- DAFI 32-10112, *Installation Geospatial Information and Services (IGI&S)*

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12.0 ACRONYMS

12.1 Standard Acronyms (Applicable to all DAF installations)

- eDASH Acronym Library
- *Natural Resources Playbook*—Acronym Section
- US EPA Terms & Acronyms

12.2 Installation Acronyms

97 AMW	97th Air Mobility Wing
97 AMW/CC	97th Air Mobility Wing Commander
97 AMW/PA	97th Air Mobility Wing Public Affairs
97 AMW/SEF	97th Air Mobility Wing Flight Safety Office
97 CES/CEIE	97th Civil Engineer Squadron, Environmental Element
97 CES/CEO	97th Civil Engineer Squadron, Operations Flight
97 CES/CEOI	97th Civil Engineer Squadron, Pest Management
97 CES/CEN	97th Civil Engineer Squadron, Civil Engineering
97 FSS	97th Force Support Squadron
97 MDG	97th Medical Group
97 MSG	97th Mission Support group
97 MXG	97th Maintenance Group
97 OG	97th Operations Group
97 SFS	97th Security Forces
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFCEC/CZOF	Air Force Wildland Fire Branch
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AKN	Avian Knowledge Network
ARU	Audio Recording Unit
BASH	Bird/Wildlife Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act

BHWG	Bird Hazard Working Group
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CEMML	Center for Environmental Management of Military Lands
CFR	Code of Federal Regulations
CRM	Cultural Resources Manager
CSU	Colorado State University
CWA	Clean Water Act
DAF	Department of the Air Force
DAFI	Department of the Air Force Instruction
DAFMAN	Department of the Air Force Manual
DoDI	Department of Defense Instruction
EA	Environmental Assessment
eDNA	Environmental deoxyribonucleic acid
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FES	Fire and Emergency Services
FR	Federal Register
FY	Fiscal Year
GEM	Golf Environmental Management
GIS	Geographic Information System
GSU	Geographically Separated Unit
IAW	In accordance with
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPMP	Integrated Pest Management Plan

IPaC	Information for Planning and Consultation
JBSA	Joint Base San Antonio
MBTA	Migratory Bird Treaty Act
MSS	Mission Sensitive Species
MOU	Memorandum of Understanding
NABat	North American Bat Monitoring Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRM	Natural Resources Manager
OAC	Oklahoma Administrative Code
OCWCS	Oklahoma Comprehensive Wildlife Conservation Strategy
ODEQ	Oklahoma Department of Environmental Quality
ODWC	Oklahoma Department of Wildlife Conservation
OPDES	Oklahoma Pollutant Discharge Elimination System
OTIE	Oneida Total Integrated Enterprises
PIF	Partners in Flight
POC	Point of Contact
POL	Petroleum, oil, and lubricants
PWS	Performance Work Statement
REPI	Readiness and Environmental Protection Integration
SAIA	Sikes Act Improvement Amendment
SDZ	Sooner Drop Zone
SGCN	Species of Greatest Conservation Need
SWPPP	Stormwater Pollution Prevention Plan
T&E	Threatened and Endangered Species
TMDL	Total Maximum Daily Load

UFC	Unified Facilities Criteria
UFMP	Urban Forest Management Plan
USACE	US Army Corps of Engineers
USAF	US Air Force (now Department of the Air Force, DAF)
USC	US Code
USDA	US Department of Agriculture
USDA–APHIS–WS	USDA–Animal and Plant Health Inspection Service–Wildlife Services
US EPA	US Environmental Protection Agency
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WFMP	Wildland Fire Management Plan
WHA	Wildlife Hazard Assessment
WMA	Wildlife Management Area
WNS	White-nose Syndrome
WOTUS	Waters of the United States
WSM	Wildland Support Module

13.0 DEFINITIONS

13.1 Standard Definitions (Applicable to all DAF installations)

- *Natural Resources Playbook*—Definitions Section

13.2 Installation Definitions

Agricultural outleasing: The use of Department of Defense (DoD) land under a lease to an agency, organization, or person for growing crops or grazing animals.

Biological diversity (biodiversity): The variety of life forms, the ecological roles they perform, and the genetic variability they have within any defined time and space.

Commercial forest land: Land under management capable of producing at least 20 cubic feet of merchantable timber per acre per year. It must be accessible and programmed for silviculture prescriptions. The smallest area for this classification is 5 acres. Roadside, streamside, and shelterbelt strips of timber must have or be capable of producing a crown width of at least 120 cubic feet for classification as commercial timber.

Consultation: A process that is initiated by the installation commander in which the commander confers with the State Historic Preservation Office to reduce or avoid adverse effects on historic properties. The Advisory Council on Historic Preservation and certain interested persons may take part as consulting parties.

Cooperative agreement: A written agreement between a Department of the Air Force (DAF) installation and one or more outside agencies (federal, state, or local) that coordinates planning strategies. It is a vehicle for obtaining assistance in developing natural resource plans.

Critical habitat: Specific areas within the geographical area occupied by a species listed under the Endangered Species Act (ESA), in which the physical or biological features of the area are essential to the conservation of the species and may necessitate specific management protections or considerations.

Cropland: Land primarily suitable for producing farm crops, including grain, hay, and truck crops.

Ecosystem management: An approach to natural resources management that focuses on the interrelationships of ecological processes linking soils, plants, animals, minerals, climate, water, and topography. Managers view such processes as a living system that affects and responds to human activity beyond traditional commodity and amenity uses. They also acknowledge the importance of ecosystem services such as water conservation, oxygen recharge and nutrient recycling.

Endangered species: Any species that is at risk of extinction throughout all, or a portion of, its range and that have been designated for special protection and management pursuant to ESA.

Exotic species: Any plant or animal not native to a region, state, or country (This definition excludes certain game species that have become established, such as pheasants).

Fish: Fresh and saltwater fin-fish, other than aquatic vertebrate organisms, crustaceans, and mollusks.

Floodplains: Lowland and flat areas adjoining inland coastal waters, including flood-prone areas on offshore islands, that have a 1% or greater chance of flooding in any given year.

Forest land: Lands on which forest trees of various sizes constitute at least 10 percent of the area. This category includes open land that is capable of supporting trees and is planned for forest regeneration and management.

Forest management: Developing, conserving, and protecting forest resources to ensure that they provide sustained yield and multiple uses.

Game: Any species of fish or wildlife for which state or federal laws and regulations prescribe seasons and bag or creel limits.

Grazing land: Land with vegetative cover that consists of grasses, herbs, and shrubs valuable as forage.

Geographically Separated Unit: DAF real property under the control and command of a parent installation, that is geographically separated and non-contiguous with the supporting installation.

Habitat: An area that provides the environmental elements of air, water, food, cover, and space necessary for a given species to survive and reproduce.

Integrated Natural Resources Management Plan (INRMP): A natural resources management plan based on ecosystem management that shows the interrelationships of the individual component plans as well as mission and land-use activities affecting the basic land management plans.

Improved grounds: A grounds maintenance land use category on which personnel annually plan and perform intensive maintenance activities on land occupied by buildings and other permanent structures and lawns and landscape plantings. This category includes the cantonment area, parade grounds, drill fields, athletic areas, golf courses (excluding roughs), cemeteries, and housing areas. Grass in these areas is normally maintained by regular mowing during the growing season.

Land-use regulation: A document that prescribes the specific technical or land use and restrictions with which lessees, permittees, or contractors must comply. It derives from the grazing or cropland management plan and forms a part of all outleases, land use permits, and other contracts.

Livestock: Domestic animals kept or raised for food, by-products, work, transportation, or recreation.

Multiple use: The integrated, coordinated, and compatible use of various natural resources to derive the best benefit while perpetuating and protecting those resources.

Multiple use and sustained yield management: The care and use of natural resources so as to best serve the present and future needs of the United States and its people without impairing the productivity of the land and water.

