

**Department of the Air Force**

Integrated Natural Resources Management Plan

Sheppard AFB INRMP

**Installation Supplement**



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## **ABOUT THIS PLAN**

This installation-specific Environmental Management Plan (EMP) is based on the United States Air Force's (USAF) 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 Air Force Instructions (AFIs); Department of Defense Instructions (DoDIs); USAF Playbooks; federal, state, and local requirements; Biological Opinions; and permits are referenced.

Certain sections of this INRMP begin with standardized, USAF-wide "common text" language that address USAF 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 USAF-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/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 Conservation Program.*

## **DOCUMENT CONTROL**

### ***Standardized INRMP Template***

In accordance with (IAW) the Air Force Civil Engineer Center (AFCEC) Environmental Directorate (CZ) Business Rule (BR) 08, *EMP 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 06/26/2020 and supersedes the 2018 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 AFMAN 32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect no less than every five 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 five 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 (AFMAN 32-7003).

Annual reviews and updates are accomplished by the installation Natural Resources Manager (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**

### ***Installation Supplement***

**Digital Signature**

DREW, LYLE K Brig Gen USAF AETC 82 TRW/CC	DREW, LYLE K Brig Gen USAF AETC 82 TRW/CC Date: 09/30/2022 2:38:21 pm
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LYLE K. DREW  
Brig Gen, USAF  
Commander, 82d Training Wing

INRMP APPROVAL/SIGNATURE PAGES

**Sheppard Air Force Base**

This 2022 five-year update and revision of the Integrated Natural Resources Management Plan has been prepared in accordance with regulations, standards, and procedures of the Department of Defense and the United States Air Force in cooperation with the United States Fish and Wildlife Service and the Texas Parks and Wildlife Department. The signatures below indicate mutual agreement among the parties concerning the conservation, protection, and management of the fish and wildlife resources presented in this INRMP.

**AMY LUEDERS** Digitally signed by AMY  
LUEDERS  
Date: 2022.09.12 15:32:52  
-06'00'

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AMY LUEDERS  
Regional Director  
U.S. Fish and Wildlife Service

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(Date)

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

INRMP APPROVAL/SIGNATURE PAGES

**Sheppard Air Force Base**

This 2022 five-year update and revision of the Integrated Natural Resources Management Plan has been prepared in accordance with regulations, standards, and procedures of the Department of Defense and the United States Air Force in cooperation with the United States Fish and Wildlife Service and the Texas Parks and Wildlife Department. The signatures below indicate mutual agreement among the parties concerning the conservation, protection, and management of the fish and wildlife resources presented in this INRMP.



\_\_\_\_\_  
CARTER SMITH  
Executive Director  
Texas Parks and Wildlife Department

12 September 2022  
(Date)

The Integrated Natural Resources Management Plan (INRMP) provides the installation commander and other decision makers a narrative of present natural resources and their status, outlines the management of these resources on Sheppard Air Force Base (AFB) and its satellite facilities (Sheppard Recreation Annex [SRA] and Frederick Auxiliary Airfield), and the potential impacts on the base missions. The INRMP treats Sheppard AFB, SRA, and Frederick Airfield together unless management goals or site specific conditions differ, then additional details are discussed for each area individually.

This INRMP sets forth a unified management philosophy, strategy, and framework for the protection, conservation, use, and management of natural resources at Sheppard AFB. Natural resources are valuable assets of the USAF. They provide the natural infrastructure needed for testing weapons and technology, as well as for training military personnel. The USAF natural resources program ensures continued access to the natural resources needed to conduct military training and testing and to sustain the long-term ecological integrity and biological diversity of the resource base. This plan has been developed cooperatively between the installation, the USFWS, and Texas Parks and Wildlife Department (TPWD). Ongoing USFWS and TPWD involvement will ensure continued mutual agreement and cooperation in managing the natural resources of Sheppard AFB.

Benefits from implementation of the INRMP include, but are not limited to, land management and improvement to provide maximum military use while controlling erosion, protecting natural resources, sustaining grassland productivity, and conserving biodiversity.

The overarching program guidance for natural resources management at Sheppard AFB is provided below.

- Reduce Bird/Wildlife Aircraft Strike Hazards (BASH) for the flying mission and civilian aircraft safety in coordination with the Sheppard AFB BASH Plan.
- Manage wetland resources as aesthetic resources for the base and for passive recreation where the impact is minimal.
- Monitor for changes in state protected and federally threatened and endangered species.
- Develop an invasive species management sub-plan that will support efforts to identify base-specific invasive species, identify the negative impacts of invasive species encroachment, and identify a monitoring program and control options.
- Develop an urban forest inventory and management plan.
- Continue to map the extent of current vegetative communities and habitats on Sheppard AFB and SRA to support development of natural resource management plans and programs.
- Promote natural resources for outdoor recreation opportunities available to military and civilian personnel, including hiking, picnicking, camping, fishing, skeet shooting, boating, water skiing, and swimming.
- Continue reducing the use of pesticides through Integrated Pest Management techniques, an active monitoring program, and use of biological controls as the primary methods for controlling pests on Sheppard AFB. Pest management practices also will be reviewed to ensure that they minimize harm to pollinators.

Based on these overarching guidance principles, the goals, objectives, and projects identified in Chapter 8 of the INRMP were developed to support and sustain the base's mission. Implementing these management actions will assist the Installation Commander and NRM with effectively managing natural resources on the base. These management approaches will ensure that installation lands remain in condition to support the military mission and comply with relevant environmental regulations. The management actions outlined in this INRMP incorporate the principles of ecosystem and adaptive management, and they ensure that the multiple-use policy for natural resources is met in a sustainable manner. The USAF principles and policy are important components of natural resources management on military lands. The INRMP also addresses the potential impacts that climate change may have on the installation's natural resources and resulting impacts on the base's mission, and it discusses the need for accelerated action to adapt to those changes. None of the goals will significantly impact the base's mission through implementation of this INRMP.

## **1 OVERVIEW AND SCOPE**



This INRMP was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the 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 USAF adaptability in all environments. The USAF 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 USAF natural resources program is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of USAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. The INRMP is intended for use by all installation personnel. The Sikes Act is the legal driver for the INRMP.

## **1.1 Purpose and Scope Installation Supplement**

The resources of Sheppard AFB are used for living, training, working, and playing. These activities efficiently take place within Sheppard AFB's 5,736 acres through multiple-use coordination of facilities and management plans. This INRMP sets forth a single, unified management philosophy, strategy, and framework for protecting, conserving, using, and managing natural resources at Sheppard AFB. It is intended to fulfill the requirements of United States Department of Defense Instruction (DoDI) 4715.03, DoDI 4150.07, DoDI 7310.5, Air Force Policy Directive (AFPD) 32-70, Military Handbook-1028/SA, Air Force Manual (AFMAN) 32-1053, and AFMAN 32-7003.

### 1.1.1 SECURITY INSTRUCTION

1. The long title of this plan is Sheppard AFB Integrated Natural Resource Management Plan. The short title is SAFB INRMP. Both titles are UNCLASSIFIED.
2. This document is "UNCLASSIFIED."
3. Reproduction of this document, in whole or in part, to assist tasked organizations in development of supporting operating instructions/checklists, is authorized.
4. The provisions of AFI 10-701 AFI Sup 1, Operating Security, were considered during the formation of this plan.

### 1.1.2 PURPOSE

The INRMP provides the installation commander and other decision-makers a narrative of present natural resources and their status, outlines the management of these resources on Sheppard AFB and its satellite facilities (Sheppard Recreation Annex [SRA] and Frederick Auxiliary Airfield), and the potential impacts on the base's mission.

All installation personnel, both civilian and military, will act responsibly in the public interest in managing the land and historic resources that are an integral part of the installation plans, decisions, actions, and programs.

### 1.1.3 CONDITIONS FOR IMPLEMENTATION

This plan will be implemented when approved in writing by the Installation Commander (or delegated authority), the United States Fish and Wildlife Service (USFWS) Region 2 Executive Director, and the Texas Parks and Wildlife Department (TPWD) Executive Director (or delegated authority) at least every five years. Continuous Support is required to maintain and update the document.

Annual review of the INRMP by stakeholder signatories will verify that:

- All must-fund projects and activities have been budgeted for and implementation is on schedule.
- All required trained natural resources positions are filled or are in the process of being filled.
- Projects and activities for the upcoming year have been identified and included in the INRMP.
- All required agency coordination has occurred.

- Any significant changes to installation mission requirements or its natural resources have been identified.

The Environmental, Safety, and Occupational Health Council (ESOHC) is briefed annually on the results of the reviews.

#### 1.1.4 OPERATIONS TO BE CONDUCTED

All current and planned installation activities (e.g., master planning, construction requests, site approval requests, and training exercise plans) shall be planned and conducted so as to ensure effective and timely coordination with installation historic resources management personnel.

There are no key assumptions or operational constraints, and Operations Security is normal.

### **1.2 Management Philosophy Installation Supplement**

Natural resources under control of the installation are managed to support their military mission while practicing the principles of multiple use and sustained yield, using scientific methods and, taking an interdisciplinary approach. Conserving natural resources and the military mission need not and shall not be mutually exclusive.

Sheppard AFB develops its natural resources within manpower and mission constraints. The management approach of this INRMP uses and cares for the natural resources in a manner that best serves both the present and future needs of the United States (U.S.) and its people. It provides the best possible outdoor-recreation experiences for those persons eligible to use base facilities. All installation personnel, both civilian and military, are required to act responsibly in the public interest when managing the land and natural resources that are an integral part of the installation. There shall be a conscious and active concern for the inherent value of natural resources in all installation plans, decisions, actions, and programs.

The Natural Resources Manager (NRM) developed this plan with appropriate federal, state, and local government officials and other public groups with interest in or jurisdiction over installation planning and activities that affect natural resources.

All current and planned installation activities (e.g., master planning, construction requests, site-approval requests, and training-exercise plans) are planned and conducted to ensure effective and timely coordination with installation natural resources management personnel. Any planned actions that would substantially affect natural resources or require changes to this plan would be reviewed by ESOHC. Such actions will proceed only when compatible with this plan or after the plan has been appropriately changed. The installation NRM coordinates these plan and management activities under it with all affected installation offices. Proponents of actions that would affect installation natural resources coordinate with the installation NRM at the outset of planning and throughout planning and implementation. The NRM routinely reviews work requests and job orders that affect natural resources and ensures that they are compatible with this plan.

### **1.3 Authority Installation Supplement**

The Sikes Act, 16 United States Code (U.S.C.) § 670a, requires that an INRMP be developed and implemented for all Department of Defense (DoD) installations with significant natural resources. This plan has been developed cooperatively between the installation, the USFWS, and TPWD. The USAF natural resources program ensures continued access to land, air, and water resources to conduct realistic military training and testing, as well as to sustain the long-term ecological integrity of the resource base.

Laws, regulations, and directives that authorize the development and implementation of this INRMP include those listed below.

- Sikes Act of 1960 (16 U.S.C. 670 et. seq.), as amended, provides for cooperation between the Department of the Interior, DoD, and state agencies in planning, developing, and maintaining natural resources on military reservations.
- The Sikes Act Improvement Amendment, as contained in the Fiscal Year (FY) 1998 National Defense Authorization Act, specifically calls for the cooperative preparation and implementation of INRMPs on military installations.

- DoD Instruction 4715.03, Environmental Conservation Program, implements policy, assigns responsibilities, and prescribes procedures for the integrated management of natural and cultural resources on the property under DoD control.
- Air Force Policy Directive (AFPD) 32-70, Environmental Quality, requires Air Force installations to conserve natural and cultural resources through effective environmental planning.
- AFMAN 32-7003, *Environmental Conservation*, implements the Sikes Act as well as DoDI 4715.03 and AFPD 32-70, and it provides guidance in managing natural resources on USAF installations in accordance with (IAW) applicable federal, state, and local laws and regulations. AFMAN 32-7003 establishes the INRMP as the principal tool for managing natural resources on USAF installations.

Other applicable guidance includes Chapter 2—Cultural Resources Management in AFMAN 32-7003, and DoD Instruction 7000.14, *DoD Financial Management Policy and Procedures*. Appendix A, Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP, summarizes key legislation and guidance used to create and implement this INRMP. Refer to that complete listing of AFIs, AFMANs, the Federal Register, and the U.S.C. to ensure that all applicable guidance documents, laws, and regulations are reviewed. Installation-specific policies, including state and local laws and regulations are summarized in the table below.

Installation-Specific Policies (including State and/or Local Laws and Regulations)	
N/A	There are no installation specific policies

#### 1.4 Integration with Other Plans Installation Supplement

INRMP revisions and concurrence with the final plan must be coordinated through the installation chain of command and the NRM, entomology department, community developer, grounds maintenance manager, Bird/Wildlife Aircraft Strike Hazard (BASH) supervisor, and United States Department of Agriculture (USDA) BASH program manager. The NRM must ensure that the INRMP, Integrated Pest Management Plan (IPMP), Integrated Cultural Resource Management Plan (ICRMP), BASH Plan, Drought Contingency Plan, Wildland Fire Management Plan (WFMP), Grounds Maintenance contract, Air Installation Compatible Use Zone (AICUZ) studies, comprehensive base plans, and any other plans that may affect natural resources, are mutually supportive and not in conflict.

- Comprehensive Planning—The INRMP serves an important role in support of the comprehensive development-planning processes for the base and SRA. Information in the INRMP that is important to comprehensive planning process includes data on the location and condition of natural resources. The INRMP also details natural resources management activities that may need to be considered during comprehensive planning efforts.
- Development and implementation of the development plan must take into account resources identified by the INRMP and may incorporate mitigation plans as necessary to mitigate for impacts to natural resources.
- AICUZ Program—The AICUZ program objectives are developed to assist local, regional, state, and federal officials with protecting the public's health, safety, and welfare by promoting long-term land use compatible with military operations, and protecting USAF operational capability from the effects of land and water use that are incompatible with USAF operations. The INRMP provides details on how land and water should be used, developed, and protected on Sheppard AFB.
- BASH Plan—The Sheppard NRM participates in the BASH program as directed by AFMAN 32-7003. The BASH plan is designed to reduce the risk of bird/wildlife strikes during airfield operations. The INRMP and BASH should work together to reduce the quality of wildlife habitat near the airfield for minimizing the number of animals within the area while balancing the protection of the base's natural resources. The draft revisions of the INRMP must be coordinated through the BASH working group to ensure that the plans are mutually supportive.
-

IPMP: The pest management manager and NRM work together to ensure the IPMP and INRMP are mutually supportive. A goal of the INRMP is to reduce the overall use of pesticides. The IPMP reflects this goal, and low use and no use pesticide measures are preferred to control pests on Sheppard AFB.

- WFMP—The WFMP describes and controls the way in which prescription burns are used on Sheppard AFB to control undesirable species and reduce the risk of uncontrolled wildland fires during airshows. Controlled burns can shape wildlife habitat and may be used to control invasive species; in this way, the objectives of the WFMP can directly support the BASH program and are closely related to the goals of the INRMP.
- ICRMP— The ICRMP describes the responsibility of managing the land and historic resources that are an integral part of the installation mission and works with NRM if there are resources discovered.

## 2 INSTALLATION PROFILE

### Installation Supplement

<b>Office of Primary Responsibility (OPR)</b>	82d Civil Engineer Squadron/Environmental Element (82 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.
<b>Natural Resources Manager/Point of Contact (POC)</b>	Name: Jose Martinez Phone: 940-676-2410 Email: jose.martinez.91.ctr@us.af.mil
<b>State and/or local regulatory POCs</b> (Include agency name for Sikes Act cooperating agencies)	<u>United States Fish and Wildlife Service</u> Sean Edwards, Fish and Wildlife Biologist 2005 NE Green Oaks Blvd., Ste. 140 Arlington, TX 76006  <u>Texas Parks and Wildlife Department</u> Rick Hanson 1702 Landmark Lane, Ste. 3 Lubbock, TX 79415
<b>Total acreage managed by installation</b>	5,297 Acres (Sheppard AFB), 430 Acres (Sheppard Recreation Annex), 9 Acres (Frederick Auxiliary Airfield)
<b>Total acreage of wetlands</b>	41.82 acres (Sheppard AFB only)
<b>Total acreage of forested land</b>	318 acres (Sheppard AFB only)
<b>Does installation have any Biological Opinions?</b> (If yes, list title and date, and identify where they are maintained)	No

<p><b>Natural Resources Program Applicability</b> (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)</p>	<ul style="list-style-type: none"> <li>[ X ] Fish and Wildlife Management</li> <li>[ X ] Outdoor Recreation and Access to Natural Resources</li> <li>[ X ] Conservation Law Enforcement</li> <li>[ X ] Management of Threatened, Endangered, and Host Nation-Protected Species</li> <li>[ X ] Invasive Species</li> <li>[ X ] Water Resource Protection</li> <li>[ X ] Wetland Protection</li> <li>[ X ] Grounds Maintenance</li> <li>[ ] Forest Management</li> <li>[ X ] Wildland Fire Management</li> <li>[ ] Agricultural Outleasing</li> <li>[ X ] Integrated Pest Management Program</li> <li>[ X ] Bird/Wildlife Aircraft Strike Hazard (BASH)</li> <li>[ ] Coastal Zone and Marine Resources Management</li> <li>[ X ] Cultural Resources Protection</li> <li>[ X ] Public Outreach</li> <li>[ X ] Geographic Information Systems (GIS)</li> </ul>
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## 2.1 Installation Overview

### 2.1.1 Location and Area

#### Installation Supplement

##### 2.1.1 Location and Area

Sheppard AFB encompasses 5,297 acres, plus a 9-acre training annex at Frederick Auxiliary Airfield in Oklahoma and a 430-acre recreation annex at Lake Texoma (SRA). Figure 2-1 depicts Sheppard AFB facilities and vicinity.

##### 2.1.1.1 Sheppard AFB

Sheppard AFB is in the extreme north-central part of the Rolling Plains of Texas in Wichita County and the Red River Valley, close to the City of Wichita Falls (Figure 2-2).

Sheppard AFB is a USAF training installation under the Air Education and Training Command (AETC). Sheppard AFB is an active military installation where the 82d Training Wing (82 TRW) conducts its technical and field training mission and where the 80th Flying Training Wing (80 FTW) conducts flight training.

With construction of the railroad in 1882, the town of Wichita Falls became an agricultural and trade center in northern Texas. In the early 1900s, Wichita Falls became an area nexus for oil operations. During World War II, Sheppard AFB began as an Army Air Corps Training Center and became a permanent installation in 1941 (Sheppard AFB 2010).

##### 2.1.1.2 Sheppard Recreation Annex

SRA is approximately 120 miles east of Sheppard AFB, adjacent to Lake Texoma on the Texas/Oklahoma border. It is located on the western end of the lake, approximately nine miles northwest of Gordonville in Grayson County, Texas. SRA falls within the Eastern Cross Timbers Ecoregion, a stretch of woodland spanning eastern Cooke County to the western Hill Country. The recreation area contains administrative, maintenance, and temporary living (cabin) facilities on its 430-plus acres of land.