Natural resources management professional: A person with a degree in the natural sciences who manages natural resources on a regular basis and receives periodic training to maintain proficiency in that job.

Nuisance wildlife: Wildlife that impedes installation operations, endangers public health and safety, and damages property to the point where control measures are necessary. This category excludes all species protected under the ESA or the Migratory Bird Treaty Act.

Outdoor recreation resources: Land and water areas and associated natural resources that provide, or have the potential to provide, opportunities for outdoor recreation for present and future generations.

Rangeland: Land on which the native vegetation is predominantly grasses, grass-like plants, herbs, or shrubs suitable for grazing or browsing use. It includes lands revegetated naturally or artificially to provide a forage cover that is managed like native vegetation. It also includes natural grasslands, savannas, shrubland, most deserts, tundra, alpine communities, coastal marshes, and wet meadows.

Semi-improved grounds: Grounds maintenance category where personnel perform periodic maintenance primarily for operational and aesthetic reasons (such as erosion and dust control, bird control, and visual clear zones). These usually include grounds adjacent to runways, taxiway and aprons, runway clear zones, rifle and pistol ranges, picnic areas, ammunition storage areas, antenna facilities, and golf course roughs. These grounds are mowed less often than the maintained turf grass on improved grounds.

Stewardship: The management of a resources base with the goal of maintaining or increasing the resources' value indefinitely into the future.

Threatened species: Species that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range and that have been designated for special protection and management pursuant to the ESA.

Unimproved grounds: A grounds maintenance land use category in which these areas are not classified as 'improved' or 'semi-improved' and usually not mowed more than once a year. These grounds include weapons ranges, forest lands, cropland and grazing lands, lakes, ponds, wetlands, areas in airfields beyond the safety zones, and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities.

Urban forests: Planted or remnant native tree species existing within urbanized areas such as parks, tree-lined residential streets, scattered tracts of undisturbed woodlands, and cantonment areas.

Watchable Wildlife areas: Areas identified under the Watchable Wildlife Program as suitable for passive recreational uses such as birdwatching, nature study, and other nonconsumptive uses of wildlife resources.

Wetlands: Areas inundated or saturated by surface water or groundwater at a frequency and a duration that supports particular vegetation and aquatic life typically adapted for life in saturated soil conditions.

Wildland fire: A non-structure fire that occurs in the wildland. Three distinct types of wildland fire include wildfire, wildland fire use, and prescribed fire.

14.0 APPENDICES

14.1 Standard Appendices

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

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Federal Public Laws (PLs) and Executive Orders (EOs)	
National Defense Authorization Act of 1989 (PL 101-189); Volunteer Partnership Cost-Share Program	Amends 2 Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991 (PL 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*	Requires all federal agencies to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
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 they observe adverse effects on natural, cultural, or historic resources.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
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; (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 US Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 13112, *Invasive Species*	Prevents 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 13751, *Safeguarding the Nation from the Impacts of Invasive Species*	Amends EO 13112 and directs actions to continue coordinated Federal prevention and control efforts related to invasive species. This order incorporates considerations of human and environmental health, natural hazards, technological innovation, and other emerging priorities into federal efforts to address invasive species; and strengthens coordinated, cost-efficient federal action.
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*	The US 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 (USC)	
Animal Damage Control Act (7 USC § 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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Bald and Golden Eagle Protection Act of 1940, as amended (16 USC § 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, as amended (42 USC §§ 7401–7671q, 14 July 1955)	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 of 1980 (Superfund), as amended (PL 96-510, 94 Stat. 2797; 26 USC §§ 4611–4682)	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish cleanup standards, assign liability, and other efforts to address environmental contaminants. The Environmental Restoration Program (formerly, Installation Restoration Program) guides cleanups at DoD installations.
Endangered Species Act (ESA) of 1973, as amended (PL 93-205; 16 USC § 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 National Oceanic and Atmospheric Administration (NOAA) Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (Pittman-Robertson Act) (16 USC § 669–669i; 50 Stat. 917)	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 USC §§ 1701–1782)	Requires management of Bureau of Land Management 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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Federal Noxious Weed Act of 1974 (7 USC §§ 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) (33 USC §§1251–1387)	The Clean Water Act 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 (PL 96-366, 94 Stat. 1322; 16 USC §§ 2901–2911)	Installations are encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 USC § 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 USC § 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, as amended (10 USC § 2667)	Authorizes DoD to lease to commercial enterprises federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act (16 USC §§ 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 (PL 91-190; 42 USC § 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 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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
National Historic Preservation Act (16 USC § 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 USC §§ 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 USC § 668dd-ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990, as amended (25 USC § 3001–13; 104 Stat. 3042)	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 USC § 401 et seq.)	Makes it unlawful for the US Department of the Air Force (DAF) to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the US 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 USC § 2665)	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (PL 95-193; 16 USC § 2001)	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.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Sikes Act, as amended (16 USC § 670a–l, 74 Stat. 1052)	Provides for the cooperation of DoD, the Department 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 INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees. NOTE: Department of the Air Force Manual (DAFMAN) 32-7003 Section 3.11, *INRMP Implementation*. As defined in DoD Instruction (DoDI) 4715.03, *Natural Resources Management*, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. Per Section 3.11.1, *Outsourcing Natural Resources Management,* as stipulated in the Sikes Act, 16 USC § 670 et seq., the Office of Management and Budget Circular No. A-76, *Performance of Commercial Activities*, 4 August 1983 (Revised 29 May 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 Policies, Directives, and Instructions	
DoDI 4150.07, *DoD Pest Management Program,* dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoDI 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.
DoDI 4715.03, *Natural Resources Management*	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.
DoDI 4715.28, *Military Installation Resiliency*	Implements policy, assigns responsibilities, and mandates procedures for ensuring military installation resilience, including natural hazard and energy resilience.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
Office of the Secretary of Defense (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, supporting military training and testing needs, and facilitating the INRMP review process.
90 Federal Register 27857, *Department of Defense Implementation of the National Environmental Policy Act*	This document provides information, guidance, and requirements to DoD agencies to implement NEPA.
DAF Instructions and Directives	
DAF Instruction (DAFI) 32-1015, *Integrated Installation Planning*	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations.
DAFMAN 32-7003, *Environmental Conservation*	Implements Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*; DoDI 4715.03; and DoDI 7310.5, *Accounting for Sale of Forest Products*. It explains how to manage natural resources on DAF property in compliance with federal, state, territorial, and local standards. This Manual also implements DoDI 4710.1, *Archaeological and Historic Resources Management*. It explains how to manage cultural resources on DAF property in compliance with federal, state, territorial, and local standards.

Table 14-1. Annotated summary of key legislation related to design and implementation of the Integrated Natural Resources Management Plan (INRMP)

Legislation	Description
DAFI 32-10112 *Installation Geospatial Information and Services (IGI&S)*	This instruction implements DoDI 8130.01 by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and AFPD 32-10, *Installations and Facilities*.
AFPD 32-70, *Environmental Quality*	Outlines the DAF mission to achieve and maintain environmental quality on all DAF 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 US Air Force Environmental Office (USAF/ILEV) on 29 January 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

14.2 Installation Appendices

14.2.1 Appendix B. Species Present at Altus Air Force Base

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Afghan pine	*Pinus brutia* var. *eldarica*
Aleppo pine	*Pinus halepensis*
Alfalfa*	*Medicago sativa*
Alkali sacaton	*Sporobolus airoides*
American field pansy	*Viola bicolor*
American pokeweed	*Phytolacca americana*
American sycamore	*Platanus occidentalis*
American wild carrot	*Daucus pusillus*
Annual marsh elder	*Iva annua*
Annual rabbitsfoot grass	*Polypogon monspeliensis*
Annual ragweed	*Ambrosia artemisiifolia*
Arizona cypress	*Hesperocyparis arizonica*
Arkansas dozedaisy	*Aphanostephus skirrhobasis*
Aromatic aster*	*Symphyotrichum oblongifolium*
Ashy sunflower	*Helianthus mollis*
Austrian pine	*Pinus nigra*
Azure blue sage*	*Salvia azurea*
Bald cypress	*Taxodium distichum*
Baldwin's flatsedge	*Cyperus croceus*
Barnyardgrass	*Echinochloa crus-galli*
Bearded flatsedge	*Cyperus squarrosus*
Bearded sprangletop	*Leptochloa fusca* spp. *fascicularis*
Bermudagrass	*Cynodon dactylon*
Big bluestem*	*Andropogon gerardii*
Bighead pygmycudweed	*Evax prolifera*
Bitter dock	*Rumex obtusifolius*
Blackeyed Susan*	*Rudbeckia hirta*
Black locust	*Robinia pseudoacacia*
Black medick	*Medicago lupulina*
Black willow	*Salix nigra*
Bluejacket*	*Tradescantia ohiensis*
Blue giant anise hyssop* (blue giant hyssop)	*Agastache foeniculum*
Blue mistflower*	*Conoclinium coelestinum*
Bractless blazingstar	*Mentzelia nuda*
Bradford pear	*Pyrus calleryana*
Branched noseburn	*Tragia ramosa*
Brazos rain-lily (evening rainlily)	*Cooperia drummondii*
Buffalobur nightshade	*Solanum rostratum*
Burningbush	*Bassia scoparia*
Bur oak	*Quercus macrocarpa*
Bush morning-glory	*Ipomoea leptophylla*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Bush's poppymallow*	*Callirhoe bushii*
Bushy knotweed	*Polygonum ramosissimum*
Butterfly milkweed*	*Asclepias tuberosa*
Button eryngo*	*Eryngium yuccifolium*
Camphorweed	*Heterotheca subaxillaris*
Canadian horseweed	*Conyza canadensis*
Canada wildrye	*Elymus canadensis*
Canada toadflax	*Nuttallanthus canadensis*
Carelessweed	*Amaranthus palmeri*
Carolina canarygrass	*Phalaris caroliniana*
Carolina geranium	*Geranium carolinianum*
Chairmaker's rush	*Schoenoplectus americanus*
Cheatgrass	*Bromus tectorum*
Chickasaw plum	*Prunus angustifolia*
Chinese elm	*Ulmus parvifolia*
Chinese lantern	*Quincula lobata*
Chinese pistache	*Pistacia chinensis*
Chinquapin oak	*Quercus muehlenbergi*
Climbing milkweed	*Funastrum cynanchoides*
Coastal sandbur	*Cenchrus spinifex*
Common boneset*	*Eupatorium perfoliatum*
Common buttonbush	*Cephalanthus occidentalis*
Common chickweed	*Stellaria media*
Common dandelion	*Taraxacum officinale*
Common groundsel	*Senecio vulgaris*
Common hibiscus	*Hibiscus syriacus*
Common milkweed*	*Asclepias syriaca*
Common pepperweed	*Lepidium densiflorum*
Common purslane	*Portulaca oleracea*
Common sunflower	*Helianthus annuus*
Common spikerush	*Eleocharis palustris*
Common threesquare	*Schoenoplectus pungens* var. *pungens*
Common wheat	*Triticum aestivum*
Common yarrow	*Achillea millefolium*
Compassplant*	*Silphium laciniatum*
Cosmopolitan bulrush	*Scirpus maritimus*
Crapemyrtle	*Lagerstroemia indica*
Creeping woodsorrel	*Oxalis corniculata*
Crested pricklypoppy	*Argemone polyanthemos*
Crowpoison	*Nothoscordum bivalve*
Cuman ragweed	*Ambrosia psilostachya*
Curlytop knotweed	*Polygonum lapathifolium*
Curly dock	*Rumex crispus*
Cursed buttercup	*Ranunculus sceleratus*
Cutleaf evening primrose	*Oenothera laciniata*
Dakota mock vervain	*Glandularia bipinnatifida* var. *bipinnatifida*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Dallisgrass	*Paspalum dilatatum*
Desert willow	*Chilopsis linearis*
Dotted blazing star	*Liatris punctata*
Downy Indian paintbrush	*Castilleja purpurea*
Drummond's leaf-flower	*Phyllanthus abnormis*
Dwarf horseweed	*Conyza ramosissima*
Eastern annual saltmarsh aster	*Symphyotrichum subulatum*
Eastern cottonwood	*Populus deltoides*
Eastern prickly pear	*Opuntia humifusa*
Eastern purple coneflower*	*Echinacea purpurea*
Eastern red cedar	*Juniperus virginiana*
Engelmann's daisy*	*Engelmannia peristenia*
Escarpment live oak	*Quercus fusiformis*
False daisy	*Eclipta prostrata*
False indigo*	*Baptisia australis*
Field bindweed	*Convolvulus arvensis*
Five-stamen tamarisk	*Tamarix chinensis*
Florida paspalum	*Paspalum floridanum*
Fourpoint evening primrose	*Oenothera rhombipetala*
Foxglove beardtongue*	*Penstemon digitalis*
Foxtail barley	*Hordeum jubatum*
Fringeleaf wild petunia*	*Ruellia humilis*
Geyer's sandmat	*Chamaesyce geyeri*
Giant ironweed*	*Vernonia gigantea*
Giant ragweed	*Ambrosia trifida*
Great Plains false willow	*Baccharis salicina*
Green ash	*Fraxinus pennsylvanica*
Green antelopehorn milkweed	*Asclepias viridis*
Green bristlegrass	*Setaria viridis*
Green carpetweed	*Mollugo verticillata*
Golden crownbeard	*Verbesina encelioides*
Golden zizia*	*Zizia aurea*
Grassleaf rush	*Juncus marginatus*
Great Plains ragwort	*Packera tampicana*
Greek valerian*	*Polemonium reptans*
Gum bully	*Sideroxylon lanuginosum* spp. *albicans*
Hairy waterclover	*Marsilea vestita*
Henbit deadnettle	*Lamium amplexicaule*
Hoary false goldenaster	*Heterotheca canescens*
Hoary verbena*	*Verbena stricta*
Honeylocust	*Gleditsia triacanthos*
Honey mesquite	*Prosopis glandulosa*
Hooker's scratchdaisy	*Croptilon hookerianum* var. *validum*
Horned pondweed	*Zannichellia palustris*
Illinois bundleflower*	*Desmanthus illinoensis*
Indiangrass	*Sorghastrum nutans*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Indian blanket*	*Gaillardia pulchella*
Indian rushpea	*Hoffmannseggia glauca*
Johnsongrass	*Sorghum halepense*
Juniper leaf	*Polypremum procumbens*
Kentucky bluegrass	*Poa pratensis*
Kiss me quick	*Portulaca pilosa*
Knotted hedgeparsely	*Torilis nodosa*
Lanceleaf tickseed*	*Coreopsis lanceolata*
Largeleaf wild indigo	*Baptisia alba* var. *macrophylla*
Leadplant*	*Amorpha canescens*
Lemon beebalm*	*Monarda citriodora Monarda citriodora*
Light poppymallow	*Callirhoe alcaeoides*
Littlepod false flax	*Camelina microcarpa*
Little barley	*Hordeum pusillum*
Little bluestem*	*Schizachyrium scoparium*
Little cryptantha	*Cryptantha minima*
Little lovegrass	*Eragrostis minor*
Loblolly pine	*Pinus taeda*
Longbract spiderwort	*Tradescantia bracteata*
Longbract wild indigo	*Baptisia bracteata*
Lowland rotala	*Rotala ramosior*
Manyflower broomrape	*Orobanche ludoviciana* spp. *multiflora*
Maximilian sunflower*	*Helianthus maximiliani*
Meadow flax	*Linum pratense*