##### 2.1.1.3 Frederick Auxiliary Airfield

The Frederick Auxiliary Airfield is located at Frederick Regional Airport in southern Oklahoma. The airfield was originally opened as an Army airfield in 1942. Currently the USAF uses the airfield runway for touch and go flight practice. The area maintained by the USAF at Frederick Auxiliary Airfield is limited to the runway and the immediately surrounding area comprising approximately nine acres. Habitat types at Frederick are limited to maintained grasslands surrounding the runway and do not provide significant natural resource management concerns beyond BASH.



Figure 2-1. Sheppard AFB facilities and vicinity





Figure 2-2. Overview of the main Sheppard AFB installation.

Installation/Geographically Separated Unit Location and Area Descriptions

Installation/Geographically Separated Unit	Main Use/Mission	Acreage	Describe Natural Resource Implications
Main Installation	United States Air Force training installation (technical and field training)	5,297	Wetlands, floodplains, riparian, maintained grasslands, mixed mesquite woodlands, mesquite brushlands, cultural resources, bird/wildlife aircraft strike hazards, sensitive species, vegetation management, grounds maintenance, integrated pest management
Federick Auxiliary Airfield	Flight training	9	Minimal—management of bird/wildlife aircraft strike hazard adjacent to airfield
Sheppard Recreation Annex	Recreation	430	Sensitive species, wooded areas, grasslands, wetlands, invasive species management, grounds maintenance

### 2.1.2 Installation History Installation Supplement

Sheppard AFB began as an Army Air Corps Training Center during World War II. In February 1941, representatives of the War Department and the City of Wichita Falls entered into a lease agreement giving the Federal Government the right to build and operate a military installation adjacent to the Wichita Falls Municipal Airport.

Construction of the facility began in May and training of the initial class of 220 aviation mechanics students commenced in the fall of that year. Since 1950, Sheppard AFB has been a permanent USAF base dedicated to training. In 1959, it became a technical training center, and since then it has provided technical training to members of the USAF, other services, and foreign nations. In 1980, Sheppard AFB became the site of the Euro-North Atlantic Treaty Organization Joint Jet Pilot Training program. Currently, Sheppard AFB specializes in training for technical and flying programs (Sheppard AFB 2010).

### 2.1.3 Military Missions Installation Supplement

In 1959, nine years after Sheppard AFB became a permanent base, it became a technical training center and, since that time, it has provided technical training to members of the USAF, other services, and foreign nations. Today, Sheppard AFB is the most diversified technical training center in AETC, providing technical, field, and flying training to approximately 60,000 students annually. Base units now include the 82 TRW, 80 FTW, 82d Training Group (TRG), 782d TRG, 982d TRG, 82d Mission Support Group, and the 82d Medical Group.



### Listing of Tenants and Natural Resources Responsibility

Tenant Organization	NR Responsibility
Air Education and Training Command	Coordinate with the Natural Resource Manager (NRM) when planning projects that may impact natural resources (e.g., work orders, AF Form 813s).
80th Flying Training Wing (Host Wing) (80 Operations Support Squadron, and the 88th, 89th, 90th, 459th, and 469th Flying Training Squadrons)	Coordinate with the NRM when planning projects that may impact natural resources (e.g., work orders, AF Form 813s). Inform the NRM when the General has ordered a tree removal and or base-wide trimming.
City of Wichita Falls Commissary Defense Printing Service	Coordinate with the NRM when planning projects that may impact natural resources (e.g., work orders, AF Form 813s). Support bird/wildlife aircraft strike hazard management and goals by working towards reducing bird-strike hazards on the leased land; the entities will follow environmental procedures when developing new areas or adding additional sources to existing areas. All Facility Managers oversee caring for the inside and outside of the facility. All Facility Managers must get approval from the NRM for trimming/cutting shrubs/trees and removals in landscaped areas.

Chaplain  
Command Post  
Law Center  
Military Equal Opportunity  
NCO Academy  
Retiree Affairs  
Scouts Boys/Cubs and Girls  
Thrift Shop Training Operations  
Royal Saudi Air Force Tech Training  
University of Tennessee  
361st TRS\*  
362d TRS  
363d TRS  
364th TRS  
365th TRS  
366th TRS  
372d TRS  
373d TRS  
982d Maintenance Squadron  
82d Civil Engineer Squadron  
82 CES/CE1  
MFH (Balfor Beaty)  
82d Communications Squadron  
82d Force Support Squadron(Vernon, Midwestern,  
Wayland, etc.)  
82d Security Forces Squadron  
82d Force Support Squadron  
82d Logistics Readiness Squadron  
82d Contracting Squadron  
Unions Local 779 and Local

Coordinate with the NRM when planning projects that may impact natural resources (e.g., work orders, AF Form 813s). All Facility Managers oversee caring for the inside and outside of the facility. All Facility Managers must get approval from the NRM for trimming/cutting shrubs/trees and removals in landscaped areas.

#### *2.1.4 Natural Resources Needed to Support the Military Mission*

##### **Installation Supplement**

Natural resources that benefit the military mission are those that offer recreational and training opportunities. These resources benefit the skills, morale, and mental well-being of airmen, students, and on-base family living. Types of resources include the wildlife viewing, fishing, and hiking opportunities provided at SRA.

#### *2.1.5 Surrounding Communities*

##### **Installation Supplement**

Sheppard AFB is located on the northern outskirts of Wichita Falls, Texas. Wichita Falls is the largest population center near the base, with approximately 102,316 people in the Wichita Falls Urbanized Area, which includes Wichita County and a small portion of Archer County (U.S. Census Bureau 2022). Sheppard AFB is the largest employer in the area, accounting for up to 58 percent of local employment (Sheppard AFB 2010).

The median age of the surrounding population was 32.9 in 2019, based on estimates from the U.S. Census Bureau, and average household size was 3.3 persons. The ethnic breakdown of the Metropolitan Statistical Area is 62.4 percent white, 13.0 percent black, 2.5 percent Asian, 1.1 percent American Indian or Alaskan Native, 9.4 percent other ethnicity, and 11.4 percent two or more ethnicities (U.S. Census Bureau 2022).

Land use in the area is still dominated by the oil and gas industry and agriculture, although large durable goods manufacturing is growing in the region. Although Wichita Falls is a growing community, no current trends jeopardize the military mission of the installation.

#### *2.1.6 Local and Regional Natural Areas*

##### **Installation Supplement**

Wichita Falls is located nearly equidistant between the Dallas-Fort Worth metropolitan area and Oklahoma City. Wichita Falls is the hub of a regional economic trade area and in recent years has diversified its economy beyond the traditionally dominant oil and gas industry and agriculture. In the 1860s, the existing grassy prairies were used by the North Texas cattle barons for extensive cattle ranching (Sheppard AFB 2010). The railroad connected to the town in 1882, and Wichita Falls became a transportation hub for cotton, wheat, and oats. Oil was discovered during World War I and, by 1940, 40 percent of the State's oil production was based out of the Wichita Falls area. The land, therefore, has been impacted by both cattle ranching and oil and gas exploration. Oil and gas production in the region, although still important, plays a less dominant role in the diversified economy (Sheppard AFB 2010).

Wichita Falls is one of the areas in Texas with the least access to state recreational areas, with only 3.5 state acres available per 1,000 acres within a 90-minute drive radius and no access to federal land. There are no state or federal sites within five miles of the installation; the nearest state park is Lake Arrowhead State park, a reservoir located 14 miles southeast of Wichita Falls.

The Wichita River runs through Wichita Falls and to the south of Sheppard AFB. The Red River, which marks the boundary between Texas and Oklahoma, is approximately 11 miles to the north. Bear Creek, a tributary to the Wichita River, runs through the eastern side of Sheppard AFB.

## **2.2 Physical Environment**

### *2.2.1 Climate*

#### **Installation Supplement**

The climate at Sheppard AFB is sub-humid with an average yearly rainfall of 29.00 inches. A significant part of this moisture is lost to evaporation caused by high average temperatures and hot southwestern winds. The growing season is approximately 8 months, with an average frost-free period of 225 days (30 March–11 November). Periodic droughts are a problem; hence, careful planning and accurate timing of operations is required to establish perennial plantings. Rapid temperature fluctuations also are possible (for example, temperature drops of 20 to 30 Fahrenheit (°F) in one hour). Table 2-1 and Table 2-2 provide average monthly temperatures and average monthly rainfall at Sheppard AFB.

**Table 2-1 Average Temperature Conditions (in degrees F)\***

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
42.4	46.3	54.7	62.8	71.8	80.1	84.7	84.1	76.0	64.6	52.7	43.7

\*Based on National Oceanic and Atmospheric Administration data for Wichita Falls, TX, averaged for 1991-2020

**Table 2-2 Average Rainfall per Month (in inches)\***

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1.00	1.00	2.00	3.00	4.00	3.00	2.00	3.00	3.00	3.00	2.00	2.00

\*Based on National Oceanic and Atmospheric Administration data for Wichita Falls, TX, averaged for 1991-2020

### 2.2.1.1 Climate Change Projections

To project future climate conditions at Sheppard AFB, Colorado State University's Center for Environmental Management of Military Lands (CEMML) generated site-specific climate projections under two future carbon-emission scenarios: Representative Concentration Pathway (RCP) 4.5 (moderate-level emissions) and RCP 8.5 (high-level emissions). CEMML then used these projections to assess potential impacts of future climate on natural resources at the installation. Models used historical daily climate data recorded from 1980 through 2009 to represent average historical (also called baseline) conditions and generate climate projections. The historical daily climate data represent the 30-year historical reference point used by the Intergovernmental Panel on Climate Change (IPCC) to define climate change scenarios. Future climate conditions, assessed under both RCP 4.5 and RCP 8.5, were projected to produce two decadal time series of daily climate values for 2026–2035 and 2046–2055, represented hereafter as 2030 and 2050, respectively (CEMML 2019).

Historical data included average daily temperature, maximum and minimum daily temperatures, and daily precipitation. For each of these variables, researchers calculated a daily anomaly (the difference of a future climate compared to the historical climate) under each emission scenario (RCP 4.5 and RCP 8.5) for both 2030 and 2050. Daily data were then averaged within both 10-year periods for each variable and emission scenario to produce an annual average temperature (TAVE), annual average maximum (TMAX) and minimum (TMIN) temperatures, and annual average precipitation (PRECIP).

The climate assessment was based primarily on publicly available data and data provided by the Air Force Civil Engineer Center (AFCEC) (CEMML 2019). Climate projections were based on recent global climate model simulations developed for the IPCC Fifth Assessment Report, the IPCC Coupled Model Intercomparison Project Phase 5, and the National Center for Atmospheric Research-Community Climate System Model (NCAR-CCSM) (Hibbard et al. 2007, Moss et al. 2008, 2010, Gent et al. 2011, Hurrell et al. 2013).

Climate projections for Sheppard AFB (Table 2-3. Summary of climate data for Sheppard AFB.) indicate that TAVE will increase over time under both emission scenarios. For the decade centered around 2030, both of the scenarios project a similar TAVE increase of 2.4 °F (1.3 Centigrade [°C]) to 3.5 °F (1.9 °C) over the historical average. The two emission scenarios project greater warming by 2050, with RCP 4.5 expressing a warming of approximately 3.3 °F (1.8 °C) and RCP 8.5 expressing a slightly greater warming of 4.9 °F (2.7 °C) for this period. Maximum and minimum temperatures also indicate increasing trends over time under both scenarios.

PRECIP varies between emission scenarios and over time due to the larger interconnected ocean-atmosphere dynamics associated with the NCAR-CCSM. For 2030, the RCP 4.5 scenario projects an increase in PRECIP of 23 percent, whereas RCP 8.5 projects an increase of 9 percent. For 2050, both scenarios project a moderate increase in PRECIP of approximately 12 percent.

Table 2-3. Summary of climate data for Sheppard AFB.

PRECIP (inches)	29.5	36.3	33.1	32.1	32.9
TMIN (°F)	50.9	53.4	53.9	54.5	55.6
TMAX (°F)	76.1	78.4	79.8	79.6	81.1
TAVE (°F)	63.3	65.8	66.9	67.0	68.4
GDD (°F)	4861	5344	5492	5512	5746
HOTDAYS	77.0	96.2	101.6	101.6	109.8

\*TAVE °F = annual average temperature; TMAX °F = annual average maximum temperature; TMIN °F = annual average minimum temperatures; PRECIP (inches) = average annual precipitation; GDD °F = Average annual accumulated growing degree days with a base temperature of 50 °F; HOTDAYS (average # of days per year) = average number of hot days exceeding 90 °F; WETDAYS (average # of days per year) = annual number of days with precipitation exceeding 2 inches in a day.

### 2.2.2 Landforms

#### Installation Supplement

The installation is located within the Central Rolling Red Plains of the Redbeds Plains unit of the Central Lowlands physiographic province. The general topography consists of smooth rounded hills with broad shallow valleys. The base itself and the surrounding countryside are largely flat.

### 2.2.3 Geology and Soils

#### Installation Supplement

Sheppard AFB is in the area known as the Rolling Red Plains of Texas. The northern one-third of the base is bisected by a crescent-shaped, 100-year floodplain, which precludes development of building facilities in that area. Sandy loam topsoils without suitable vegetation cover and management are highly susceptible to wind and water erosion.

Sheppard AFB is located on a broad east-west soil belt known as the Kamay-Bluegrove-Deandale (K-B-D) Association. The K-B-D Association consists of loamy soils that formed in red-bed clay, shale, or sandstone, or in old alluvium derived from red-bed clay and shale; it is about 32 percent Kamay, 12 percent Bluegrove, 10 percent Deandale, and 46 percent less extensive soils. Kamay soils have 10 inches of dark grayishbrown silt loam over clay of very slow permeability; Bluegrove soils have less than 10 inches of brown loam over clay loam of very moderately slow permeability; and Deandale soils have 12 inches of dark grayish-brown silt loam over clay of very slow permeability. On Sheppard AFB, soils are generally characterized as reddish-brown sandy loam underlain with red clay to clay loam. In certain areas, red-bed shales and sandstone are near the surface, a characteristic feature of the "Rolling Red Plains of Texas." On base, the natural topsoil is thin sandy loam, with red clay as a typical sub-soil. Because the topsoils are sandy loams, they are highly susceptible to wind and water erosion. For detailed information concerning soils at Sheppard AFB, refer to the Natural Resources Conservation Service (NRCS 2022b) online web soil survey.

#### 2.2.3.1 Soil Fertility

The soils are low in organic matter and nitrogen and require applications of both nutrients when establishing new turf areas. Fertilizer and organic matter are required to maintain healthy vigorous growth of the turf type desired on specific areas.

### 2.2.4 Hydrology

#### Installation Supplement

Sheppard AFB is bisected by Bear Creek and one of its tributaries. Stormwater on the base drains to Plum Creek, Bear Creek, or the Wichita River. Plum and Bear Creeks are tributaries of the Wichita River, which eventually flows into the Red River. There are 41.82 acres of wetlands on the base, located predominantly in the northwestern corner. These wetlands are in the floodplain, and this area of the base drains into Bear Creek. The water supply for Sheppard AFB is provided by the city, and is sufficient for current use and growth plans.

The northern one-third of Sheppard AFB is bisected by a 100-year floodplain. The floodplain is considered an area where development is restricted. The 80 FTW was built on the floodplain, but several feet of additional fill were added to the building site to accommodate the floodplain in the immediate area.

## **2.3 Ecosystems and the Biotic Environment**

### *2.3.1 Ecosystem Classification*

#### **Installation Supplement**

Sheppard AFB is located in the Central Texas Plateau region, which includes what is commonly referred to as the "Edwards Plateau" and "Rolling Plains." In its natural state the region is predominantly short-grass and mid-grass prairie with areas of savanna and woodland. The vegetation is more diverse toward the south and eastern boundaries of the region.

The vegetation throughout the region has been heavily impacted by overgrazing of livestock and other developments. The prairies in the rolling plains, once dominated by sideoats grama (*Bouteloua curtipendula*), little bluestem (*Schizachyrium scoparium*), and blue grama (*Bouteloua gracilis*), have been converted to grain fields or have been cleared for oil well pads.

The mesquite savanna is an open canopy dominated by scattered broadleaf evergreen or deciduous shrub and short tree species with dense to open grass cover throughout the region.

### *2.3.2 Vegetation*

#### **Installation Supplement**

The area surrounding Wichita Falls is dominated by species consistent with the Rolling Plains ecosystem (TPWD, no date<sup>[1]</sup>). Native grasses include little bluestem, blue grama, sideoats grama, Indiangrass (*Sorghastrum nutans*), and sand bluestem (*Andropogon hallii*). Many rangelands in this region have been invaded by annual and perennial forbs, legumes, and woody species due to historical livestock grazing practices and lack of naturally occurring fire on the landscape. Dominant woody species include honey mesquite (*Prosopis glandulosa*), Pinchot's juniper (*Juniperus pinchotii*), yucca (*Yucca* spp.), lotebush (*Ziziphus obtusifolia*), sugarberry (*Celtis laevigata*), prickly pear (*Opuntia* spp.), skunkbush sumac (*Rhus trilobata*), plum (*Prunus* spp.), western soapberry (*Sapindus saponaria*), little leaf sumac (*Rhus microphylla*), shinnery (or Harvard) oak (*Quercus havardii*), algerita (*Mahonia trifoliolata*), catclaw acacia (*Senegalia greggii*), lime pricklyash (*Zanthoxylum fagara*), and sand sage (*Artemisia filifolia*). Mesquite grasslands dominate vast areas of this ecological region. Bottomlands along larger streams contain American elm (*Ulmus americana*), common buttonbush (*Cephalanthus occidentalis*), pecan (*Carya illinoensis*), and cottonwood (*Populus deltoides*). The NRCS classifies approximately 90 percent of the area as being in the "Deep Hardland and Shallow Red Land Range Site." Range sites are kinds of rangeland that differ in their ability to support vegetation.

<sup>[1]</sup> Note—Plant species names in this section and throughout the INRMP were updated in March 2022 via the NRCS Plants online database (NRCS 2022a) and, where conflicts arose, with the Texas Natural Diversity Database.

Vegetation lists for Sheppard AFB were obtained as part of NRCS grazing studies. A biological survey completed in 2015 provides a preliminary survey of plant species observed on base (Appendix I). Grass, shrub, and tree species currently used for landscape planting are listed in Tab 6.

#### **2.3.2.1 Historic Vegetation Cover Installation Supplement**

Prior to European settlement, several tribes of Native Americans occupied the area. The Wichita tribe settled the area and planted home gardens with a wide variety of crops near their towns. The region was historically dominated by prairie grasslands. Dominant grasses included sideoats grama, little bluestem, blue grama, and big bluestem (*Andropogon gerardii*). Overgrazing, loss of bison (*Bos bison*) herds, and changes in fire management have led to invasions of new species and expansions of native species, such as honey mesquite, shinnery oak, broom snakeweed (*Gutierrezia sarothrae*), and prickly pear (Sheppard AFB 2010).