Mediterranean lovegrass	*Eragrostis barrelieri*
Mexican tea	*Dysphania ambrosioides*
Missouri gourd	*Cucurbita foetidissima*
Musk thistle	*Carduus nutans*
Narrowleaf blue-eyed grass	*Sisyrinchium angustifolium*
Narrowleaf cattail	*Typha angustifolia*
Narrowleaf dock	*Rumex stenophyllus*
Narrowleaf goosefoot	*Chenopodium leptophyllum*
Narrowleaf plantain	*Plantago lanceolata*
Narrowleaf rhombopod	*Cleomella angustifolia*
Narrowleaf stoneseed	*Lithospermum incisum*
New Jersey tea*	*Ceanothus americanus*
Nineanther prairie clover	*Dalea enneandra*
Northern catalpa	*Catalpa speciosa*
Nuttall's povertyweed	*Monolepis nuttalliana*
Nuttall's sensitive-briar	*Mimosa nuttallii*
Obedient plant	*Physostegia virginiana*
Oklahoma redbud	*Cercis canadensis* var. *texensis 'Oklahoma'*
Old man's whiskers*	*Geum triflorum*
Oneflower flatsedge	*Cyperus retroflexus*
Oriental arborvitae	*Platycladus orientalis*
Osage-orange	*Maclura pomifera*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Palmer's spectaclepod	*Dimorphocarpa candicans*
Partridge pea*	*Chamaecrista fasciculata*
Pecan	*Carya illinoinensis*
Pennsylvania smartweed	*Polygonum pensylvanicum*
Perfumeballs	*Gaillardia suavis*
Pin oak	*Quercus palustris*
Plains bluegrass	*Poa arida*
Plains coreopsis*	*Coreopsis tinctoria*
Plains fleabane	*Erigeron modestus*
Plains onion	*Allium perdulce*
Plains sandparsley	*Ammoselinum popei*
Plains snakecotton	*Froelichia floridana*
Platte River milkvetch	*Astragalus plattensis*
Prairiefire crabapple (prairie crab apple)	*Malus ioensis*
Prairie cupgrass	*Eriochloa contracta*
Prairie fleabane	*Erigeron strigosus*
Prairie ironweed*	*Vernonia fasciculata*
Prairie milkweed*	*Asclepias sullivantii*
Prairie phacelia	*Phacelia strictiflora*
Prairie shooting-star*	*Dodecatheon meadia*
Prairie spiderwort*	*Tradescantia occidentalis*
Prairie sunflower	*Helianthus petiolaris*
Prairie threeawn	*Aristida oligantha*
Pricklyburr	*Datura innoxia*
Prickly lettuce	*Lactuca serriola*
Prostrate sandmat	*Euphorbia prostrata*
Puncturevine	*Tribulus terrestris*
Purple lovegrass*	*Eragrostis spectabilis*
Purple milkweed*	*Asclepias purpurascens*
Purple poppymallow*	*Callirhoe involucrata*
Purple prairie clover*	*Dalea purpurea*
Purple sandgrass	*Triplasis purpurea*
Purple seepweed (Pursh seepweed)	*Suaeda calceoliformis*
Purple threeawn	*Aristida purpurea*
Ram's horn	*Proboscidea louisianica*
Red lovegrass	*Eragrostis secundiflora*
Red mulberry	*Morus rubra*
Redstem stork's bill	*Erodium cicutarium*
Rescuegrass	*Bromus catharticus*
Rocky Mountain blazing star*	*Liatris ligulistylis*
Rough barnyard grass	*Echinochloa muricata*
Rough cocklebur	*Xanthium strumarium*
Rough dropseed	*Sporobolus clandestinus*
Roundhead lespedeza	*Lespedeza capitata*
Sand bluestem	*Andropogon hallii*
Salt heliotrope	*Heliotropium curassavicum*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Scratchgrass	*Muhlenbergia asperifolia*
Saltgrass	*Distichlis spicata*
Scaldweed	*Cuscuta gronovii*
Scarlet globemallow	*Sphaeralcea coccinea*
Seaside brookweed	*Samolus valerandi.* spp. *parviflorus*
Shepherd's purse	*Capsella bursa-pastoris*
Showy chloris	*Chloris virgata*
Showy evening primrose	*Oenothera grandis*
Showy goldenrod*	*Solidago speciosa*
Showy milkweed*	*Asclepias speciosa*
Shumard's oak	*Quercus shumardii*
Sideoats grama*	*Bouteloua curtipendula*
Siberian elm	*Ulmus pumila*
Silver beardgrass	*Bothriochloa laguroides* spp. *torreyana*
Silver maple	*Acer saccharinum*
Silky prairie clover	*Dalea villosa*
Silverleaf nightshade	*Solanum elaeagnifolium*
Sixweeks fescue	*Vulpia octoflora* var. *octoflora*
Slash pine	*Pinus elliottii*
Slender snakecotton	*Froelichia gracilis*
Slickseed fuzzybean	*Strophostyles leiosperma*
Smallflower desert-chicory	*Pyrrhopappus pauciflorus*
Smallflowered milkvetch	*Astragalus nuttallianus*
Smallhead sneezeweed	*Helenium microcephalum*
Small Venus looking-glass	*Triodanis biflora*
Smooth blue aster*	*Symphyotrichum laeve*
Smooth oxeye*	*Heliopsis helianthoides*
Soapweed yucca	*Yucca glauca*
Sorrelvine	*Cissus trifoliata*
Southern annual saltmarsh aster	*Symphyotrichum divaricatum*
Southern crabgrass	*Digitaria sanguinalis*
Spanish gold	*Grindelia papposa*
Spider milkweed	*Asclepias asperula*
Spiny sowthistle	*Sonchus asper*
Spotted beebalm	*Monarda punctata*
Spotted ladysthumb	*Polygonum persicaria*
Spreading sandmat	*Chamaesyce humistrata*
Spreading wallflower	*Erysimum repandum*
Starhair groundcherry	*Physalis viscosa*
Stiff goldenrod	*Oligoneuron rigidum* var. *rigidum*
Stinkgrass	*Eragrostis cilianensis*
Strawcolored flatsedge	*Cyperus strigosus*
Suckling clover	*Trifolium dubium*
Sugarberry	*Celtis laevigata*
Sweetclover	*Melilotus officinalis*
Sweetscent	*Pluchea odorata*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name
Switchgrass	*Panicum virgatum*
Tall tumblemustard	*Sisymbrium altissimum*
Tall blazing star*	*Liatris aspera*
Tapertip flatsedge	*Cyperus acuminatus*
Tenpetal thimbleweed	*Anemone berlandieri*
Texas bluegrass	*Poa arachnifera*
Texas redbud	*Cercis canadensis* var. *texensis*
Texas red oak	*Quercus buckleyi*
Texas signalgrass	*Urochloa texana*
Texas sleepydaisy	*Xanthisma texanum*
Texas thistle	*Cirsium texanum*
Texas yellowstar	*Lindheimera texana*
Thin paspalum	*Paspalum setaceum*
Thymeleaf sandwort	*Arenaria serpyllifolia*
Tumble windmill grass	*Chloris verticillata*
Twistspine pricklypear	*Opuntia macrorhiza*
Upright prairie coneflower	*Ratibida columnifera*
Valdivia duckweed	*Lemna valdiviana*
Velvetweed	*Oenothera curtiflora*
Velvet ash	*Fraxinus velutina*
Vente conmigo	*Croton glandulosus*
Virginia plantain	*Plantago virginica*
Viscid tansyaster	*Rayjacksonia annua*
Warty spurge	*Euphorbia spathulata*
Wavyleaf thistle	*Cirsium undulatum*
Weeping lovegrass	*Eragrostis curvula*
West Indian nightshade	*Solanum ptycanthum*
Western tansymustard	*Descurainia pinnata*
Western wallflower	*Erysimum asperum*
Western wheatgrass	*Pascopyrum smithii*
Whitemargin sandmat	*Chamaesyce albomarginata*
Whitemouth flower	*Commelina erecta*
White four o'clock	*Mirabilis albida*
White heath aster*	*Symphyotrichum ericoides*
White mulberry	*Morus alba*
White tridens	*Tridens albescens*
Wild bergamot*	*Monarda fistulosa*
Wild four-o'clock*	*Mirabilis nyctaginea*
Winged pigweed	*Cycloloma atriplicifolium*
Wingpod purslane	*Portulaca umbraticola*
Witchgrass	*Panicum capillare*
Woolly plantain	*Plantago patagonica*
Yellowseed false pimpernel	*Lindernia dubia*
Yellow bluestem	*Andropogon ischaemum*
Yellow salsify	*Tragopogon dubius*

Table 14-2. Vascular plant species of Altus Air Force Base

Common Name	Scientific Name

*Plants used in the 2024 planting of the Monarch Waystation
Sources: Altus AFB 2024*g*; CEMML 2019

Table 14-3. Bats confirmed present at Altus Air Force Base

Common Name	Scientific Name
Big brown bat	*Eptesicus fuscus*
Brazilian free-tailed bat	*Tadarida brasiliensis*
Canyon bat	*Parastrellus Hesperus*
Cave myotis	*Myotis velifer*
Eastern red bat	*Lasiurus borealis*
Evening bat	*Nycticeius humeralis*
Hoary bat	*Lasiurus cinereus*
Pallid bat	*Antrozous pallidus*
Silver-haired bat	*Lasionycteris noctivagans*
Townsend's big-eared bat	*Corynorhinus townsendii*
Tricolored bat	*Perimyotis subflavus*
Western small-footed myotis	*Myotis ciliolabrum*

Sources: Hauer and Schwab 2017, NABat 2023, USDA–APHIS–WS 2024

Table 14-4. Mammals confirmed present at Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
American badger	*Taxidea taxus*	X	—
American beaver	*Castor canadensis*	X	—
Black-tailed jackrabbit	*Lepus californicus*	X	—
Bobcat	*Lynx rufus*	X	—
Brown/Norway rat	*Rattus norvegicus*	X	—
Coyote	*Canis latrans*	X	—
Eastern cottontail	*Sylvilagus floridanus*	X	—
Eastern fox squirrel	*Sciurus niger*	X	—
Eastern mole	*Scalopus aquaticus*	X	—
Eastern spotted skunk	*Spilogale putorius*	X	—
Fulvous harvest mouse	*Reithrodonomys fulvescens*	X	X
Gray fox	*Urocyon cinereoargenteus*	X	—
Hispid cotton rat	*Sigmodon hispidus*	X	X
Hispid pocket mouse	*Chaetodipus hispidus*	X	X
House mouse	*Mus musculus*	X	X
Nine-banded armadillo	*Dasypus novemcinctus*	X	—

Table 14-4. Mammals confirmed present at Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
North American deer mouse	*Peromyscus maniculatus*	X	X
North American porcupine	*Erethizon dorsatum*	X	—
Northern pygmy mouse	*Baiomys taylori*	X	—
Plains harvest mouse	*Reithrodonomys montanus*	—	X
Plains pocket gopher	*Geomys bursarius*	X	—
Raccoon	*Procyon lotor*	X	—
Red fox	*Vulpes fulva*	X	—
Southern Plains woodrat	*Neotoma micropus*	X	—
Striped skunk	*Mephitis mephitis*	X	—
Thirteen-lined ground squirrel	*Ictidomys tridecemlineatus*	X	—
Virginia opossum	*Didelphis virginiana*	X	—
Whitetail deer	*Odocoileus virginianus*	X	X
White-footed deer mouse	*Peromyscus leucopus*	X	X

Codes: — = Undetected; X = Detected
Sources: Schnell et al. 1998; Altus AFB 2022*a*, 2022*b,* 2023*c*; Altus AFB 2024*i*, iNaturalist Community 2024; USDA–APHIS–WS 2024

Table 14-5. Reptiles and amphibians confirmed present at Altus Air Force Base

Common Name	Scientific Name
Amphibians	
American bullfrog	*Lithobates catesbeianus*
Barred tiger salamander	*Ambystoma tigrinum mavortium*
Blanchard's cricket frog	*Acris blanchardi*
Gray treefrog complex	*Hyla versicolor complex*
Plains leopard frog	*Lithobates blairi*
Plains spadefoot	*Spea bombifrons*
Spotted chorus frog	*Pseudacris clarkii*
Western narrow-mouthed toad	*Gastrophryne olivacea*
Woodhouse's toad	*Anaxyrus woodhousii*
Reptiles	
Bullsnake	*Pituophis catenifer sayi*
Checkered garter snake	*Thamnophis marcianus*
Common snapping turtle	*Chelydra serpentina*
Diamondback watersnake	*Nerodia rhombifer*
Eastern yellow-bellied racer	*Coluber constrictor flaviventris*
Gopher snake	*Pituophis catenifer*
Graham's crayfish snake	*Regina grahamii*
Mediterranean gecko	*Hemidactylus turcicus*
North American racer	*Coluber constrictor*
Orange-striped ribbonsnake	*Thamnophis proximus proximus*
Ornate box turtle	*Terrapene ornata*
Pallid spiny softshell	*Apalone spinifera pallida*
Plain-bellied watersnake	*Nerodia erythrogaster*
Plains hognose snake	*Heterodon nasicus*
Prairie kingsnake	*Lampropeltis calligaster*
Red-eared slider	*Trachemys scripta elegans*
Ring-necked snake	*Diadophis punctatus*
Six-lined racerunner	*Aspidoscelis sexlineatus*
Spiny softshell	*Apalone spinifera*
Texas horned lizard	*Phrynosoma cornutum*
Western coachwhip	*Masticophis flagellum*
Western diamond-backed rattlesnake	*Crotalus atrox*
Western ratsnake	*Pantherophis obsoletus*
Western ribbon snake	*Thamnophis proximus*
Yellow-bellied slider	*Trachemys scripta scripta*
Yellow mud turtle	*Kinosternon flavescens*

Sources: Petersen et al. 2017; USFWS 2021*b*; Altus AFB 2022*a*, 2022*b*; Altus AFB 2023*c;* iNaturalist Community 2024; USDA–APHIS–WS 2024

Table 14-6. Bird species present at Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Birds of Prey/Raptors			
American kestrel	*Falco sparverius*	X	X
Burrowing owl	*Athene cunicularia*	X	X
Cooper's hawk	*Accipiter cooperii*	X	—
Ferruginous hawk	*Buteo regalis*	X	—
Great horned owl	*Bubo virginianus*	X	—
Merlin	*Falco columbarius*	X	—
Mississippi kite	*Ictinia mississippiensis*	X	—
Northern harrier	*Circus hudsonius*	X	X
Prairie falcon	*Falco mexicanus*	X	—
Red-shouldered hawk	*Buteo lineatus*	X	—
Red-tailed hawk	*Buteo jamaicensis*	X	X
Rough-legged hawk	*Buteo lagopus*	X	—
Swainson's hawk	*Buteo swainsoni*	X	—
Turkey vulture	*Cathartes aura*	X	—
Doves			
Eurasian collared dove	*Streptopelia decaocto*	X	—
Mourning dove	*Zenaida macroura*	X	X
Rock dove/Pigeon	*Columba livia*	X	—
White-winged dove	*Zenaida asiatica*	X	—
Swifts, Swallows, Nightjars			
Bahama swallow	*Tachycineta cyaneoviridis*	X	—
Barn swallow	*Hirundo rustica*	X	X
Cave swallow	*Petrochelidon fulva*	X	—
Chimney swift	*Chaetura pelagica*	X	—
Cliff swallow	*Hirundo pyrrhonota*	X	—
Common nighthawk	*Chordeiles minor*	X	X
Common poorwill	*Phalaenoptilus nuttallii*	X	—
Purple martin	*Progne subis*	X	—
Corvids, Shrikes, Vireos			
American crow	*Corvus brachyrhynchos*	X	X
Bell's vireo	*Vireo bellii*	X	—
Blue jay	*Cyanocitta cristata*	X	—
Loggerhead shrike	*Lanius ludovicianus*	X	X
Blackbirds and Allies			
Baltimore oriole	*Icterus galbula*	X	X
Brewer's blackbird	*Euphagus cyanocephalus*	X	—
Bronzed cowbird	*Molothrus aeneus*	X	—
Brown-headed cowbird	*Molothrus ater*	X	X
Common grackle	*Quiscalus quiscula*	X	—