Mesquite invasion, in particular, has led to declines in native prairie and grasses. Prior to European colonization, the primary ecological forces in the Texas prairies were fire and bison, both mediated by Native peoples' management. At one time, upwards of 30 million bison roamed the North American plains, including Texas (Flores 1991). Their grazing, wallowing, and passage over the land worked in tandem with fires ignited by lightning and people to maintain vast expanses of grasslands and savannah by supporting fast nutrient cycling and suppressing growth of shrub seedlings (Knapp et al. 1999). Bison prefer to graze in recently burned sites, which likely compounded the effects of fire and bison activities to suppress shrub encroachment and stimulate grass growth, thereby maintaining the prairie ecosystem and suppressing spread of mesquite (Allred et al. 2011).

The current North Texas Rolling Hills landscape of dense mesquite thickets interspersed with occasional remnants of shortgrass and mid-height prairies developed as fires were suppressed, bison were eradicated, and domestic cattle became the dominant grazers. Overgrazing by cattle is often cited as a primary driver of mesquite encroachment because cattle are restricted in their movements by fencing, forcing them to target grasses to the point of suppressing them and allowing shrub encroachment, particularly in the absence of fire that would kill seedling mesquite and Ashe's juniper (*Juniperus ashei*) (Stambaugh et al. 2014). In addition, cattle will consume mesquite seedpods, dispersing and depositing them in a nutrient-rich environment in which they can readily become established (Ansley and Hart 2012).

### **2.3.2.2 Current Vegetation Cover Installation Supplement**

In 2015, biological surveys were completed on Sheppard AFB and SRA by PIKA-Pirnie, and an updated vegetation map will be developed in 2022. During the surveys, four vegetation types were identified at Sheppard AFB: riparian, maintained grassland, mixed mesquite woodland, and mesquite brushland.

Riparian areas included stream corridors, forested wetlands, and herbaceous wetlands. These areas were identified along streams on the western side of the installation and within Wind Creek Park (Figure 2-2). Dominant riparian species consisted of green ash (*Fraxinus pennsylvanica*), red mulberry (*Morus rubra*), American elm, water hickory (*Carya aquatica*), screwbean mesquite (*Prosopis pubescens*), black willow (*Salix nigra*), blackfruit spikerush (*Eleocharis melanocarpa*), giant ragweed (*Ambrosia trifida*), and annual ragweed (*Ambrosia artemisiifolia*).

There are maintained grasslands within the airfield and surrounding areas and within the park. Dominant species included Bermudagrass (*Cynodon dactylon*), yellow (King Ranch) bluestem (*Bothriochloa ischaemum*), Texas grama (*Bouteloua rigidiseta*), Texas wintergrass (*Nassella leucotricha*), purple threeawn (*Aristida purpurea*), tumble windmill grass (*Chloris verticillata*), tanglegrass (*Schedonnardus paniculatus*), and Cuman ragweed (*Ambrosia psilostachya*). A full list of plant species occurring on the airfield is provided in Tab 6.

Mixed mesquite woodland was identified within the explosive ordnance disposal area and along the western perimeter of the installation surrounding the northern riparian area. Mixed mesquite woodland was characterized by mature mesquite-dominated areas with a variety of codominant tree species, such as common hackberry (*Celtis occidentalis*), western soapberry, cottonwood, and green ash. Canopy cover for woodlands was between 40 and 66 percent.

Mesquite brushland was identified on the northwestern corner of the installation. This area was dominated by sporadic to moderately dense mesquite trees and grasses such as yellow bluestem, needle and thread (*Hesperostipa comata*), and field (Japanese) brome (*Bromus arvensis*; originally *B. japonicus*) (PIKA-Pirnie 2015).

Invasive species typically do not become established because of the competition for moisture, nutrients, and light in stable native plant communities that have reached the latter stages of succession. Although they can invade areas of intact vegetation, they invade most often after some type of disturbance has already reduced the stability of the existing vegetation community. Table 2-4 lists undesirable plant species on Sheppard AFB. On the airfield, invasive grasses provide seeds sought by birds, thus raising the risk of BASH, and they can prevent the establishment and persistence of beneficial native grass species. Through a multi-year grassland restoration plan begun in 2014, the base has established and/or restored more than 500 acres of native grasslands. In 2020–2021, four acres were seeded with sideoats gramma and buffalograss (*Bouteloua dactyloides*), and over 800 acres were treated with herbicide to control cheatgrass (*Bromus tectorum*) and other invasive plants. These efforts will continue in future years as funding allows.

**Table 2-4 Undesirable Plant Species on Sheppard AFB.**

<b>Common Name</b>	<b>Scientific Name</b>
Khaki Weed	<i>Alternanthera caracasa</i>
Johnson Grass	<i>Sorghum halpense</i>
Sandspur	<i>Cenchrus</i> spp.
Cheatgrass/Japanese Brome	<i>Bromus japonicus</i>
Crab Grass	<i>Digitaria</i> spp.
Puncture Vine	<i>Tribulus terrestris</i>
Field Bindweed	<i>Convolvulus arvensis</i>

### 2.3.2.2.1 Current Vegetative Cover on SRA

Two vegetation types were mapped within SRA in 2015: mixed woodland and maintained grassland. A list of species documented within each vegetation type is provided in Appendix I. Mixed hardwood- dominated woodland was identified throughout the base in unmaintained areas on the western boundary and in the southeastern portion of the annex. Dominant tree species were eastern redcedar (*Juniperus virginiana*), green ash, pecan, western soapberry, oaks (*Quercus* spp.), and flowering dogwood (*Cornus florida*). There are maintained grasslands along the roadways and in the northern portion of the annex. Dominant species within these environments were Bermudagrass, little bluestem, sweetclover (*Melilotus officinalis*), switchgrass (*Panicum virgatum*), and annual bluegrass (*Poa annua*) (PIKA-Pirnie 2015).

An updated survey of SRA would be beneficial and should focus on a tree inventory and forest health survey that could determine the sustainability of forest resources and recreational opportunities as temperature and potential for drought increase.

### 2.3.2.3 Future Vegetation Cover Installation Supplement



The CEMML climate assessment identifies dominant ecosystems present at Sheppard AFB as shrubland (21.4 percent) and woodland (0.1 percent). Dominant ecosystems were defined as those with greater than three acres of coverage. Although woodland cover (6.5 acres) is a small amount of overall acreage compared to developed areas (1887.0 acres) and open space and maintained grassland (1731.6 acres), developed and maintained areas have limited value as habitat for priority species. As such, even the small portion of woodlands is ecologically significant on the installation. Slight changes in temperature and precipitation can alter the composition, distribution, and abundance of species in these ecosystems, as well as the products and services they provide. The extent of these changes also will depend on changes in precipitation and fire.

Climate change impacts to shrubland and prairie bioregions include increased seasonal, annual, minimum, and maximum temperature and changing precipitation patterns. Because these ecosystems are relatively dry with a strong seasonal climate, they are sensitive to climatic changes and vulnerable to shifts in climatic regime.

In general, woodland areas are susceptible to climate change. There is a temperature below which the equilibrium state of the ecosystem appears constant but above which the equilibrium of this vegetation cover declines steadily. The mesquite canopy exerts a profound influence on neighboring vegetation, soils, subcanopy microclimate, wildlife, and insect populations. High densities of mesquite (greater than 25 percent canopy cover) suppress grass growth and may reduce understory species diversity (Texas Natural Resources Server 1997).

Losses of vegetative cover coupled with increases in precipitation intensity and climate-induced reductions in soil aggregate stability would dramatically increase potential erosion rates. Rising temperatures under various climate change scenarios likely will enhance soil decomposition.

#### 2.3.2.4 Turf and Landscaped Areas Installation Supplement

Turf and landscaped areas comprise a significant portion of Sheppard AFB. The grounds maintenance contractor is responsible for mowing, fertilizing, pruning, and planting lawns, planted landscaping, pedestrian walkways with shade trees, and recreational facilities. As part of the Vision 2030 Plan, these areas are key to improving walkability and traffic flow. Landscaped areas provide important aesthetic and morale benefits, decrease air temperatures, and provide services such as stormwater infiltration.

An urban tree survey is needed to generate a tree database and an accompanying urban forestry management plan that emphasizes drought-tolerant, native species and reduces the effects of heat sinks and impermeable surfaces, such as paved or graveled areas. The plan should include analysis of potential effects of increasing temperatures on tree species currently planted and their pests, and it should present replacement options suitable for projected conditions.

Grasses at Sheppard AFB include a mix of native species and non-native cultivars selected for suitability in the local climate and for compatibility with BASH prevention (Table 2-5 and Table 2-6).

**Table 2-5 Planting List for Grasses on Improved Grounds**

<b>Common name</b>	<b>Scientific name</b>
Buffalo grass	<i>Buchloe dactyloides</i>
U-3 Bermuda grass	<i>Cynodon dactylon</i>
U-3 Blue grama	<i>Bouteloua gracilis</i>
Perennial ryegrass	<i>Lolium perenne</i>
St. Augustine grass	<i>Stenotaphrum secundatum</i> "Raleigh"

**Table 2-6 Planting List for Grasses on Semi-improved and Unimproved Grounds**

<b>Common name</b>	<b>Scientific name</b>
Vine mesquite	<i>Panicum obtusum</i>
Arizona cottontop	<i>Trichachne California</i>
Little bluestem	<i>Andropogon scoparius</i>
Buffalograss	<i>Buchloe dactyloides</i>
Sideoats grama	<i>Bouteloua curtipendula</i>
Blue grama	<i>Bouteloua gracilis</i>
Hairy grama	<i>Bouteloua hirsute</i>
Bermuda grass	<i>Cynodon dactylon</i>
Perennial ryegrass	<i>Lolium perenne</i>

Planting of grasses shall be done only during periods when satisfactory results are likely to be obtained. Off-season planting will be avoided whenever possible. The favorable planting time for each method of establishment is listed in Table 2-7.

The planting of trees, shrubs, ground cover, and vines at Sheppard AFB will be conducted IAW approved landscape development plans based on the Master Landscape Plan for the installation. All plans are available in the office of the Civil Engineer. Planting lists for trees (Table 2-8), evergreen shrubs (Table 2-9), and ground cover and vines (Table 2-10) are provided below.

**Table 2-7 Annual Grass Planting Schedule at Sheppard AFB**

<b>Action</b>	<b>Area</b>	<b>Time of year</b>
Seeding	Irrigated areas	15 April – 1 September
Seeding	Non-irrigated areas	15 March – 15 April
Seeding	All areas (cool season grasses)	1 October – 15 November
Seeding	All areas (warm season grasses)	15 April – 1 June
Sodding	All areas	1 April – 15 October
Sodding	Dormant season	15 November – 15 March
Sprigging	All areas	1 April – 1 June
Hydro mulching	All areas	1 April – 15 November
Hydro mulching	Warm season grasses	1 April – 1 August
Hydro mulching	Cool season grasses	1 October – 15 November

**Table 2-8 Tree Planting List at Sheppard AFB**

<b>Common Name</b>	<b>Scientific Name</b>
--------------------	------------------------

Pecan	<i>Carya illinoensis</i> "Shawnee, Cheyenne, Pawnee, Caddo, Sioux, Osage, Oconee"
Desert willow	<i>Chilopsis linearis</i>
Chinese elm	<i>Ulmas parvifolia</i>
Bur oak	<i>Quercus macrocarpa</i>
Nuttall oak	<i>Quercus nuttallii</i>
Shumard oak	<i>Quercus shumardii</i>
Bald cypress	<i>Taxodium distichum</i>
Cedar elm	<i>Ulmus crassifolia</i>
Eastern redbud	<i>Cercis Canadensis</i> "Oklahoma"
Eastern red cedar	<i>Juniperus virginiana</i>
Austrian pine	<i>Pinus nigra</i>

**Table 2-9 Evergreen Shrubs Planting List at Sheppard AFB**

<b>Common Name</b>	<b>Scientific Name</b>
Glossy abelia	<i>Abelia grandiflora</i>
Japanese laurel	<i>Aucuba japonica</i>
Japanese boxwood	<i>Buxus japonica</i>
Dwarf Japanese boxwood	<i>Buxus japonica</i> "Wintergreen"
Grayleaf cotoneaster	<i>Cotoneasterglaucophyllus</i>
Silverberry	<i>Elaeagnus fruitlandii</i>
Buford holly	<i>Ilex cornuta var. bufordii</i>

**Table 2-9 Evergreen Shrubs Planting List at Sheppard AFB Continued**

<b>Common Name</b>	<b>Scientific Name</b>
Dwarf Buford holly	<i>Ilex cornuta var bufordii nana</i>
Yaupon holly	<i>Ilex vomitoria</i>
Dwarf Yaupon holly	<i>Ilex vomitoria var. nana</i>
India hawthorn	<i>Raphiolepis indica</i>
Forsythia	<i>Forsythia intermedia</i>
Shrubby althea	<i>Hibiscus syriaca</i>

Hydrangea	<i>Hydrangeamacrophylla</i>
Crepe myrtle	<i>Lagerstroemia indica</i>
Dwarf crepe myrtle	<i>Lagerstroemia indica</i> "Dwarf"
Spiraea	<i>Spiraea vanhouttei</i>
Texas sage	<i>Leucophyllum frutescens</i>
Spanish bayonet	<i>Yucca aloifolia</i>
Ivory tower yucca	<i>Yucca flaccida</i>
Soapweed Yucca	<i>Yucca glauca</i>
Chinese juniper	<i>Juniperus chinensis</i>
U Gold coast juniper	<i>Juniperus chinensis var. aurea</i>
Pfizer juniper	<i>Juniperus cinensis var. pfizerina</i>

**Table 2-10 Ground Cover and Vine Planting List at Sheppard AFB**

<b>Common Name</b>	<b>Scientific Name</b>
Rock cotoneaster	<i>Cotoneaster horizontalis</i>
Creeping juniper	<i>Juniperus horizontalis</i>
Tam juniper (Savin)	<i>Juniperus sabina</i> "Tam"
Big Blue lilyturf	<i>Liriope muscari</i>
Texas honeysuckle	<i>Lonicera albiflora</i>
Dwarf lilyturf	<i>Ophiopogon japonicus</i>
Asiatic jasmine	<i>Trachelospermum asiaticum</i>
Trumpet creeper*	<i>Campsis radicans</i>

\*May be planted only in areas away from buildings.

All plantings, whether made by installation personnel, occupants of quarters, or community effort, must conform to the approved planting plan. This plan may not be altered without Command approval.

Applicable publications include the American Joint Committee on Horticultural Nomenclature (current edition), which contains standardized plant names and the American Association of Nurserymen, Inc., (current edition) American Standard for Nursery Stock.

All shipments or orders of plant material shall be properly inspected at the nursery or at the growing site by the authorized federal authorities. These shipments or orders shall contain certificates of inspection.

All plant material shall be nursery-grown, well branched, full-foliaged, and well-proportioned, particularly with respect to the width-height relationship, and shall have a fibrous root system. The Government may inspect plants at place of growth, but such inspection shall not preclude the right of rejection at the site.

Planting seasons for trees and shrubs: Planting shall be done only during periods when satisfactory results are likely to be obtained. Off-season planting will be avoided whenever possible. The favorable time for container-grown trees and shrubs is 1 November–1 June.

### 2.3.3 Fish and Wildlife

#### Installation Supplement

Wildlife present at Sheppard AFB properties includes species that are typical of grassland, woodland, and riparian habitats of the region in North Texas. A baseline biological survey was performed by PIKA-Pirnie in 2015 (Appendix I). Surveys included avian point counts, live-trapping small mammals, vegetation mapping, and documenting incidental sightings of reptiles, sensitive species, and large mammals (PIKA-Pirnie 2015). A comprehensive species list of Wichita and Grayson Counties compiled by the TPWD was updated with observations by the NRM and Entomology personnel along with local knowledge to create a comprehensive species list of animals with the potential to occur within Sheppard AFB and SRA (Appendix G) <sup>2</sup>.

Pollinators have come to the forefront in natural resource management discussions in recent years, and a Memorandum of Understanding was developed between a non-profit organization called the Pollinator Partnership (<https://www.pollinator.org>) and the DoD, which outlines steps that both organizations will take to conserve pollinators and their habitats. Pollinator population declines have been observed around the world (National Research Council 2007, The White House 2015, USDA and United States Department of the Interior [USDI] 2015). Globally, pollinators including bees, butterflies, moths, bats, and birds, are important for sustaining native and agricultural plants, as over 80 percent of flowering plants require a pollinator to reproduce (USDA and USDI 2015). As such, we highlight pollinators throughout this document as an essential resource on the installation.

<sup>2</sup> *Mammal, bird, herptile, fish, and invertebrate species taxonomy/nomenclature updated in March 2022, both in this section and throughout the INRMP, via the American Society of Mammalogists (ASM) online database (ASM 2022); the American Ornithological Society (AOS) online Checklist of North and Middle American Birds (AOS 2022); the DoD Partners in Amphibian and Reptile Conservation (PARC) database (Crothers 2017); the American Fisheries Society (AFS) Common and Scientific Names of Fishes from the United States, Canada, and Mexico (Page 2013); and Texas Park and Wildlife Natural Diversity Database (Texas Parks and Wildlife 2022), respectively.*

#### 2.3.3.1 Sheppard AFB

As a result of development and fencing-limited access to Sheppard AFB, fewer species occur on base than on SRA. Avian, reptile, amphibian, and small mammal species may occur on base in areas of limited development. During the 2015 survey, four vegetation types were identified and mapped within the survey areas at Sheppard AFB: riparian, maintained grassland, mixed mesquite woodland, and mesquite brushland. The avian survey identified 46 species of birds, several of which were migratory species using the base as a stopover to feed and rest during migration. Others were breeding, such as a pair of Mississippi kites (*Ictinia mississippiensis*) that likely had a nest near Wind Creek Park (the former golf course). No sensitive bird species were observed. There were several small mammals detected through trapping efforts in riparian, grassland, and mixed woodland habitats, including eastern woodrat (*Neotoma floridana*), hispid cotton rat (*Sigmodon hispidus*), and eastern deer mouse (*Peromyscus maniculatus*). Two species of snake, the western ratsnake (*Pantherophis obsoletus*) and North American racer (*Coluber constrictor*) were found near water sources. Other reptiles observed included a red-eared slider (*Trachemys scripta elegans*), yellow mud turtle (*Kinosternon flavescens*), and spiny softshell (*Apalone spinifera*) within the drainage and ponds in Wind Creek Park (the former golf course) (PIKA-Pirnie 2015).