Table 14-6. Bird species present at Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Eastern meadowlark	*Sturnella magna*	X	X
European starling	*Sturnus vulgaris*	X	—
Great-tailed grackle	*Quiscalus mexicanus*	X	—
Red-winged blackbird	*Agelaius phoeniceus*	X	X
Western meadowlark	*Sturnella neglecta*	X	—
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	X	—
Finches, Warblers, Wrens, Chickadees			
American goldfinch	*Carduelis tristis*	X	—
Blue grosbeak	*Passerina caerulea*	X	—
Carolina wren	*Thryomanes ludovicianus*	X	X
House finch	*Haemorhous mexicanus*	X	—
Indigo bunting	*Passerina cyanea*	X	—
Northern cardinal	*Cardinalis cardinalis*	X	—
Pine siskin	*Spinus pinus*	X	X
Tufted titmouse	*Baeolophus bicolor*	X	—
Wilson's warbler	*Cardellina pusilla*	X	—
Yellow warbler	*Setophaga petechia*	X	—
Yellow-rumped warbler	*Setophaga coronata*	X	—
Woodpeckers and Kingfishers			
Belted kingfisher	*Megaceryle alcyon*	X	—
Downy woodpecker	*Picoides pubescens*	X	—
Ladder-backed woodpecker	*Dryobates scalaris*	X	—
Northern flicker	*Colaptes auratus*	X	—
Red-bellied woodpecker	*Melanerpes carolinus*	X	—
Sparrows			
Cassin's sparrow	*Peucaea cassinii*	X	—
Clay-colored sparrow	*Spizella pallida*	X	—
Dark-eyed junco	*Junco hyemalis*	X	—
Dickcissel	*Spiza americana*	X	X
Field sparrow	*Spizella pusilla*	X	X
Fox sparrow	*Passerella iliaca*	X	—
Grasshopper sparrow	*Ammodramus savannarum*	X	X
Harris's sparrow	*Zonotrichia querula*	X	X
Horned lark	*Eremophila alpestris*	X	—
House sparrow	*Passer domesticus*	X	—
Lapland longspur	*Calcarius lapponicus*	—	X
Lark sparrow	*Chondestes grammacus*	X	X

Table 14-6. Bird species present at Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Lazuli bunting	*Passerina amoena*	—	X
Lincoln's sparrow	*Melospiza lincolnii*	X	—
Savannah sparrow	*Passerculus sandwichensis*	X	—
Song sparrow	*Melospiza melodia*	X	X
Spotted towhee	*Pipilo maculatus*	X	—
White-crowned sparrow	*Zonotrichia leucophrys*	X	X
White-throated sparrow	*Zonotrichia albicollis*	X	X
Vesper sparrow	*Pooecetes gramineus*	X	X
Waders/Shorebirds			
American avocet	*Recurvirostra americana*	X	—
Baird's sandpiper	*Calidris bairdii*	X	—
Black-necked stilt	*Himantopus mexicanus*	X	—
Great blue heron	*Ardea herodias*	X	X
Great egret	*Ardea alba*	X	—
Green heron	*Butorides virescens*	X	—
Greater yellowlegs	*Tringa melanoleuca*	X	—
Killdeer	*Charadrius vociferus*	X	—
Least sandpiper	*Calidris minutilla*	X	—
Little blue heron	*Egretta caerulea*	X	—
Sandhill crane	*Grus canadensis*	X	—
Sora	*Porzana carolina*	X	—
Upland sandpiper	*Bartramia longicauda*	X	—
Western cattle-egret	*Ardea ibis*	X	—
White-faced ibis	*Plegadis chihi*	X	—
Whooping crane	*Grus americana*	X	—
Wilson's phalarope	*Phalaropus tricolor*	X	—
Wilson's snipe	*Gallinago delicata*	X	—
Yellow-crowned night heron	*Nyctanassa violacea*	X	—
Tyrant Flycatchers			
Eastern kingbird	*Tyrannus tyrannus*	X	—
Eastern phoebe	*Sayornis phoebe*	X	—
Great crested flycatcher	*Myiarchus crinitus*	X	—
Scissor-tailed flycatcher	*Tyrannus forficatus*	X	X
Western kingbird	*Tyrannus verticalis*	X	X
Thrushes and Cuckoos			
American robin	*Turdus migratorius*	X	—

Table 14-6. Bird species present at Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Brown thrasher	*Toxostoma rufum*	X	—
Greater roadrunner	*Geococcyx californianus*	X	—
Northern mockingbird	*Mimus polyglottos*	X	X
Yellow-billed cuckoo	*Coccyzus americanus*	X	—
Upland Game Birds			
Northern bobwhite	*Colinus virginianus*	X	X
Wild turkey	*Meleagris gallopavo*	X	—
Waterbirds			
American coot	*Fulica americana*	X	—
American wigeon	*Mareca americana*	X	—
Blue-winged teal	*Anas discors*	X	—
Bufflehead	*Bucephala albeola*	X	—
Canada goose	*Branta canadensis*	X	—
Canvasback	*Aythya valisineria*	X	—
Common merganser	*Mergus merganser*	X	—
Double-crested cormorant	*Phalacrocorax auritus*	X	—
Gadwall	*Mareca strepera*	X	—
Green-winged teal	*Anas carolinensis*	X	—
Mallard	*Anas platyrhynchos*	X	—
Northern pintail	*Anas acuta*	—	X
Northern shoveler	*Spatula clypeata*	X	—
Pie-billed grebe	*Podilymbus podiceps*	X	—
Redhead	*Aythya americana*	X	—
Ruddy duck	*Oxyura jamaicensis*	X	—
Snow goose	*Chen caerulescens*	X	—

Codes: — = Undetected; X = Detected
Sources: Schnell et al. 1998, iNaturalist Community 2024, USDA–APHIS–WS 2024, USGS 2024