#### 2.3.3.2 SRA

In contrast, SRA is easily accessible to wildlife and is largely undeveloped. SRA provides a variety of habitat types including woodlands, grasslands, and aquatic (Lake Texoma). The habitat at SRA is considered high quality for deer and migratory birds. During the 2015 survey, two vegetation types were mapped within the SRA: mixed woodland and maintained grassland. Fifty-nine bird species were identified during the survey, including pass-through migrants and breeding species. A pair of Mississippi kites likely had a nest in the wooded area near the southern entrance. No sensitive bird species were observed within the SRA. Small mammal species detected during trapping at SRA were the same as those captured at the main base, including the eastern woodrat, hispid cotton rat, and deer mouse. Reptile and amphibian observations included ground skink (*Scincella lateralis*), Texas toad (*Anaxyrus speciosus*), Woodhouse's toad (*A. woodhousii*), eastern cricket frog (*Acris crepitans*), and western narrow-mouthed toad (*Gastrophryne olivacea*) within the wooded areas; and a three-toed box turtle (*Terrapene carolina triunguis*) in the lacustrine habitat along the edge of Lake Texoma (PIKA-Pirnie 2015).

### **2.3.3.3 Frederick Auxiliary Airfield**

Habitat types at Frederick Auxiliary Airfield are limited to maintained grasslands surrounding the runway and do not provide significant natural resource management concerns beyond BASH. No suitable habitat for fish or wildlife is present on the airfield.

### **2.3.3.4 Climate Impacts on Fish and Wildlife**

Fish and wildlife communities at Sheppard AFB and SRA are not expected to experience significant changes due to the projected climate change conditions. Much of Sheppard AFB is developed, and as a result, the majority of wildlife species on the installation are generalists, capable of tolerating a wide range of environmental conditions. Increasing temperatures and precipitation are not likely to pose direct threats to the majority of fish and wildlife species, but may result in indirect threats. For example, migrating birds time their movements to coincide with the springtime emergence of insects. Rising temperatures could prompt insects to emerge earlier, which could cause birds migrating to or through the base to miss a major feeding opportunity (Both et al. 2010).

Climate change also may alter vegetation communities, which would impact specialist wildlife species that historically have depended on specific native plant communities for their survival (Dukes and Mooney 1999). Changing environmental conditions also may create open niches into which non-native invasive species may expand on Sheppard AFB. Newly arriving invasive species often have the ability to outcompete native species that are already experiencing reduced fitness due to environmental conditions shifting away from historical norms (Hellmann et al. 2008). Rising temperatures also could lead to increased incidences of infectious disease that are transmissible to humans, particularly those carried by foxes, rodents and arthropods, such as rabies and West Nile virus (Süss et al. 2008). In general, monitoring wildlife, such as small mammals, birds, bats, reptiles, amphibians, and insects, will be important in a changing climate. Surveys are useful for documenting potential changes that may occur to native species populations and provide information for supporting management decisions.

Precipitation is projected to increase slightly, but increases may be offset by higher evapotranspiration rates due to increasing temperatures. Increasing temperatures are likely to have a negative impact on water quality, particularly in lentic systems. As water temperatures rise in lentic systems, dissolved oxygen will decrease, diminishing habitat quality for larval amphibians and aquatic macroinvertebrates. Increasing water temperatures also will raise the chances of algal blooms occurring, further depleting dissolved oxygen content and habitat quality (Paerl et al. 2011). If it is determined feasible to stock fish in the ponds in Wind Creek Park, monitoring for water temperature will be necessary to sustain the habitat characteristics that will support healthy fish populations.

### **2.3.4 Threatened and Endangered Species and Species of Concern Installation Supplement**

The Endangered Species Act (ESA) of 1973 (P.L. 93-205) provides protection to federally listed threatened and endangered (T&E) species and their habitats. The ESA requires that all federal agencies shall utilize their authorities to further the purposes of the ESA and seek to conserve T&E species. Also, the Sikes Act (16 U.S.C. 670a-670o, as amended) requires all military installations with adequate natural resources to consider federally listed T&E species and critical habitats if they are found on the installations. When practical, the INRMP provides guidance on similar protection efforts for any species listed as a federal candidate.

Although not required by the ESA, the INRMP addresses species protected by state law when such protection is not in direct conflict with the military mission. The following state-level categories of species are addressed in this INRMP: state endangered, state threatened, and state species of greatest conservation need (SGCN).

For the purposes of this INRMP, species of concern (SOC) on Sheppard AFB includes species in any of the above categories and protected by the Migratory Bird Treaty Act (MBTA), Bald and Golden Eagle Protection Act (BGEPA), avian species considered to be birds of conservation concern (BCC) by the USFWS, and Mission-sensitive Bird Species identified by DoD Partners in Flight. The MBTA is intended to ensure the sustainability of bird populations by prohibiting take of protected migratory bird species without prior authorization from the USFWS. The BGEPA prohibits taking, possessing, or transporting any bald or golden eagle or parts of eagles without authorization from the USFWS. The USFWS also manages a BCC list of migratory and non-migratory bird species (beyond those already listed as federal T&E species) that are their highest conservation priorities. DoD Partners in Flight developed a list of Mission-sensitive Bird Species, designated as such due to their high potential to impact the military mission should they be listed as T&E species. In addition to the Mission-sensitive Bird Species, DoD Partners in Flight also categorized additional species as Tier 2 species if they are experiencing long-term declines and may become relevant to potential future mission impacts.

A list of T&E species, plus SOC that have been documented or have the potential to occur within Sheppard AFB and SRA, was created by cross referencing the TPWD Rare, Threatened, and Endangered Species lists for Wichita and Grayson Counties (Appendix H) with observations by the NRM and Entomology personnel (Appendix G) (Table 2-11 and Table 2-12). The NRM will review the status of listed threatened and endangered species during the annual INRMP review.

**Table 2-11. State and federal threatened and endangered (T&E) species, species of greatest conservation need (SGCN), and United States Fish and Wildlife Service Birds of Conservation Concern (BCC) that occur or have the potential to occur at Sheppard AFB.**

Common Name	Scientific Name	Federal Status	State Status	USFWS BCC	Recorded on Site
<b>Mammals</b>					
Big brown bat	<i>Eptesicus fuscus</i>		SGCN		
Cave myotis bat	<i>Myotis velifer</i>		SGCN		
Eastern red bat	<i>Lasiurus borealis</i>		SGCN		
Hoary bat	<i>Aeorestes cinereus</i>		SGCN		
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>		SGCN		
Eastern spotted skunk	<i>Spilogale putorius</i>		SGCN		
Long-tailed weasel	<i>Neogale frenata</i>		SGCN		
Muskrat	<i>Ondatra zibethicus</i>		SGCN		
Texas kangaroo rat	<i>Dipodomys elator</i>		T		X
<b>Birds</b>					

Bald eagle	<i>Haliaeetus leucocephalus</i>	DL	SGCN		
Franklin's gull	<i>Leucophaeus pipixcan</i>		SGCN		
Interior least tern	<i>Sternula antillarum athalassos</i>	DL		X	
Lark bunting	<i>Calamospiza melanocorys</i>		SGCN	X	
Mountain plover*	<i>Charadrius montanus</i>		SGCN	X	
Piping plover	<i>Charadrius melodus</i>	LT	T		
Western burrowing owl*	<i>Athene cunicularia hypugaea</i>		SGCN		
Whooping crane	<i>Grus americana</i>	LE	E		
<b>Reptiles</b>					
Prairie Skink	<i>Plestiodon septentrionalis</i>		SGCN		
Slender Glass Lizard	<i>Ophisaurus attenuatus</i>		SGCN		
Texas horned lizard	<i>Phrynosoma cornutum</i>		T		X
Ornate box turtle	<i>Terrapene ornata</i>		SGCN		
Plains hog-nosed snake	<i>Heterodon nasicus</i>		SGCN		
Western massasauga	<i>Sistrurus tergeminus</i>		SGCN		
Western rattlesnake	<i>Crotalus oreganus</i>		SGCN		
<b>Amphibians</b>					
Woodhouse's toad	<i>Anaxyrus woodhousii</i>		SGCN		
<b>Fish</b>					
Chub shiner	<i>Notropis potteri</i>		T		
Red river pupfish	<i>Cyprinodon rubrofluviatilis</i>		T		
Red river shiner	<i>Notropis bairdi</i>		SGCN		
Silver chub	<i>Macrhybopsis storeriana</i>		SGCN		
<b>Insects</b>					
American bumblebee	<i>Bombus pensylvanicus</i>		SGCN		
Swift tiger beetle	<i>Cicindela celeripes</i>		SGCN		



Plants					
Heller's marbleseed	<i>Onosmodium helleri</i>		SGCN		
Prairie Butterfly-weed	<i>Gaura triangulata</i>		SGCN		
Rolling plains goldenrod	<i>Solidago mollis var. angustata</i>		SGCN		

\*DoD Partners in Flight Mission-Sensitive Species.

**Table 2-12. State and federal threatened and endangered (T&E) species, species of greatest conservation need (SGCN), and United States Fish and Wildlife Service Birds of Conservation Concern (BCC) that occur or have the potential to occur at SRA.**

Common Name	Scientific Name	Federal Status	State Status	USFWS BCC	Recorded on Site
Mammals					
Big Brown Bat	<i>Eptesicus fuscus</i>		SGCN		
Eastern Red Bat	<i>Lasiurus borealis</i>		SGCN		
Hoary bat	<i>Aeorestes cinereus</i>		SGCN		
Tri-colored Bat	<i>Perimyotis subflavus</i>		SGCN		
Black Bear	<i>Ursus americanus</i>		T		
Eastern Spotted Skunk	<i>Spilogale putorius</i>		SGCN		
Long-tailed weasel	<i>Neogale frenata</i>		SGCN		
Mountain lion	<i>Puma concolor</i>		SGCN		
Muskrat	<i>Ondatra zibethicus</i>		SGCN		
Swamp rabbit	<i>Sylvilagus aquaticus</i>		SGCN		
Birds					
Bald Eagle	<i>Haliaeetus leucocephalus</i>	DL	SGCN		
Chestnut-collared longspur**	<i>Calcarius ornatus</i>		SGCN	X	
Franklin's Gull	<i>Leucophaeus pipixcan</i>		SGCN		
Interior Least Tern	<i>Sterna antillarum athalassos</i>	DL		X	
Piping plover	<i>Charadrius melodus</i>	LT	T		

Western burrowing owl*	<i>Athene cunicularia hypugaea</i>		SGCN		
White-faced ibis	<i>Plegadis chihi</i>		T		
Whooping crane	<i>Grus americana</i>	LE	E		
Wood Stork	<i>Mycteria americana</i>		T		
<b>Reptiles</b>					
Smooth Softshell	<i>Apalone mutica</i>		SGCN		
Eastern Box Turtle	<i>Terrapene carolina</i>		SGCN		
Ornate box turtle	<i>Terrapene ornata</i>		SGCN		
Western chicken turtle	<i>Deirochelys reticularia miaria</i>		SGCN		
Prairie skink	<i>Plestiodon septentrionalis</i>		SGCN		
Slender glass lizard	<i>Ophisaurus attenuatus</i>		SGCN		
Texas horned lizard	<i>Phrynosoma cornutum</i>		T		
Timber (canebrake) rattlesnake	<i>Crotalus horridus</i>		SGCN		X
<b>Amphibians</b>					
Eastern tiger salamander	<i>Ambystoma tigrinum</i>		SGCN		
Southern crawfish frog	<i>Lithobates areolatus areolatus</i>		SGCN		
Strecker's chorus frog	<i>Pseudacris streckeri</i>		SGCN		
Woodhouse's toad	<i>Anaxyrus woodhousii</i>		SGCN		
<b>Fish</b>					
Chub shiner	<i>Notropis potteri</i>		T		
Red river shiner	<i>Notropis bairdi</i>		SGCN		
Silver chub	<i>Macrhybopsis storeriana</i>		SGCN		
<b>Mollusks</b>					
Texas heelsplitter	<i>Potamilus amphichaenus</i>		T		
<b>Insects</b>					
American Bumblebee	<i>Bombus pensylvanicus</i>		SGCN		

(No common name)	<i>Bombus variabilis</i>		SGCN		
<b>Plants</b>					
Bigflower Cornsalad	<i>Valerianella stenocarpa</i>		SGCN		
Hall's Prairie Clover	<i>Dalea hallii</i>		SGCN		
Sutherland Hawthorn	<i>Crataegus sutherlandensis</i>		SGCN		

\* DoD Partners in Flight Mission-Sensitive Species.

\*\* DoD Partners in Flight Tier 2 Species.

### 2.3.4.1 Sheppard AFB

#### Texas Kangaroo Rat (*Dipodomys elator*)

The Texas kangaroo rat has been observed on Sheppard AFB (Table 2-11); however, it was not observed during the 2015 survey. The Texas kangaroo rat is a state listed threatened species. It is associated with scattered mesquite shrubs and sparse, short grasses in areas underlain by firm clay soils. This species prefers areas along fencerows adjacent to cultivated fields and roads (TPWD 2021). The Texas kangaroo rat is listed on the USFWS National Listing Work Plan for evaluation in fiscal year 2022, meaning the status assessment and 12-month finding for whether federal listing is warranted is planned for completion in 2022.

#### Texas horned lizard (*Phrynosoma cornutum*)

The Texas horned lizard has been observed on Sheppard AFB (Table 2-11) multiple times, primarily on the northwest portion of the airfield. The Texas horned lizard is a state listed threatened species. The lizard occurs in open, arid and semi-arid areas with sparse vegetation, including grass, cactus, scattered brush, or scrubby trees. It may occur on a variety of soils from sandy to rocky (TPWD 2021). Main threats to the Texas horned lizard are the elimination of its main food source, harvester ants. Harvester ants (*Pogonomyrmex* spp.) occur in arid habitats in areas of native short grasses over clay loam soil (Drees, no date). Harvester ants are a preferred food of the Texas horned lizard and could indicate population viability in areas where there are multiple mounds and suitable lizard habitat. Several red harvester ant mounds were observed during vegetation mapping, indicating potential food sources for Texas horned lizard (PIKA-Pirnie 2015).

No federally designated critical habitats are within or adjacent to Sheppard AFB. No critical habitat has been designated for the Texas horned lizard, and no critical habitat units for any other species are near Sheppard AFB. See Section 7.4 for additional information.

### 2.3.4.2 SRA

#### Timber Rattlesnake (*Crotalus horridus*)

Two juvenile timber rattlesnakes, a Texas SGCN, were observed on SRA (Table 2-12) during wildlife surveys in 2015, one near the woodlands on the west side of the Annex, and in a shrub within a wetland on the eastern boundary. The timber rattlesnake can be found in almost any habitat that provides dense ground cover over limestone, sandy soil, or black clay. Habitats include swamps, floodplains, pine and deciduous woodlands, riparian zones, and abandoned farmland (TPWD 2021).

The timber rattlesnake was recently delisted by TPWD and the status has changed from state threatened to state species of greatest conservation need. No critical habitat has been designated for the timber rattlesnake, and no critical habitat units for any other species are near the SRA. See Section 7.4 for additional information.

### 2.3.4.3 Frederick Auxiliary Airfield

Habitat types at Frederick Auxiliary Airfield are limited to maintained grasslands surrounding the runway and do not provide significant natural resource management concerns beyond BASH. No suitable habitat for T&E species is present on the airfield.

### 2.3.4.4 Plant Species of Concern

In addition to the above animal species, three plant species listed by Texas as SGCN have the potential to occur on SRA: narrowcell cornsalad (*Valerianella stenocarpa*), Hall's prairie clover (*Dalea hallii*), and Sutherland hawthorn (*Crataegus viridis* var. *glabriuscula*); and three Texas as SGCN may occur on the main base: velvety (Rolling Plains) goldenrod (*Solidago mollis* var. *angustata*), Heller's marbleseed (*Onosmodium helleri*), and prairie beeblossom (prairie butterfly-weed) (*Gaura triangulata*). If suitable habitat occurs, surveys for these species should be conducted.

#### **2.3.4.5 Pollinator Species of Concern**

There are two pollinator species listed by Texas as SGCN that have the potential to occur on the main base or on the SRA. The American bumblebee (*Bombus pensylvanicus*) is included on the lists for both Wichita and Grayson Counties, so it could be present on the main base and the SRA. This species is generally active from May to October, and it nests on the ground surface (Colla et al. 2011). The variable bumblebee (*Bombus variabilis*) is included on the Grayson County list, so it has the potential to be present on the SRA. This species of bumblebee is extremely rare (and possibly extinct), and is known to parasitize the American bumblebee (Colla et al. 2011). The variable bumblebee does not build its own nest, but instead lays its eggs in nests of the American bumblebee and leaves the workers of that species to attend to its offspring. Because the variable bumblebee is extremely rare, less is known about this species.

The monarch butterfly (*Danaus plexippus*) is not included on the Texas SGCN list but it is considered a candidate species by USFWS. A candidate species is one that has been evaluated for listing, and the listing under the ESA is warranted but precluded at this time by higher priority listing actions. Candidate species receive no statutory protection under ESA; however, the USFWS will continue to review its status until the time comes to develop a proposal to list the species. Monarch butterflies do migrate in spring and fall through Texas in the Central Flyway. Decline of monarch populations has been attributed to reductions in overwintering area, extreme weather conditions in overwintering area and breeding grounds, and loss of milkweed and nectar-producing plants on its breeding grounds (TPWD 2016a). Surveys for all three of these species should be conducted on the main base and SRA to determine if these species occur on the installation.

#### **2.3.4.6 Climate Impacts on Threatened and Endangered Species and Species of Concern**

Habitat change and disruption to food availability are two major climate-related threats to all species at Sheppard AFB. Habitat requirements, such as need for refugia, for some species may change as they employ behavioral adaptations. Prey populations or forage abundance may also be affected by changes in temperature and precipitation. Seasonal cues for prey or forage emergence may change, resulting in a mis-match between the timing of food availability and food needs of T&E species. Populations of some T&E species are further imperiled by life stages that are sensitive to temperature and precipitation changes projected in the climate scenarios (CEMML 2019).

Predicted changes to the future climate may negatively impact Texas horned lizards, both directly and indirectly. Texas horned lizards at the northern edge of their distribution, which experience the coldest temperatures, demonstrate an increase in clutch size, indicating a reproductive response for greater fecundity at the colder northern edge of its geographic range (Hughes et al. 2019). As temperatures rise across the species range, their fecundity may decrease in comparison to those in colder regions, possibly leading to declines in their population. Texas horned lizard are extremely vulnerable to changes in habitat and the loss of harvester ants, which comprise up to 69 percent of their diet (Pianka and Parker 1975, Carpenter et al. 1993). Invasive fire ants are thought to out-compete native harvester ants for food and space, and research has predicted the range of fire ants to increase more than 5 percent in 40–50 years and more than 20 percent by 2100, thus decreasing native harvester ants and indirectly impacting Texas horned lizard populations (Henke and Fair 1998, Morrison et al. 2005). Additionally, Lara-Resendiz et al. (2015) used eco-physiological models of extinction to predict that Texas horned lizard will become locally extinct at 6 percent of their current sites by 2050 and 18 percent by 2080.

The distribution of the Texas kangaroo rat has declined significantly over the past few decades and currently has an extremely restricted range, likely less than 6,500 square kilometers across 5 Texas counties (Hafner et al. 1998, Martin 2002, USFWS 2011). In Wichita County, Texas kangaroo rat preferred grazed sites with short, sparse grasses and little overhead woody cover (Stasey et al. 2010), and burrows were associated with high percentages of bare ground, and low height herbaceous and woody vegetation (Goetze et al. 2007). Since Texas kangaroo rat are well adapted to arid climates, increasing temperatures and drought conditions predicted by climate change are not expected to negatively impact them directly, but their small population size and restricted range increases their vulnerability to the indirect impacts of climate change (USFWS 2011). Cameron and Scheel (2001) used models to predict the effects of climate change on Texas kangaroo rat over the next 40 years under both a wetter and drier scenario. Where conditions are expected to get wetter, the species is predicted to lose approximately 80 percent of its existing suitable habitat and where conditions are expected to get drier, they are predicted to lose approximately 40 percent of its existing suitable habitat (Cameron and Scheel 2001).

Timber rattlesnake populations have declined throughout their range over the past half century, due mainly to habitat loss and persecution (Brown 1988, Martin 1982, Stechert 1982). Similar to Texas kangaroo rat, timber rattlesnake is not expected to be severely impacted by climate change directly, but could be vulnerable to indirect impacts from climate change. Timber rattlesnakes are sensitive to development and habitat degradation, both of which could increase due to climate change (Wittenberg and Beaupre 2014). Additionally, timber rattlesnakes require habitat connectivity to maintain sustainable populations, which could be disrupted climate change, resulting in further fragmenting of suitable habitat and increasing population extirpation (Clark et al. 2011, Costanza et al. 2020, Wittenberg and Beaupre 2014). The timber rattlesnake is also a long-lived and slow-maturing ectothermic vertebrate, with a low reproductive rate and a relatively long mean generation time, all of which decrease its ability to recover following population declines.

### *2.3.5 Wetlands and Floodplains*

#### **Installation Supplement**

The 100-year floodplain is defined by the Federal Emergency Management Agency (FEMA) as an area with a one percent annual chance of flooding in any given year. FEMA regulates construction and fill within the 100-year floodplain. Floodplain locations are provided in Figure 2-3.

Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Based on these criteria, Sheppard AFB encompasses 41.82 acres of wetlands.

Two wetland surveys have been conducted on Sheppard AFB: one on 7 September 2011 by the USACE Planning, Environmental, and Regulatory Division, Tulsa District and the other on 16 September 2014 by PIKA-Pirnie. The wetland surveys identified a total of 41.82 acres of wetlands. Three wetlands identified in 2014 located within Wind Creek Park (former golf course ponds) are not considered jurisdictional due to a lack of connectivity to Waters of the U.S. In 2011, the USACE determined that two creeks and associated wetlands within Sheppard AFB are considered jurisdictional, Bear Creek and a tributary to Bear Creek. Section 7.6 further discusses wetlands on Sheppard AFB.

As of the date of this INRMP, no assessments have been conducted to evaluate the health of the wetlands existing on Sheppard AFB. No formal wetland delineations have been conducted on SRA or the Frederick Auxiliary Airfield.

Wetlands are located primarily in the northwest corner but with smaller areas elsewhere on the base, as shown in Figure 2-4. The wetland areas are identified on the installation comprehensive plan and are inspected as needed and marked prohibiting traffic and construction. The TPWD, USACE, or NRCS will inspect and provide technical assistance in maintaining wetland habitat when needed.

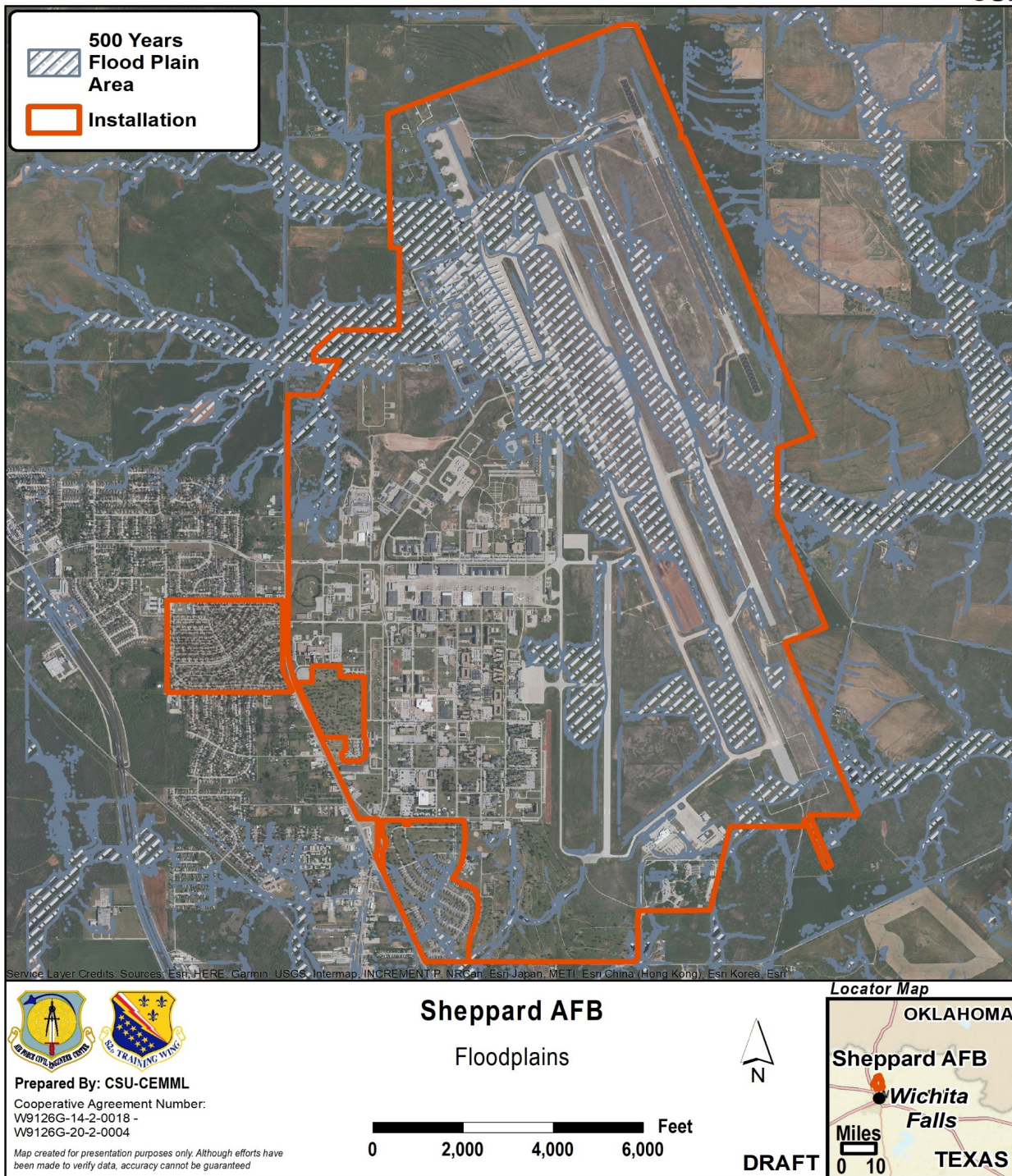


Figure 2-3. Environmental Constraints, Water Resources-Floodplains at Sheppard AFB.





Figure 2-4. Environmental Constraints, Water Resources-Wetlands at Sheppard AFB.

### 2.3.6 Other Natural Resource Information

#### **Installation Supplement**

Land management activities are designed to control dust, soil erosion, pesticide, fertilizer, and water run-off. The application of pesticides is carefully controlled and monitored. Irrigation applications are delayed after sprayings. Weather conditions are taken into consideration before any pesticides are used. Certified personnel IAW the manufacturer's label, and IAW the Base IPMP, apply pesticides. Landscape designs for the Base encourage use of xeriscape plants and insect or disease-resistant varieties to reduce use of pesticides, fertilizer and water for irrigation.

Figure 2-5 and Figure 2-6 show other environmental constraints of the installation.



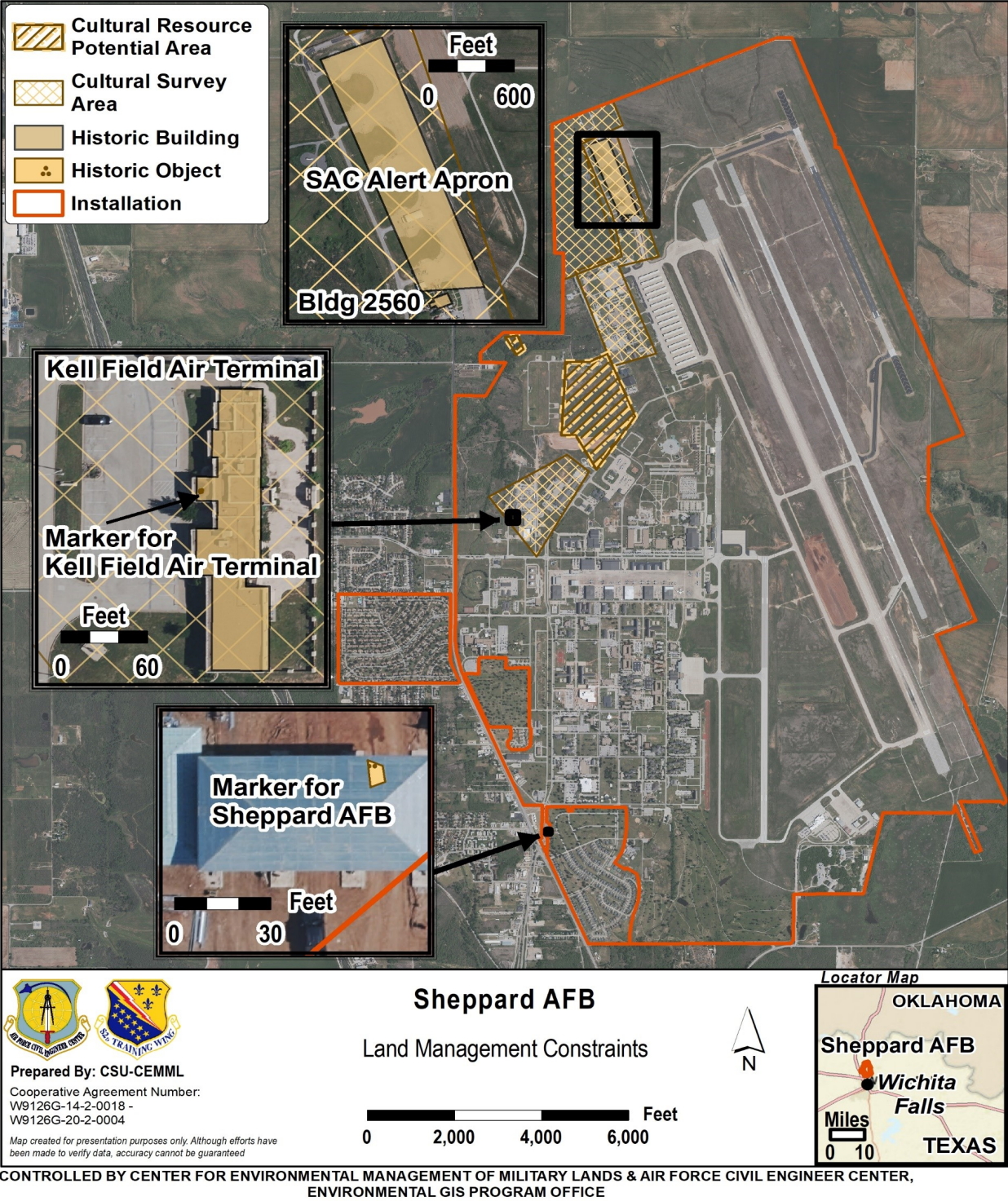


Figure 2-5. Environmental Constraints, Cultural Resources and Land Management on Sheppard AFB.



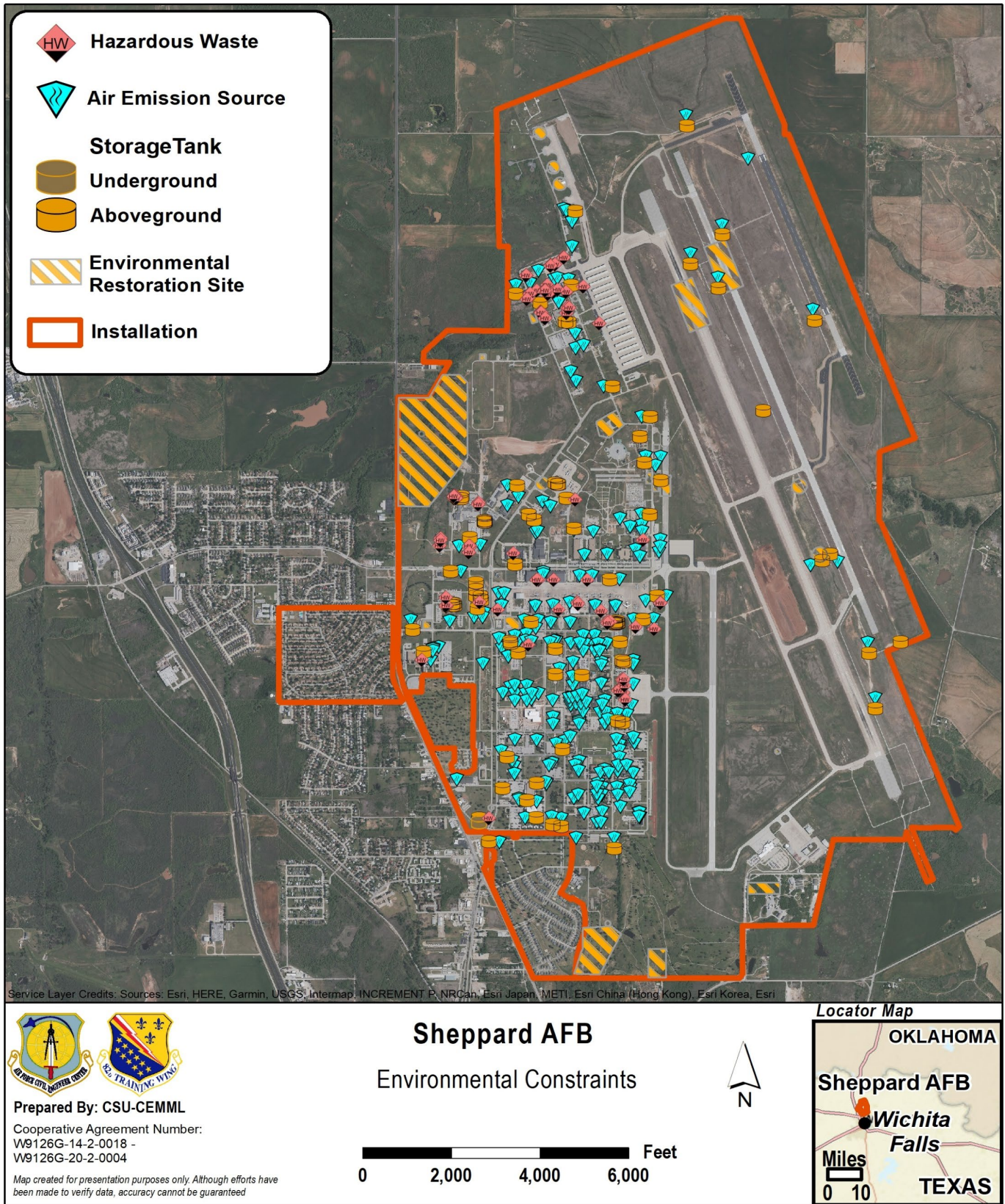


Figure 2-6. Environmental Constraints, Environmental Quality and Air Emissions on Sheppard AFB.

## 2.4 Mission and Natural Resources

### 2.4.1 Natural Resource Constraints to Mission and Mission Planning

#### Installation Supplement

The current comprehensive plans for Sheppard AFB are not largely constrained by natural resources restrictions. Most of the developments planned for the base are upgrades and slated to occur in areas that have already been developed. The INRMP supports unrestricted use of the installation while considering natural resource management goals.

No plans for base development will interfere with land uses outside of the installation. The most recent AICUZ study, published in 2011, used the latest technology to define noise levels in areas near Sheppard AFB. Information gathered and validated in 2010, indicated that a total of 3,988 acres not on DoD property had a day-night average A-weighted sound level Noise Zone of 65 decibels (dB) or greater. Although no residential buildings outside of Sheppard AFB exist in a noise zone greater than 74 dB, the estimated total population of those living in a noise zone of 65-69 dB was 258 and the estimated population in the noise zone of 70 to 74 dB was only 5. On-base buildings have been constructed to reduce noise levels inside to acceptable levels. Training flights remain primarily within Wichita County and are mostly over farming and grazing lands or oil fields. Per the general plan, the 65-dB noise contour extends into a residential housing area north of Sheppard AFB and into the area used by a gun club to the south. In addition, residential development activity is occurring south of the base in densities higher than those recommended by AICUZ guidelines.

#### 2.4.1.1 Potential Future Constraints Due to Climate Change

Military readiness is maintained by installations that are able to provide the necessary environment for training and testing. The natural environment plays a key role in providing likely operational situations suitable for high quality training opportunities. When climate change has adverse impacts on an installations natural resources, impacts to the mission are realized in the potential loss of training and operational readiness. In the future, climate driven changes in the environment will cause significant risk to installations as they try to maintain the capacity of the land to support the mission (Stein et al. 2019). See Section 7.16 of this INRMP for a more extensive discussion of how climate change may impact USAF missions and operations at Sheppard AFB.

### 2.4.2 Land Use

#### Installation Supplement

To the greatest extent practical, a coordinated program of land management and improvement will be applied to provide maximum military use while controlling erosion, protecting natural resources, sustaining productivity of croplands and grasslands, and encouraging fish and wildlife.

The land to be managed includes Sheppard AFB proper, SRA at Lake Texoma, and land leased from the City of Frederick (Oklahoma). Table 2-13 identifies the land types by acreage at Sheppard AFB, and Figure 2-7 illustrates land use at the main installation.

**Table 2-13 Land Type Acreages at Sheppard Air Force Base**

Land type	Acres
Improved grounds	2,124
Semi-improved grounds	3,330
Unimproved grounds	704



Total acres

6,158

\*This is all grounds and includes easements, land under facilities, grounds maintained by contractor, tenants, or housing occupants, and grounds not maintained at Sheppard AFB, Frederick Auxiliary Airfield and SRA.