Table 14-7. Fish species at Altus Air Force Base

Family	Common Name	Scientific Name	Confirmed Present
Catostomidae	River carpsucker	*Carpiodes carpio*	—
	Smallmouth buffalo	*Ictiobus bubalus*	—
Centrarchidae	Black crappie	*Pomoxis nigromaculatus*	—
	Bluegill	*Lepomis macrochirus*	X
	Green sunfish	*Lepomis cyanellus*	X
	Green sunfish x Orangespotted sunfish	*Lepomis cyanellus x L. humilis*	—
	Largemouth bass	*Micropterus salmoides*	—
	Longear sunfish	*Lepomis megalotis*	X
	Orangespotted sunfish	*Lepomis humilis*	—
	Plains longear sunfish	*Lepomis aquilensis*	X
	Redear sunfish	*Lepomis microlophus*	X
	Warmouth	*Lepomis gulosus*	—
	White crappie	*Pomoxis annularis*	—
	Logperch	*Percina caprodes*	—
	Orangebelly darter	*Etheostoma radiosum*	—
	Plains orangethroat darter	*Etheostoma pulchellum*	—
Clupeidae	Gizzard shad	*Dorosoma cepedianum*	—
Cyprinidae	European carp	*Cyprinus carpio*	X
Cyprinodontidae	Red River pupfish	*Cyprinodon rubrofluviatilis*	X
Fundulidae	Blackspotted topminnow	*Fundulus olivaceus*	—
	Gulf killifish	*Fundulus grandis*	—
	Plains killifish	*Fundulus zebrinus*	—
Ictaluridae	Black bullhead	*Ameiurus melas*	X
	Channel catfish	*Ictalurus punctatus*	X
	Flathead catfish	*Pylodictis olivaris*	—
	Yellow bullhead	*Ameiurus natalis*	—
Lepisosteidae	Longnose gar	*Lepisosteus osseus*	—
	Shortnose gar	*Lepisosteus platostomus*	—
	Spotted gar	*Lepisosteus oculatus*	—
Leuciscidae	Blacktail shiner	*Cyprinella venusta*	—
	Central stoneroller	*Campostoma anomalum*	—
	Bullhead minnow	*Pimephales vigilax*	—
	Emerald shiner	*Notropis atherinoides*	—
	Fathead minnow	*Pimephales promelas*	—
	Ghost shiner	*Notropis buchanani*	—
	Plains minnow	*Hybognathus placitus*	—
	Prairie chub	*Macrhybopsis australis*	—
	Red river shiner	*Notropis bairdi*	—
	Red shiner	*Cyprinella lutrensis*	X
	Red shiner x Blacktail shiner	*Cyprinella lutrensis x C. venusta*	—

Table 14-7. Fish species at Altus Air Force Base

Family	Common Name	Scientific Name	Confirmed Present
	Sand shiner	*Notropis stramineus*	—
	Suckermouth minnow	*Phenacobius mirabilis*	—
Poeciliidae	Western mosquitofish	*Gambusia affinis*	X
Sciaenidae	Freshwater drum	*Aplodinotus grunniens*	—

Codes: — = Undetected; X = Detected
Altus AFB 2023*a*, iNaturalist Community 2024

Table 14-8. Invertebrate species confirmed present at Altus Air Force Base

Common Name	Scientific Name
Admirable grasshopper	*Syrbula admirabilis*
American bird grasshopper	*Schistocerca americana*
American bumble bee	*Bombus pensylvanicus*
Amphipod crustacean	*Gammarus* spp.
Arachnids	*Arachnida* spp.
Asian lady beetle	*Harmonia axyridis*
Backswimmer	*Notonecta* spp.
Black fly	Simuliidae spp.
Black horse fly	*Tabanus atratus*
Black swallowtail	*Papilio polyxenes*
Blue mud wasp	*Chalybion californicum*
Carolina mantis	*Stagmomantis carolina*
Clam shrimp	Laevicaudata spp.
Clouded crimson moth	*Schinia gaurae*
Common green June beetle	*Cotinis nitida*
Cottonwood borer	*Plectrodera scalator*
Crustacean	Copepoda spp.
Darner	Aeshnidae spp.
Differential grasshopper	*Melanoplus differentialis*
Drain fly	*Clogmia albipunctata*
Elm leaf beetle	*Xanthogaleruca luteola*
Elm sphinx	*Ceratomia amyntor*
Evergreen bagworm moth	*Thyridopteryx ephemeraeformis*
Fiery skipper	*Hylephila phyleus*
Flat worm	*Turbellaria* spp.
Flea beetle	*Disonycha leptolineata*
Gold-winged leaf beetle	*Chrysolina auripennis*
Gray hairstreak	*Strymon melinus*
Ground beetle spp.	*Philophuga viridicollis*
Huron sachem	*Atalopedes campestris huron*
Klug's velvet ant	*Dasymutilla klugii*
Large-tailed aphideater	*Eupeodes volucris*
Mayfly	Baetidae spp.
Mayfly	Caenidae spp.
Mayfly	*Tricorythodes* spp.
Monarch	*Danaus plexippus*
Mosquito	*Psorophora cyanescens*
Moth	*Euchaetes bolteri*
Narrow-winged damselfly	Coenagrionidae spp.
Non-biting midges	Chironomidae spp.
North American wheel bug	*Arilus cristatus*
Northeastern hammertail	*Efferia aestuans*
Oriental cockroach	*Blatta orientalis*

Table 14-8. Invertebrate species confirmed present at Altus Air Force Base

Common Name	Scientific Name
Queen	*Danaus gilippus*
Question mark	*Polygonia interrogationis*
Red-shouldered bug	*Jadera haematoloma*
Roundworm	*Nematoda* spp.
Predaceous diving beetle	*Dytiscidae* spp.
Primitive minnow mayfly	Siphlonuridae spp.
Pronotal-lined blister beetle	*Epicauta albida*
Sachem	*Atalopedes campestris*
Scud	*Amphipoda* spp.
Seven-spotted lady beetle	*Coccinella septempunctata*
Skimmer	Libellulidae spp.
Snail	Gastropoda spp.
Southern black widow	*Latrodectus mactans*
Southern Plains crayfish	*Procambarus simulans*
Spread-winged damselflies	Lestidae spp.
Striped blister beetle	*Epicauta vittata*
Tan jumping spider	*Platycryptus undatus*
Unexpected cycnia moth	*Cycnia collaris*
Variegated fritillary	*Euptoieta claudia*
Vine sphinx	*Eumorpha vitis*
Virginia tiger moth	*Spilosoma virginica*
Water beetle	*Peltodytes* spp.
Water beetle	Haliplidae spp.
Water boatman	*Corixidae* spp.
Water flea	*Cladocera* spp.
Water scavenger beetle	*Hydrophilidae*
Western honey bee	*Apis mellifera*
Western spotted orbweaver	*Neoscona oaxacensis*
White-lined sphynx	*Hyles lineata*

Sources: Altus AFB 2019, 2021*a*, 2022*b*, 2023*c*; T. Fleishman, personal communication 2022, 2023; iNaturalist Community 2024

14.2.2 Appendix C. Threatened, Endangered, and Species of Greatest Conservation Need at Altus Air Force Base

Table 14-9. Threatened and endangered species and species of concern known to or potentially occurring on Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Federal Status	State Status	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Amphibians					
Texas toad	*Anaxyrus speciosus*)	—	SGCN III	Yes	No
Reptiles					
Lesser earless lizard	*Holbrookia maculata*	—	SGCN II	Potential	Potential
Spiny softshell turtle	*Apalone spinifera*	—	SGCN III	Yes	No
Texas horned lizard	*Phrynosoma cornutum*	—	SGCN I	Yes	No
Texas long-nosed snake	*Rhinocheilus lecontei*	—	SGCN Tier II	Potential	Potential
Fish					
Orangebelly darter	*Etheostoma radiosum*	—	SGCN II	Potential	No
Plains minnow	*Hybognathus placitus*	—	SGCN II	Potential	No
Red river pupfish	*Cyprinodon rubrofluviatilis*	—	SGCN III	Yes	No
Red river shiner	*Notropis bairdi*	—	SGCN II	Potential	No
Silverband shiner	*Notropis shumardi*	—	SGCN II	Potential	No
Birds					
American avocet	*Recurvirostra americana*	MBTA, BCC	—	Yes	No
American golden plover	*Pluvialis dominica*	MBTA, BCC	SGCN III	Potential	Potential
Bell's vireo	*Vireo bellii*	—	SGCN II	Yes	No
Belted kingfisher	*Megaceryle alcyon*	MBTA, BCC	—	Yes	No
Black-billed cuckoo	*Coccyzus erythropthalmus*	MBTA, BCC, DoD PIF Tier 2 Species	—	Potential	Potential