CUI

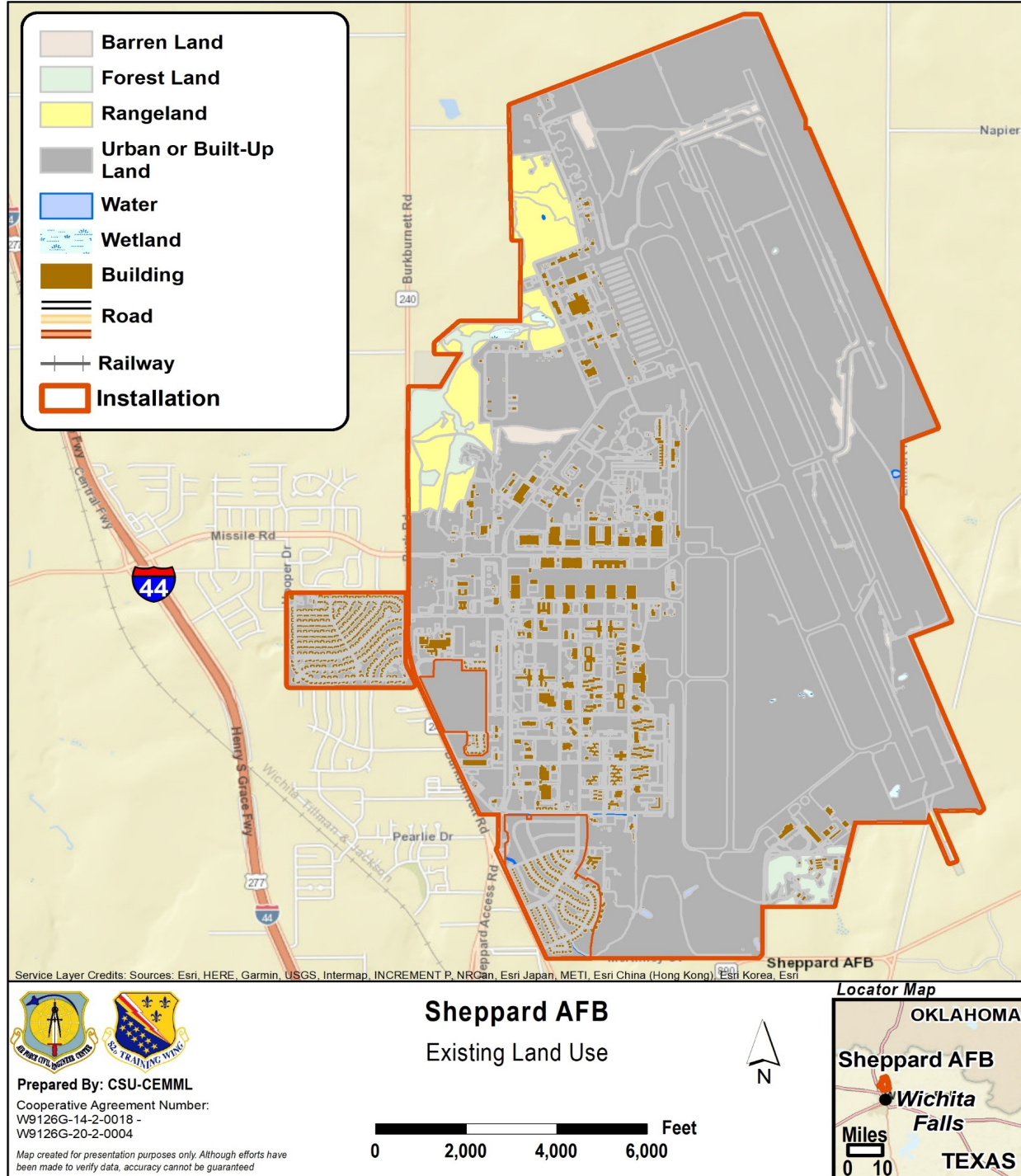


Figure 2-7. Sheppard AFB land use.

### 2.4.3 Current Major Mission Impacts on Natural Resources

#### **Installation Supplement**

Sheppard AFB does have several air emissions sources. Jet engine testing, fuel dispensing, woodworking, and paint spraying are a few sources of air emissions. The base also uses cold cleaner degreasers, and fuel storage tanks. The base has several boilers, some of which are very large capacity. Plans to replace those boilers should also reduce the amount of air emissions produced on the base.

As with other USAF installations, noise issues result from airfield operations, low-level training routes, or ranges. Most of Sheppard AFB is within the 65-dB noise contour of the airfield. The floodplain and wetlands area northwest of the base are in the zone between 65 dB and 75 dB. The effects of noise on local fish and wildlife are not well studied or known, although some avoidance behavior may be expected. Casual observations do not indicate that animals born and raised on the installation are affected by the noise level. Noise would not likely affect species living below water, as sound attenuates when passing from the air into water. Hazardous waste materials are gathered and stored in approved hazardous waste facilities. No current sources and gathering points for hazardous waste pose a threat to natural resources. There are several installation restoration program (IRP) areas on base from previous activities (Sheppard AFB 2010). See Figure 2-8 for a map of IRP sites at Sheppard AFB.

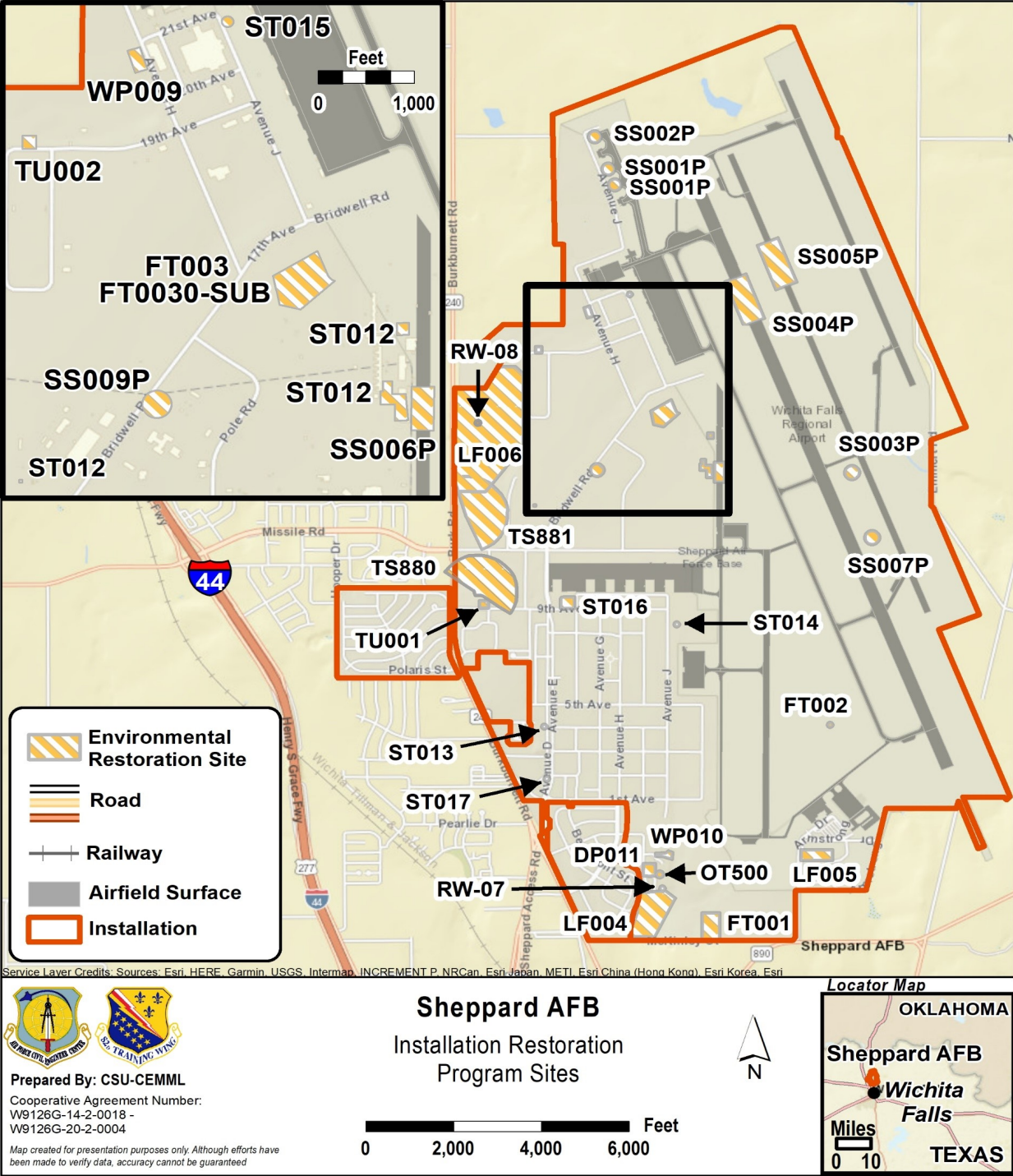


Figure 2-8. Sheppard AFB Installation Restoration Program sites.

#### 2.4.4 Potential Future Mission Impacts on Natural Resources

##### Installation Supplement

The installation comprehensive plans provide information on the future development planned at Sheppard AFB. The main objectives of the Vision 2030 Plan are shrink the base footprint by "collapsing to the core", consolidate administration facilities, add recreation and sports fields, and incorporate more adaptable/flexible use facilities. Goals include orienting to a more pedestrian friendly layout to reduce vehicle traffic, focusing on sustainable and energy efficient facilities, and increasing efficiency of utility lines.

In addition to implementing the Vision 2030 Plan elements, initiatives to make the base more pedestrian friendly and attractive should incorporate designs that reduce the urban heat island (UHI) effect by considering the placement and density of greenspaces, shade trees, lawns, and natural landscaping elements such as pollinator gardens (McCarty et al. 2021). UHI refers to the phenomenon of temperatures of an urban area being higher than the surroundings because of the relative effects of building materials versus vegetation on air temperature and land surface temperature. Parks, greenways, trees, lawns, and native vegetation can be incorporated into planning designs to counteract the heating effects of parking lots, buildings, and road surfaces. These landscape elements will become increasingly important as temperatures increase and HOTDAYS become more common (days over 90 °F are projected to increase from a historic average of 77 per year to as many as 110 under a high emissions scenario; CEMML 2019).

Future development and demolition are proposed in areas that are currently developed and have been addressed in the Environmental Assessment for Implementing Multiple Projects from the Strategic Development Plan. Construction within these areas will not increase existing effects to natural resources in the area. No development within wetlands, cultural resource sites, or forested areas is proposed. The Vision 2030 Plan emphasizes cutting down on vehicular traffic and making the base more walkable, which will decrease air pollution.

### **3 ENVIRONMENTAL MANAGEMENT SYSTEM**

The USAF environmental program adheres to the Environmental Management System (EMS) framework and its Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13834, *Efficient Federal Operations*; DoDI 4715.17, *Environmental Management Systems*; AFI 32-7001, *Environmental Management*; and International Organization for Standardization (ISO) 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 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 GENERAL ROLES AND RESPONSIBILITIES**

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

##### Installation Supplement

<b>Office/Organization/Job Title</b> (Listing is not in order of hierarchical responsibility)	<b>Installation Role/Responsibility Description</b>
--	---

<p>Installation Commander</p>	<ul style="list-style-type: none"> <li>• Approve the INRMP by signature on all revised INRMPs. The Installation Commander may re-delegate signature authority to a lower level provided that the signatory has control over all aspects and management objectives addressed within the subject INRMP, but no lower than the Support Group commander.</li> <li>• Certify the annual review of the INRMP as valid and current; or delegate the certification of the annual INRMP review authority to no lower than the Civil Engineer Squadron Commander.</li> <li>• Provide appropriate staffing to ensure implementation of the INRMP.</li> <li>• Control access to and use of installation natural resources.</li> <li>• Sign cooperative agreements and interagency agreements entered into, pursuant to the Sikes Act, 16 U.S.C. §670c-1. The Chief of the National Guard Bureau, or an official duly delegated authority to act on his/her behalf, signs Sikes Act cooperative agreements and interagency agreements for the ANG.</li> <li>• Approve and sign the installation Wildland Fire Management Plan (WFMP). The Installation Commander may re-delegate signature authority to a lower level provided that the signatory has control over all aspects of WFMP implementation.</li> <li>• Ensure that a notice of intent (NOI) is prepared, per 32 C.F.R. Part 989.17, and a public scoping process initiated per 32 C.F.R. Part 989.18 as described in section 4.4.2. for the EIAP on actions that may affect wetlands.</li> <li>• Consider, in coordination with the Environmental Planning Function (EPF), the impact of proposed actions on federally listed threatened and endangered species by including the species in the scoping of the NEPA analysis at the earliest possible time.</li> <li>• Consider, in coordination with EPF, the impact of their proposed actions on federally listed threatened and endangered species by including the species in the scoping of the NEPA analysis at the earliest possible time.</li> </ul>
<p>Installation Natural Resources Manager/POC</p>	<ul style="list-style-type: none"> <li>• Coordinate this plan with appropriate federal, state and local government officials and other public groups with interest or jurisdiction and with planners of installation activities that affect natural resources.</li> <li>• Routinely review work requests and job orders affecting natural resources and ensure their compatibility with this plan.</li> <li>• Coordinate and manage activities of this plan with all affected installation offices.</li> <li>• If the installation natural resources manager cannot resolve any conflicts that may arise concerning natural resources, the installation ESOHC will make the decision.</li> </ul>



Installation Wildland Fire Program Manager	<ul style="list-style-type: none"> <li>• Installation Fire Chief will guide actions to reduce wildfire potential, outline program safety, protect and enhance natural resources, integrate local and state permit and reporting requirements, and implement ecosystem management goals outlined in the BASH Plan and INRMP</li> </ul>
Pest Manager	<ul style="list-style-type: none"> <li>• Maintain the pest management program</li> <li>• Ensure the IPMP conforms to the requirements of the INRMP</li> </ul>
National Environmental Policy Act (NEPA)/Environmental Impact Analysis Process (EIAP) Manager	<ul style="list-style-type: none"> <li>• Ensure compliance with the NEPA process and review all EAs and EISs.</li> </ul>
USDA	<ul style="list-style-type: none"> <li>• Help support the NRM with wildlife/BASH issues and vice versa.</li> </ul>
USFWS/TPWD	<ul style="list-style-type: none"> <li>• Act as a cooperating agency to review and approve updates to the INRMP.</li> </ul>
ESOHC	<ul style="list-style-type: none"> <li>• Review the INRMP annually;</li> <li>• Inform the installation commander of the results of its review</li> </ul>
82 SFS	<ul style="list-style-type: none"> <li>• Coordinate with the NRM on projects, if the project changes the existing natural resources of the base or the SRA area.</li> </ul>

## **5 TRAINING**

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

### **Installation Supplement**

Natural resources management training is provided to ensure that base personnel, contractors, and visitors are aware of their role in the program and the importance of their participation to its success. Training records are maintained IAW the Recordkeeping and Reporting section of this plan. Below are key NR management-related training requirements and programs.

## **6 RECORDKEEPING AND REPORTING**

### ***6.1 Recordkeeping***

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

## **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 Media Manager and SMS should refer to the Environmental Reporting Playbook for guidance on execution of data gathering, quality control/quality assurance, and report development.

### **Installation Supplement**

There are no installation-specific reporting policies or procedures.

## **7 NATURAL RESOURCES PROGRAM MANAGEMENT**

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

### **Installation Supplement**

This chapter provides management guidelines for a continuing program of conservation, utilization, and protection of fish and wildlife resources at Sheppard AFB and SRA. These guidelines are compatible with the military mission and IAW DoD policy. The fish and wildlife program implements in part, and supplements, the base's physical training mission and organizes other outdoor resource uses.

### **7.1 Fish and Wildlife Management Installation Supplement**

#### *Applicability Statement*

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

#### *Program Overview/Current Management Practices*

##### *7.1.1 Fish and Wildlife Management at Sheppard AFB*

###### **7.1.1.1 Fish Management**

There is no formal fish program on Sheppard AFB. Fish habitat is limited to three one-acre ponds that were originally used as golf course ponds and now within Wind Creek Park. One of the ponds was originally used as irrigation for the golf course, but no longer serves that capacity.

The ponds at one time were sustained by piping effluent water to them. Currently, the permit at the Northside Wastewater Treatment Plant is for Type II water (restricted human contact). Texas Commission on Environmental Quality has stated that fishing in Type I and Type II waters is prohibited. The fish within the ponds are not maintained via feeding or stocking because there is not enough dissolved oxygen in the pond to support a large number of fish. Fish kills occur periodically due to temperature changes and reductions in dissolved oxygen. There may be an opportunity to work with TPWD to improve these ponds through fish stocking to create an outdoor recreation opportunity on the main base. To determine the feasibility of fish stocking, information on baseline water quality and the existing aquatic community will be needed to assess the suitability of the habitat. It also will be important to establish a water temperature monitoring plan for the ponds to detect important thermal thresholds for survival of aquatic life under a changing climate. More HOTDAYS are projected on an annual basis for Sheppard AFB, therefore consideration will need to be given for installing plantings around the ponds that can provide shade for users and help reduce water temperatures.

###### **7.1.1.2 Wildlife Management**

The base wildlife management is very limited since the primary consideration must be aircraft safety and reduction of animal strikes. The 2,094-acre airfield area is being managed to make the airdrome environment less attractive to western meadowlarks (*Sturnella neglecta*), horned larks (*Eremophila alpestris*), red-tailed hawks (*Buteo jamaicensis*), northern harriers (*Circus hudsonius*), burrowing owls (*Athene cunicularia*), killdeer (*Charadrius vociferus*), and other species. This is being accomplished by mowing height, erosion control, control of ponding water, open-ditch maintenance, fertilizer, and selective herbicide application. Population surveys are conducted as required by the USDA wildlife biologist, 82d Civil Engineer Squadron/Environmental Element (82 CES/CEIE) or the USAF BASH Team. For further details on measures used in the BASH program see Section 7.12.

Sheppard AFB has a policy to prevent the existence of free-ranging cats and dogs on base property via the entomology department. By prohibiting free-ranging cats on base property, base management hopes to reduce predation on native songbirds. This policy is IAW the DoD "Don't Let Your Cats Go AWOL!" brochure. Sheppard AFB provides this information to base personnel as part of an education program designed to help pet owners realize the importance of keeping their cats indoors. Feral animals on base are trapped and taken to the Wichita Falls Humane Society.

Sheppard AFB does not have any established Watchable Wildlife areas. Although SRA has large areas of wildlife habitat, the base does not. In addition, the wetland and floodplain area and the northwestern corner of the base are the area's most conducive to wildlife. Unfortunately, these are also near a runway.

The BASH program, designed to reduce air strikes, does not encourage wildlife proliferation near runways. Therefore, there are no plans to enhance fish or wildlife habitat near the runway. As part of the BASH program, Sheppard AFB has a Federal migratory bird permit required for depredation of birds that may need to be displaced from the airfield. The permit is kept on file in 80 FTW/SE, 82 CES/CEIE, and in the USDA wildlife biologist's office. As part of this permit, a Wildlife Depredation Log is maintained to record species, location, and quantity affected. The base has no known fossil resources and therefore no program to enhance or protect them.

### *7.1.2 Fish and Wildlife Management at SRA*

#### **7.1.2.1 Fish Management**

Lake Texoma is a dual-state lake covering over 144,000 surface acres; the majority of land adjoining it is public. No fish management occurs within SRA. On the lake border under installation control, emphasis has been on keeping it in its natural state and restoring altered areas to a natural state.

#### **7.1.2.2 Wildlife Management**

The Lake Texoma wildlife management program is designed to promote the non-consumptive uses of wildlife since no hunting is allowed. Excellent wildlife habitat occurs throughout the 430-acre annex except the 20 developed acres with cabin sites, recreation hall, houses, and miscellaneous buildings. The habitat is ideal for deer and migratory birds. Emphasis is placed on keeping the area in its natural state and restoring man-altered disturbed areas to a natural state. Briars, native seed producing forbs and browse understory provide essential escape cover and natural food for wildlife. Three-foot wide trails provide access for those who wish to enjoy the flora and fauna, and to explore the outdoor environment. Proper management has improved and will continue to improve the habitat for wildlife. The foot trails are located adjacent to feeding areas to improve the opportunity for wildlife observation. Vehicle traffic is restricted in wildlife areas. Biological surveys for plant and animals were completed on Sheppard AFB and SRA in 2015. For more information, see Appendix I.

### *7.1.3 Fish and Wildlife Management at Frederick Auxiliary Annex*

No fish or wildlife management programs are active at Frederick Auxiliary Airfield due to the small size of the area. No suitable habitat for fish or wildlife is present on the airfield.

### *7.1.4 Climate Impacts on Fish and Wildlife Management*

Fish and wildlife management on Sheppard AFB and SRA is not likely to need to make major changes due to climate change. Current fish and wildlife management issues such as BASH concerns and managing for natural habitats on SRA are likely to persist in the future. Fish and wildlife surveys should continue to be conducted on a regular basis. Native species need to continue to be monitored to document changes. Changes in temperature and precipitation are not likely to drive away invasive or pest species, and may present opportunities for invasive species to flourish and push out native species. Invasive species monitoring will continue to be important and management plans should be flexible enough to adapt to changing fish and wildlife concerns (Hellmann et al. 2008).

Increasing temperatures could have a negative impact on amphibians and aquatic macroinvertebrate species. As water temperatures rise in lentic systems, dissolved oxygen content decreases, resulting in diminished habitat quality. Increasing water temperatures also will increase the chances of algal blooms, further depleting dissolved oxygen content and habitat suitability (Paerl et al. 2011). Efforts to remove invasive aquatic plants and algae from ponds should be considered and shade trees should be planted around water sources in an effort to prevent excessive heating of water (Poff et al. 2002) if it can be done without increasing BASH risk.

Increasing temperatures and precipitation favor vectors for diseases such as mosquitoes and ticks (Süss et al. 2008). Minimization of stagnant water in and around the cantonment area will help to minimize mosquito populations. Tick populations in urban settings can be minimized by keeping lawns mowed and by preventing overabundances of hosts such as deer and rodents.

## **7.2 Outdoor Recreation and Public Access to Natural Resources Installation Supplement**

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

This chapter describes a program for the conservation, use, and protection of outdoor recreation resources and facilities at Sheppard AFB and SRA. It is compatible with the military mission and IAW DoD policy. In the context of this plan, "outdoor recreation resources" refers to natural resources that provide opportunities for outdoor recreation. It does not include recreation facilities associated with urban development, such as playgrounds, and ball fields. This outdoor recreation program implements in part, and supplements, the base's physical training mission, and organizes other outdoor resource uses. The NRM prepared it with assistance from the 82d Force Support Squadron (FSS), Division and the TPWD.

#### *7.2.1 Sheppard AFB*

On-base outdoor recreation facilities consist of many sites with a combined area of approximately 200 acres. Recreational facilities are: seven picnic areas, a skeet range, and the par-course (exercise trail). Group picnic sites operate at capacity on weekends during the spring and summer months; however, the family site is under-utilized. The skeet range operates at 60 percent capacity year-round. These areas are restricted use and are not open to use by the general public. The skeet range on the installation may provide an opportunity to coordinate with TPWD to host hunter education classes on site. Hunter education is important for those that may be newly engaging in this activity and could expand outdoor recreation opportunities on off-base locations where hunting is allowed, for those that are interested. Since there is a Field and Stream club located in close proximity to the main base, there may be opportunity to engage with the group and provide some new outdoor recreational activities for personnel at the installation. Access to a variety of outdoor recreation opportunities can benefit the morale and mental well-being of airmen, students, and family living on the base. As also mentioned in section 7.1, there may be an opportunity to create recreational fishing on the main base by improving the ponds in Wind Creek Park (the old golf course).

#### *7.2.2 SRA*

SRA is located approximately 120 miles east of the base on a 430-acre outgrant from the USACE. Cabins, campsites, fishing facilities, shoreline, a beach site, picnic sites, water sport facilities, and a wildlife area provide a multi-use outdoor recreational facility. The cabins and trailer sites operate at capacity on weekends and 85 percent capacity on weekdays from May through October. The tent campsites, picnic, and beach areas operate at 75 percent capacity during the same time period. Cabin replacement at SRA will continue to occur as funding allows. This effort will keep the facilities in condition appropriate for guest use.

Utilization of outdoor recreation activities has increased over the past few years. This trend is expected to continue because of base population growth, the growing population of military retirees in the area, increased interest in outdoor activities, and the high cost of long distance travel. Active and retired military, invited guests, and active federal/contactor employees may utilize these recreational facilities by reservation through 82d FSS.

#### *7.2.3 Recreation Resources by Class*

Developed recreation (Class I) areas are general outdoor recreation areas with suitable characteristics to accommodate intensive recreation activities such as camping, picnicking, and various water sports (Table 7-1).

Table 7-1. Class I recreation areas.

Type of Development	Acres		Number of Units		Carrying Capacity		Degree of Public Access*
	Sheppard AFB	SRA	Sheppard AFB	SRA	Sheppard AFB	SRA	
Campgrounds Cabins		20		46		200	B
Trailer pads		5.5		36		162	B
Tent		16.5		20		116	B
Picnic sites Family	12	20	10	24	50	75	B
Group	20	10	8	4	850	500	B
Beach Site		0.3		1		50	B
Water Sports	As noted above, Lake Texoma is a dual lake state (Texas and Oklahoma) open to the public with a surface area of 144,000 acres. Recreation potential for water sports is unlimited on a lake of this size.						
Swimming							
Diving							
Boating							
Skiing							

\*Category A- Open to the general public, regardless of a person's association with the military or other DoD agencies  
 Category B - Open to DoD, employees and guests only.

Dispersed recreation (Class II) areas are natural environmental areas capable of supporting dispersed recreation such as fishing, primitive camping, bird watching, boating, hiking, and sightseeing (Table 7-2).

Table 7-2. Class II recreation areas.

Activity	Degree of Public Access*	Area Available	
		Sheppard AFB	SRA
Fishing (Lake)	A	N/A	144,000 acres
Nature Study	B	N/A	160 acres
Hiking	B	0.8 miles	10.6 miles

Wind Creek Park	B	150 acres	N/A
Skeet and Trap Shooting	B	15 persons	N/A
Low-impact Camping	B	N/A	80 acres

\*Category A- Open to the general public, regardless of a person's association with the military or other DoD agencies  
 Category B - Open to DoD, employees and guests only.

Special interest (Class III) areas are special interest areas of archaeological, botanical, geological, historical, or of scenic significance (Table 7-3).

Table 7 3. Class III recreation areas.

Special Interest Areas	Degree of Public Access*	Number	Square Feet
Bldg. 2130, AKA Little Adobe, Heritage Center (historical)	B	1	4,939
Bldg. 2560	B	1	
SAC RAMP	B	1	

\*Category A—Open to the general public, regardless of a person's association with the military or other DoD agencies. Category B—Open to DoD, employees and guests only.

On 19 November 1981, Building (Bldg.) 2130 was officially dedicated as a recorded Texas Historic Landmark. The old Kell Field Air Terminal, known as "Little Adobe," was constructed in 1928 to serve as the air terminal for Kell Field, the first municipal airport for the City of Wichita Falls. In 1941, it was incorporated into Sheppard AFB and is now the Heritage Center. The Kell Field Terminal has served such notable pilots as Charles Lindbergh, Wiley Post, and Amelia Earhart.

Bldg. 2560 and the SAC Alert Apron were deemed eligible for the listing on the National Register of Historic Places (NRHP) as an example of a SAC alert facility for dispersal bases in the 2002 Cold War inventory.

Additional information on cultural resources can be found in the ICRMP stored at Bldg. 1402, 82 CES/CEIE or on eDash.

#### 7.2.4 Summary of Recreation Resources

Class I general outdoor recreation areas will be managed primarily for trailer and cabin campsites and picnic sites. Water sports are unlimited on the 144,000-acre Lake Texoma.

Class II natural environmental areas will be managed primarily for hiking, nature study, bird and wild animal observation, and skeet shooting. The water areas of Lake Texoma are open to the public. Fishing areas are unlimited on a lake of this size.

The Class III historic landmark, Bldg. 2130 will be maintained for administrative space, historical displays of early aviation in the Wichita Falls area, and early military aviation training; and is currently being maintained by the base Historian. Bldg. 2560 and SAC Alert Apron will be maintained for administrative and classroom spaces.

Class I and II areas are managed by Force Support Squadron (FSS) and are open and available year around. Reservations are required through the Recreation Service Branch office for cabins, trailers, and group picnic sites on a first-come, first-served basis with priority to active-duty military personnel. The usage or number of users per area is based on carrying capacity of the area (Table 7-4). Routine maintenance and minor repairs are done by FSS with support by the base civil engineer on major repairs. Park and picnic sites and small lakes are maintained by the base civil engineer. Installation population is made aware of available outdoor resources by special briefings, newspaper articles, flyers, and pamphlets.

Table 7 4. Maximum carrying capacities of recreation areas at Sheppard AFB and SRA.

Sheppard AFB		Sheppard Recreation Annex	
Location	Maximum Carrying Capacity Per Day	Location	Maximum Carrying Capacity Per Day
Picnic areas	900 persons	Cabin sites	200 persons
Nature study	200 persons	Tent sites	116 persons
Par-course	150 persons	Trailer sites	162 persons
Rifle range	100 persons	Hiking trail	100 persons
Skeet range	15 persons	Picnic area	100 persons
		Beach	100 persons
		Fishing and boating	Unlimited

Use of off-road vehicles on Sheppard AFB is prohibited.

Maximum capacities are defined as the level of use that will not impair the scenic, recreational, ecological, or other values involved. The space standards used were National Park and Recreation Open Space Standards.

Operational Note: Projects planned for SRA are required to have submitted form 332. No work will occur at SRA unless approved via work order or EA.

#### *7.2.5 Public Use of and Access to Recreation Resources*

Public access for outdoor recreation use will be kept within manageable quotas to preclude impairing the military mission and to provide for sustained yield of the resource base.

Outdoor recreational facilities on the base proper are open to active duty and retired personnel, active and retired federal employees, and guests.

The water areas of the Lake Texoma reservoir are open to public use, generally without charge, for boating, swimming, sunbathing, water skiing, fishing, and other recreational purposes. Access to and from such water areas along the shores of the reservoir shall be maintained for public use. Active duty and retired military personnel, active and retired federal employees and guests have access to the recreational facilities at Lake Texoma by making reservations through the 82d FSS.

#### *7.2.6 Climate Impacts on Outdoor Recreation and Public Access to Natural Resources*

Outdoor recreation and access to natural resources on Sheppard AFB and SRA may be negatively affected by climate change. Low impact activities such as use of picnic areas, ponds, skeet range, par-course, cabins, campsites, fishing spots, beach sites, water sport facilities and wildlife areas should continue but may experience some impacts. The average number of days per year reaching over 90 °F is projected to increase from the baseline 77 days to as many as 110 days under a high emissions scenario (Table 2-3. Summary of climate data for Sheppard AFB.). The increase in HOTDAYS may require base personnel to shift their participation in outdoor activities to times when these activities are safer or more comfortable. Since a large portion of the main base is developed, the UHI effect may make outdoor activities even less comfortable if measures are not implemented to offset the heating effect phenomenon that occurs in more urbanized areas. Fishing opportunities, which are dependent on the health of fish populations, may also need to be assessed over time to ensure that they remain sustainable under changing precipitation and temperature regimes.

### **7.3 Conservation Law Enforcement Installation Supplement**

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

Sheppard AFB does not have a hunting program and therefore no enforcement occurs. Fishing is done at Sheppard's recreational annex on public waters and enforcement is conducted by state game wardens.

## **7.4 Management of Threatened and Endangered Species, Species of Concern, and Habitats Installation Supplement**

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

A baseline biological survey for Sheppard AFB and SRA was completed in 2015 by PIKA-Pirnie (Appendix I). This survey noted observations of T&E species; however, the survey did not include formal T&E species surveys. During the survey, the timber rattlesnake, a Texas SGCN, was observed on SRA. The timber rattlesnake occurs in a variety of habitats including lowland thickets, swamps and floodplains, and hardwood and pine forests. Due to the large, undeveloped area within SRA and lack of plans to develop on SRA, the timber rattlesnake population is anticipated to remain stable.

Visitors are notified of the potential to encounter venomous snakes when they check in at SRA. Placed at the entrance of the lodge is a sign that states "We have snakes. Please do not pick up any snake. Consider them all venomous. If you see a snake, please contact management or an employee. Should you be bitten by a snake call 911, then contact the facility manager." A picture of a timber rattlesnake will be provided at the check in counter to inform visitors of their appearance and their protected status under state law. A program to provide rattlesnake training for dogs could be beneficial to provide an additional layer of protection from rattlesnakes for those dogs that are with personnel recreating at the SRA.

The Texas horned lizard and Texas kangaroo rat have been observed on Sheppard AFB; however, they were not observed during the 2015 survey. The base has eliminated concerns of the Texas kangaroo rat on base. In 2012, The NRM contacted Dr. Frederick B. Stangl, Jr., and Dr. Raymond E. Willis from the local university, specializing in small mammals, to do a visual assessment. It was determined the habitat was not conducive to the Texas kangaroo rat (Appendix J). The USFWS is conducting a species status assessment to determine whether the Texas kangaroo rat warrants federal listing. Surveys for this species are being planned at Sheppard AFB in 2022.

The old landfill area in the northwestern corner of the base is the primary on-base location where the Texas horned lizard has been found, and no developments are planned in this area. The Texas horned lizard prefers open areas with sparse plant cover in arid and semiarid habitats. This species commonly occurs in areas with loose sandy or loamy soils (TPWD 2016b). The health of the existing on-base habitat for the horned lizard is stable; however, it is considered suboptimal. Beginning in 2014, efforts to restore airfield habitat to native, BASH-friendly grassland have treated more than 500 acres with a combination of reseeding and herbicide application. As funding allows, additional restoration areas will be added to benefit Texas horned lizard habitat, reduce BASH, and prevent erosion of bare areas. Native harvester ant monitoring in these sites would be beneficial to inform future efforts to restore the Texas horned lizard prey base. For instance, the effects of herbicide on ant populations and their response to restoration efforts are poorly understood, and monitoring could help determine the effects of herbicide application (if any), colonization rates into restored habitats, usage of seeded species, or determine the need for additional ant food resources. Surveys for Texas horned lizard are also being planned in 2022.

Main threats to the Texas horned lizard are the elimination of its main food source, harvester ants. Harvester ants occur in arid habitats in areas of native short grasses over clay loam soil (Drees, no date). Harvester ant populations should not be eliminated unless there is a safety concern (e.g., populations on parade grounds where contact with people is likely). If pesticides and herbicides are not used in the area known to be occupied by the Texas horned lizard, the present individuals or small population should be able to continue indefinitely. No other T&E species are known or are likely to be present on Sheppard AFB.



The base has no designated habitats of concern, nor is there any designated critical habitat in the regional vicinity. Management of fish and wildlife resources, including T&E species habitats, is coordinated with the USFWS and the TPWD. Although Sheppard AFB will avoid further degradation of the existing suboptimal habitat present for the Texas horned lizard, as this species is not federally listed, no Section 7 consultations or Biological Opinions are in place.

As mentioned in section 2.3.3 and 2.3.4, pollinators are becoming imperiled on a worldwide scale. Efforts should be made to protect and enhance pollinator populations when opportunities are available. Therefore, where compatible with the mission, seed mixes and plantings should include native species that are beneficial to pollinators, including the SGCN species that are located in Wichita and Grayson Counties. For example, the American bumblebee commonly visits species of St. Johnswort (*Hypericum* spp.), vetches (*Vicia* spp.), clovers (*Delea* spp.), goldenrods (*Solidago* spp.), and bonesets (*Eupatorium* spp.) (Colla et al. 2011). Native milkweed species (*Asclepias* spp.) are diverse in Texas (TPWD 2015), and can be planted to support migrating Monarch butterflies. Milkweeds are also likely to support variable bumblebee, which also visits asters, thistles, goldenrods, boneset, and clovers (Colla et al. 2011).

#### *Migratory Bird Species*

Migratory birds are regulated under the MBTA, administered by USFWS. According to Sheppard AFB policy, if a migratory species has established a nest, the nest at that time is considered an active nest and therefore becomes protected. The birds cannot be moved nor can the nest be removed until those hatchlings are fledged and out of the nest. Under this circumstance, the birds will be allowed to hatch their young. After fledging, the unoccupied nest can be removed only where it becomes a safety hazard, and this is done via facility manager with either NRM or entomology department approval. If nests cannot be reached, the entomology department may be notified of the work order request to remove the nest. However, it should be noted this is not in entomology's contract and they are not obligated to remove the nest. The only time a nest may require moving is if there is a safety threat to humans. A special permit is required for these removals and can take weeks to obtain. The USDA Wildlife Biologist will work with the NRM should support be needed and can provide representation/authority for the NRM when unavailable.

#### *7.4.1 Climate Impacts on Management of Threatened and Endangered Species and Species of Concern*

Management actions needed to protect T&E species will depend on the speed at which the climate changes, the nature of the climatic changes and the ability of the species to respond to those changes. Our understanding of species' response to changing climate is not yet sufficient to be able to predict how an individual species will respond. In addition, the response of sub-populations of a single species may vary; however, many current T&E management activities are appropriate for increasing these species' resilience or facilitating their adaptation to climate change. An ecosystem approach that prioritizes functional diversity, maintenance of habitat, habitat variability, and habitat connectivity can help support genetic diversity that may be important for adaptation, and can help species migrate to more favorable habitats. However, when approaching the uncertainty that is inherent with managing species under changing environmental conditions, additional analysis and planning is required.