Table 14-9. Threatened and endangered species and species of concern known to or potentially occurring on Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Federal Status	State Status	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Black-capped vireo	*Vireo atricapilla*	MBTA, BCC	—	Potential	Potential
Black tern*	*Chlidonias niger*	MBTA, BCC	—	Potential	Potential
Bobolink	*Dolichonyx oryzivorus*	MBTA, BCC	—	Potential	Potential
Buff-breasted sandpiper	*Tryngites subruficollis*	MBTA, BCC	SGCN II	Potential	Potential
Bullock's oriole	*Icterus bullockii*	MBTA, BCC	SGCN III	Yes	No
Burrowing owl	*Athene cunicularia*	MBTA, BCC, DoD PIF MSS	SGCN II	Yes	Yes
Cassin's sparrow	*Peucaea cassinii*	MBTA, BCC	SGCN II	Yes	No
Chestnut-collared longspur	*Calcarius ornatus*	MBTA, BCC, DoD PIF Tier 2 Species	SGCN II	Potential	Potential
Chimney swift*	*Chaetura pelagica*	MBTA, BCC	—	Potential	Potential
Ferruginous hawk	*Buteo regalis*	MBTA, BCC	SGCN III	Yes	No
Field sparrow	*Spizella pusilla*	MBTA, BCC	—	Yes	No
Grasshopper sparrow	*Ammodramus savannarum*	MBTA, DoD PIF Tier 2 Species	—	Yes	No
Greater yellowlegs	*Tringa melanoleuca*	MBTA, DoD PIF Tier 2 Species	—	Yes	No
Harris's sparrow	*Zonotrichia querula*	MBTA	SGCN III	Yes	Yes
Hudsonian godwit	*Limosa haemastica*	MBTA, BCC	SGCN III	Potential	Potential
Interior least tern*	*Sternula antillarum antillarum*	BCC	SGCN II	Potential	Potential

Table 14-9. Threatened and endangered species and species of concern known to or potentially occurring on Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Federal Status	State Status	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
King rail	*Rallus elegans*	MBTA, BCC, DoD PIF Tier 2 Species	SGCN III	Potential	Potential
Lark bunting	*Calamospiza melanocorys*	MBTA, BCC	—	Potential	Potential
Lesser yellowlegs*	*Tringa flavipes*	MBTA, BCC	—	Potential	Potential
Little blue heron	*Egretta caerulea*	MBTA, BCC	SGCN II	Yes	No
Loggerhead shrike	*Lanius ludovicianus*	MBTA, DoD PIF Tier 2 Species	SGCN I	Yes	Yes
Long-eared owl	*Asio otus*	MBTA, BCC	—	Potential	Potential
McCown's longspur	*Calcarius mccownii*	—	SGCN II	Yes	No
Mountain plover	*Charadrius montanus*	MBTA, BCC, DoD PIF MSS	SGCN I	Potential	Potential
Northern bobwhite	*Colinus virginianus*	DoD PIF MSS	SGCN III	Yes	Yes
Northern harrier	*Circus hudsonius*	MBTA, BCC	—	Yes	No
Northern pintail	*Anas acuta*	MBTA	SGCN III	No	Yes
Painted bunting	*Passerina ciris*	MBTA, BCC	SGCN II	Yes	No
Pectoral sandpiper*	*Calidris melanotos*	MBTA, BCC	—	Potential	Potential
Piping plover	*Charadrius melodus*	FT, MBTA	SGCN III	Potential	Potential
Prairie falcon	*Falco mexicanus*	MBTA, BCC	SGCN III	Yes	No
Pyrrhuloxia	*Cardinalis sinuatus*	MBTA, BCC	—	Potential	Potential

Table 14-9. Threatened and endangered species and species of concern known to or potentially occurring on Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Federal Status	State Status	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
Red-headed woodpecker	*Melanerpes erythrocephalus*	MBTA, BCC, DoD PIF Tier 2 Species	SGCN II	Yes	No
Rufa red knot	*Calidris canutus rufa*	FT	SGCN III	Potential	Potential
Short-eared owl	*Asio flammeus*	MBTA, BCC	SGCN III	Yes	No
Snowy plover	*Charadrius nivosus*	MBTA, BCC	SGCN I	Potential	Potential
Sprague's pipit	*Anthus spragueii*	MBTA, BCC	SGCN III	Yes	No
Swainson's hawk	*Buteo swainsoni*	MBTA	SGCN II	Yes	No
Thick-billed longspur	*Rhynchophanes mccownii*	MBTA, BCC	—	Potential	Potential
Upland sandpiper	*Bartramia longicauda*	MBTA, BCC	SGCN III	Yes	No
Western grebe*	*Aechmophorus occidentalis*	MBTA, BCC	—	Potential	Potential
Whimbrel	*Numenius phaeopus*	MBTA, BCC	—	Potential	Potential
Whooping crane	*Grus americana*	FE, MBTA	SGCN III	Potential	Potential
Willet*	*Tringa semipalmata*	MBTA, BCC	—	Potential	Potential
Wilson's phalarope	*Phalaropus tricolor*	MBTA	SGCN III	Yes	No
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	MBTA, BCC	—	Yes	No
Mammals					
Brazilian free-tailed bat	*Tadarida brasiliensis*	—	SGCN II	Yes	No
Texas kangaroo rat	*Dipodomys elator*	FPE	SGCN II	Potential	Potential
Tricolored bat	*Perimyotis subflavus*	FPE	SGCN II	Yes	No
Townsend's big-eared bat	*Corynorhinus townsendii*	—	SGCN II	Yes	No
Invertebrates					

Table 14-9. Threatened and endangered species and species of concern known to or potentially occurring on Altus Air Force Base and Sooner Drop Zone

Common Name	Scientific Name	Federal Status	State Status	Detected at Altus Air Force Base	Detected at Sooner Drop Zone
American bumblebee	*Bombus pennsylvanicus*	FUR	SGCN II	Potential	Potential
Monarch butterfly	*Danaus plexippus*	FPT	—	Yes	No
Southern Plains bumblebee	*Bombus fraternus*	FUR	SGCN III	Potential	Potential

*Probably occurs within the boundaries (USFWS 2025)

Codes:

— = No status
FE = Federally endangered
FT = Federally threatened
FC = Federal candidate
FPE = Federally proposed for listing as endangered
FPT = Federally proposed for listing as threatened
FUR = Federally under review for listing under the Endangered Species Act
BCC = USFWS Birds of Conservation Concern
DoD PIF MSS = DoD Partners in Flight Mission Sensitive Species
DoD PIF Tier 2 = DoD Partners in Flight Tier 2 species
MBTA = Migratory Bird Treaty Act
SGCN = Oklahoma Comprehensive Wildlife Conservation Strategy Species of Greatest Conservation Need
SGCN I = Critical conservation need
SGCN II = High conservation need
SGCN III = Moderate conservation need

Sources: Schnell et al. 1998; Hauer and Schwab 2017; Altus AFB 2023*c*; NABat 2023; Robertson et al. 2002; USDA–APHIS–WS; USFWS 2022; USFWS 2024*b*, 2024*d*; USGS 2024, USFWS 2025

15.0 ASSOCIATED PLANS

15.1 Tab 1—Wildland Fire Management Plan (WFMP)

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

The BASH Plan is Controlled Unclassified Information (CUI) and is available only upon request to the 97 CES/CEIE Altus AFB NRM (delaine.kelley.1@us.af.mil).

15.3 Tab 3—Golf Environmental Management (GEM) Plan

15.4 Tab 4—Integrated Cultural Resources Management Plan (ICRMP)

The ICRMP is available only upon request to the 97 CES/CEIE Altus AFB NRM (delaine.kelley.1@us.af.mil).

15.5 Tab 5—Integrated Pest Management Plan (IPMP)

The IPMP is available only upon request to the 97 CES/CEIE Altus AFB NRM (delaine.kelley.1@us.af.mil).

15.6 Tab 6—Altus Air Force Base Prescribed Burn Plan

15.7 Tab 7—Maps Containing Controlled Unclassified Information (CUI)

This document contains CUI figures and is available upon request to the 97 CES/CEIE Altus AFB NRM (delaine.kelley.1@us.af.mil).