Research into actionable science used for biodiversity conservation in changing conditions has developed several key principles. Historical patterns used for management decisions are likely to be insufficient for future management challenges (Bierbaum et al. 2013). Proactive approaches that anticipate change can help extend the period over which species can adapt to changing climate and avoid catastrophic declines associated with stochastic events that act on an already stressed ecosystem.

### **7.5 Water Resource Protection Installation Supplement**

#### *Applicability Statement*

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

#### *Program Overview/Current Management Practices*

Sheppard AFB is in a region of the country where drought conditions are common. Water restrictions during drought times are enforced on base. Conservation and wise reuse measures have been implemented to reduce water consumption. See Tab 5 for the drought contingency plan.

Stormwater on the base drains into Plum Creek, Bear Creek, or the Wichita River. Plum and Bear Creeks run into the Wichita River, which eventually runs into the Red River. The Sheppard AFB sanitary sewer discharges into the City of Wichita Falls' sanitary sewer and then into a local wastewater treatment plant.

The base relies on the City of Wichita Falls for its water supply. There is a requirement for Sheppard AFB to have a drinking water monitoring program which is managed by Bioenvironmental per the Sheppard AFB Drinking Water Monitoring Plan. Sheppard AFB has a stormwater pollution prevention program on file; under the stormwater pollution prevention plan. Sheppard AFB does not participate in any regional water monitoring programs.

## **7.6 Wetland Protection Installation Supplement**

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

The development of wetlands is regulated under Sections 401 and 404 of the Clean Water Act (CWA). Regulated activities include projects such as fill for development or infrastructure, water resource enhancements, and mining projects. Wetlands determined to be jurisdictional under the CWA are regulated by the USACE. Sheppard AFB contains both jurisdictional and non-jurisdictional wetlands. Non-jurisdictional wetlands are exempt from permitting requirements and are located within the airfield and within Wind Creek Park. A preliminary jurisdictional determination was written for the base in 2014 and provides a preliminary jurisdictional status for all wetlands and waters on Sheppard AFB and supplements a jurisdictional determination provided by the USACE in 2011. Both documents are provided in Appendix L. All streams within Sheppard AFB are considered jurisdictional. Jurisdictional wetlands occur in the northwest corner of the installation and within streams. All decision-making concerning wetlands will follow the procedures in AFI 32-1015, AFMAN 32-7003, and EOs 11988 and 11990. EO 11988, *Floodplain Management*, provides direction regarding actions in floodplains, including requirements for permits to construct within a 100-year floodplain. Installations should also give consideration to restoring and preserving the natural and beneficial values of floodplains when carrying out management of its lands. EO 11990, *Protection of Wetlands*, provides protection to wetland resources through requirements to reduce adverse impacts associated with the destruction or modification of wetland resources. AFI 32-1015, *Integrated Installation Planning*, establishes a comprehensive and integrated planning framework for development of USAF installations, and includes requirements for addressing wetlands during NEPA processes that are carried out as part of that planning. AFMAN 32-7003, *Environmental Conservation*, explains how natural resources will be managed on USAF properties in compliance with federal, state, and local standards. It references compliance with EO 11990 and states that the USAF will seek to preserve the natural values of wetlands while carrying out its mission.

As all construction within these wetlands is prohibited, there are no pending Section 404, Section 401 or Section 10 permits for any planned actions. There is no current involvement in regional or local wetlands banking. No actions are planned to enhance or restore the existing wetlands and therefore; there are no long-term monitoring plans in place.

### *7.6.1 Climate Impacts on Wetland Protection*

Wetland ecosystems are naturally resilient, provide linear habitat connectivity, link aquatic and terrestrial ecosystems, and create thermal refugia for wildlife, all characteristics that can contribute to ecological adaptation to climate change. Projected changes in the climate on the installation, however, including warmer temperatures and changes in the magnitude and seasonality of precipitation and runoff, could lead to shifts in reproductive phenology and distribution of plants and animals in wetland areas (Parmesan and Yohe 2003). In addition, warmer temperatures would increase evaporation rates in wetland areas, potentially altering the hydrological regime (Erwin 2009).

Considering these projected changes, a wetland monitoring program would be beneficial to evaluate baseline wetland health and examine changes as temperatures and drought potential increase.

## **7.7 Grounds Maintenance Installation Supplement**

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

#### *7.7.1 Sheppard AFB*

Grounds maintenance at Sheppard AFB is accomplished by contract, which is managed by 82 CES/CEY. The contractor of maintenance engineers is required to coordinate with the entomology department. As needed, both groups work cooperatively to resolve vegetation issues on Sheppard AFB. All spray requests or uses of herbicide application are coordinated and approved through the entomology shop prior to application.

The base requires personnel and contractors to follow best management practices when applying pesticides and fertilizers to prevent nonpoint-source pollution. This includes, but is not limited to, timing applications to consider weather, and managing irrigation to limit runoff.

Sheppard AFB has developed a plant list of native and locally adapted vegetation. Plants suited to the region reduce the potential for spreading disease and pest insects, and are easier to maintain. Native and locally adapted drought- and pest-tolerant plants reduce water and pesticide requirements, IAW the installation IPMP. Plant lists are organized into grasses, trees, shrubs, and ground cover. Additional grounds maintenance information is in Tab 6.

#### **7.7.1.1 Tree Conservation Policy**

A tree conservation policy is established to conserve and maintain trees requiring siting decisions for new construction, additions to existing buildings, and to incorporate existing trees into landscape design to the maximum extent possible. Design drawings will be reviewed by the NRM or base representative to ensure that the design agent has incorporated project siting requirements. Any landscape or arboriculture contractor conducting urban tree work will have a certified arborist certify the work.

Where possible, trees and shrubs will be trimmed rather than removed. Trimming should take place between 15 November and 15 April, before trees begin to leaf out. Trimming outside of this seasonal window makes trees susceptible to disease and parasites. Once leaves appear, trimming is prohibited unless authorized by the NRM.

Trees and shrubs will be watered for up to a year after planting, or once the plant has become established, whichever occurs first. The NRM or a USDA wildlife biologist can decide establishment for planted trees and shrubs. Trees will not be planted within 10 feet of a building foot line.

The customer, construction manager, and base NRM will visit and assess trees on proposed construction sites before work begins. The assessment will evaluate tree disposition, facility siting, and work to be performed. All trees larger than three inches in diameter at breast height (DBH) located within the proposed project footprint or the immediate construction site will be shown on the construction drawing. Trees and shrubs located on or near the proposed construction site will be maintained, relocated, or replaced. These management decisions will be documented in the project definition. Priority will be given to trees in good condition that appear on the INRMP list of recommended trees and shrubs. Consideration should be given to the species, size, location, historic value, estimated moving cost, and long-term maintenance cost. A one-year warranty will apply to all replaced vegetation. All vegetation will be planted between 1 November and 1 April.

Contractors and base personnel will use necessary effective means to prevent construction related injury to trees and shrubs near construction sites. Physical barriers include fences or barricades around individuals or groups of plants. Vehicles or equipment will never be parked within the drip line of any tree. No woody vegetation will be removed or pruned without prior approval from the installation NRM. Trees or shrubs damaged during construction related activity, or any vegetation replaced by the contractor that does not establish within a year of planting, will be replaced at no expense to the government.

#### **7.7.1.2 Tree Removal Exceptions**

Any tree removed in compliance with safety regulations, airfield waiver or Clear Zone requirements will not be replaced. Any tree which has become diseased or parasite-infested will be removed without replacement.

#### **7.7.1.3 Improved Grounds**

This category applies to the grounds in building areas which contain lawns, landscape plantings, oil palliative or gravel blankets for dust control, parade grounds, drill fields, athletic facilities, cemeteries, and similar areas requiring intensive maintenance. The present vegetation cover consists of Bermudagrass, yellow (King Ranch) bluestem, and buffalograss on non-irrigated improved ground. Cool season grasses are not accepted as permanent turf; these are only temporary cover for warm season grasses. All cool season grasses unless otherwise agreed upon must be terminated prior to seeding warm season grasses.

#### **7.7.1.4 Semi-improved Grounds**

This category includes airfield grounds adjacent to runways, taxiways, and apron shoulders; runway clear zones and lateral safety zones, rifle and pistol ranges, ammunition storage areas, antenna facilities, and similar areas. Within these areas, especially on and around the airfield, there has been a coordinated effort between Sheppard AFB and AETC to control unwanted vegetation (i.e., Johnsongrass). These efforts include limited controlled burns, reseeding and targeted herbicide application utilizing wicking application or boom spray application equipment.

Dominant species on the airfield and in similar areas presently includes Bermudagrass, king ranch bluestem, Texas grama, Texas wintergrass, threeawn, tumble windmill grass, tumblegrass, western ragweed, silver bluestem (*Andropogon saccharoides*), blue grama, and other native and non-native broadleaf weeds, sedges, and grasses.

#### **7.7.1.5 Unimproved Grounds**

This category usually includes areas such as bombing ranges, timber and forest lands, agricultural and grazing lands, lakes, ponds, and swamps, areas in airfields beyond the safety zone, and similar areas requiring limited or no maintenance.

The present vegetative cover consists of Bermudagrass, buffalo grass, blue grama, King Ranch bluestem, silver bluestem, Texas wintergrass, Johnsongrass, and purple three-awn.

#### **7.7.1.6 Other Grounds Maintenance Activities**

Mowing of 134 acres of on-base land will be required to eliminate fire hazards and prevent the encroachment of weeds and brush. One or two mowings annually at a height of 24 inches is sufficient. Mowing controls weed growth. Mowing requirements are provided in Figure 7-1. Brush control is not a problem. Rotary mowing and spot treatment with an approved herbicide is all that is required. Natural rainfall will be the extent of irrigation.

Water erosion is on denuded areas or steep slopes. Since the priority of work has been erosion control of improved and semi-improved grounds, very little has been done on the unimproved grounds. The erosion problem is not considered to be of major concern over most of the areas; however, serious water erosion may create severe damage in various areas.

#### **7.7.2 SRA**

SRA is an outgrant from the USACE consisting of 430 acres of land. Grounds maintenance requirements are shown in Figure 7-2. The vegetation is composed of native oaks and eastern redcedars with bluestems, buffalograss and annual grasses, and weeds covering the rocky ridges, and a few pecan and cottonwood trees with Bermudagrass, bluestems, and Johnsongrass covering the low-level land.

The soil varies from a deep sandy loam with sandy loam subsoil on the low land to a stony fine sandy loam with very tight subsoil on the ridges. Erosion becomes a problem on the slopes when the vegetation is disturbed. Most erosion control will be around new construction projects, as outlined under the improved ground section of this plan.

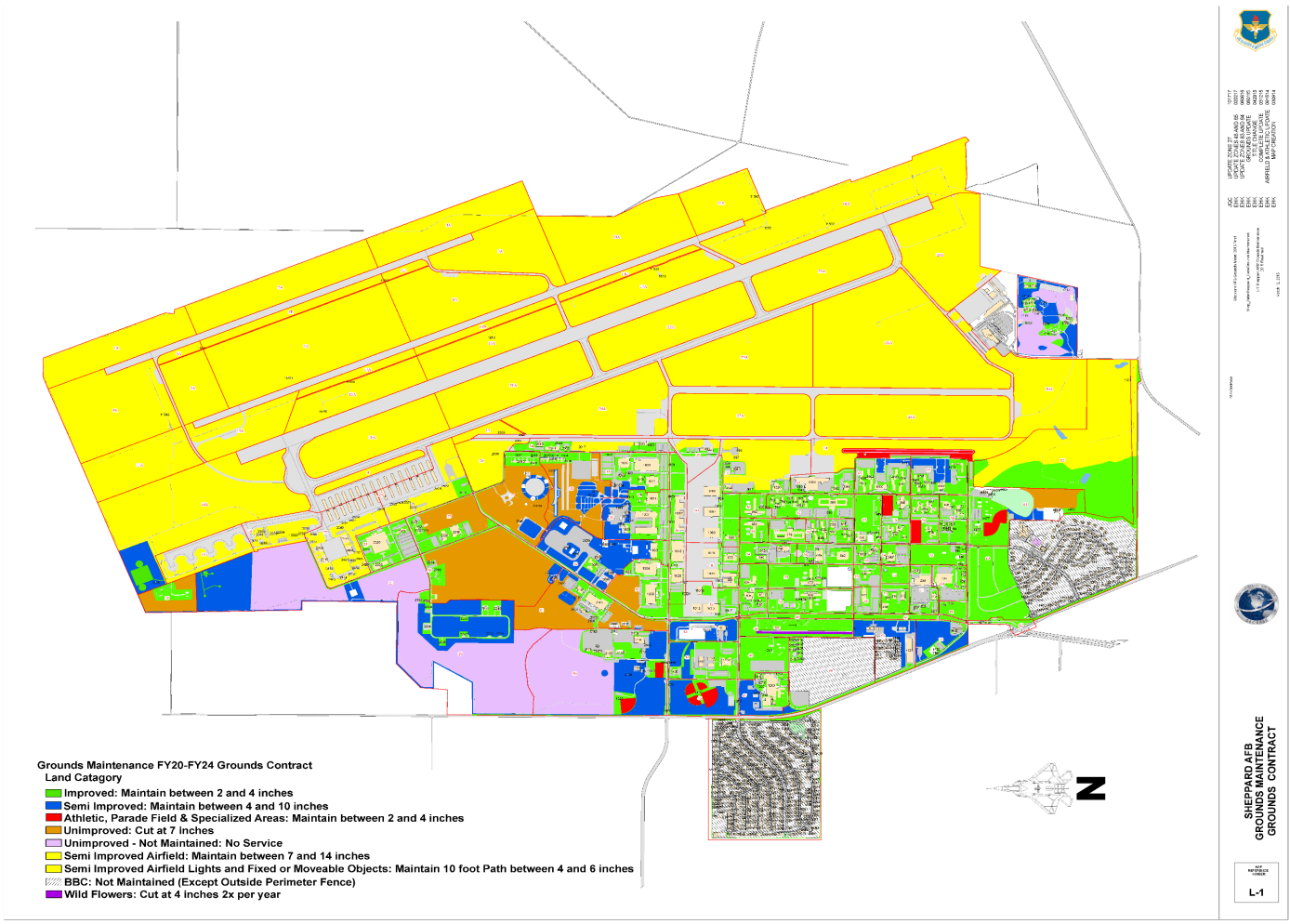


Figure 7-1. Shepard AFB grounds maintenance

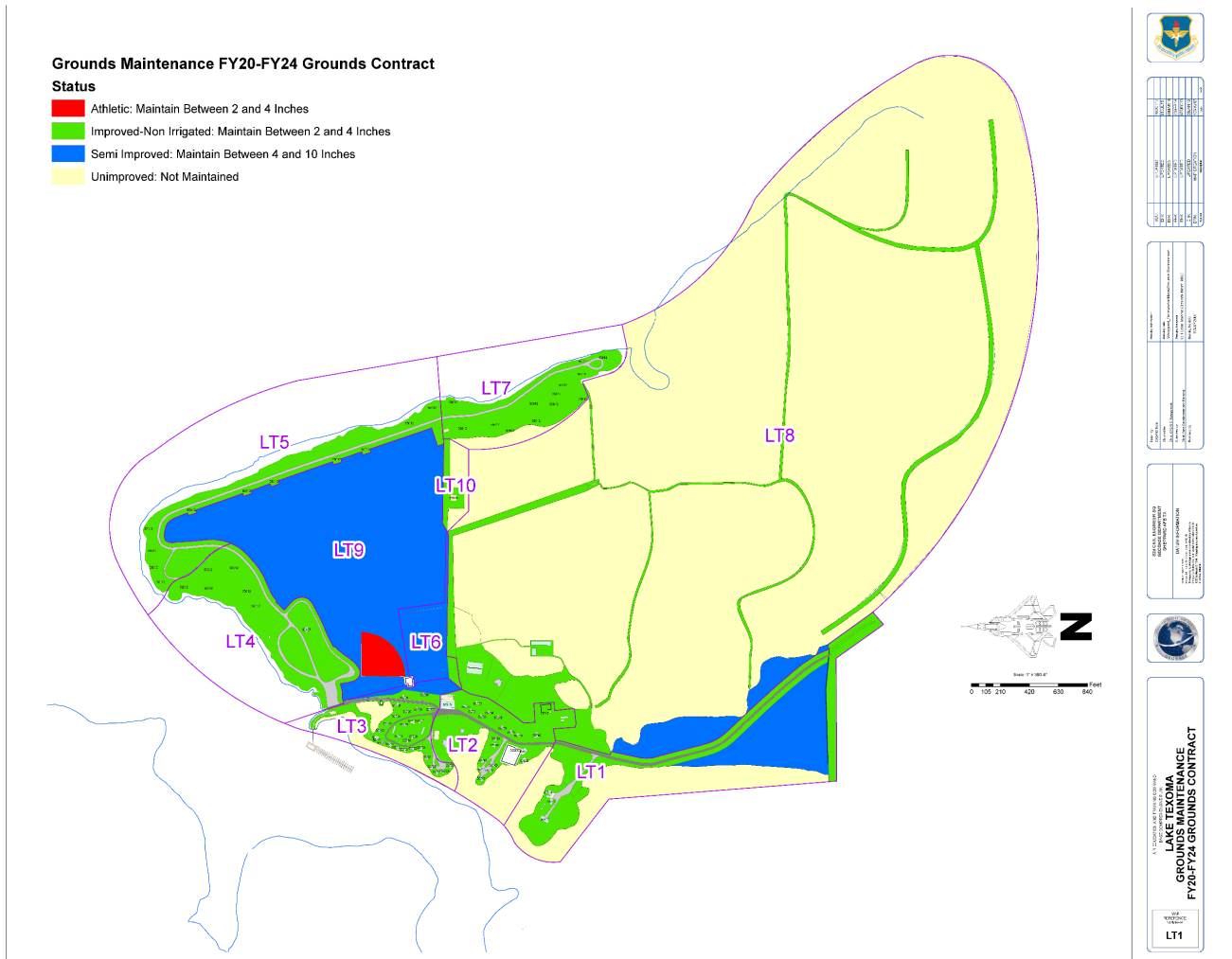


Figure 7-2. SRA grounds maintenance

### 7.7.3 Frederick Auxiliary Airfield

This is a joint-use contract. There are nine acres of land. The runway shoulders and safety zones are covered with Bermudagrass, bluestems, and sideoats grama. The remaining areas are presently being farmed as wheat land.

The local soils are in the Foard-Tillman series and are deep reddish-brown clay loam, 12-18 inches thick, over blocky, compact clay and are generally calcareous at a depth of 12 inches.

Only improved grounds and newly seeded areas will be fertilized; using methods outlined under the improved and semi-improved ground sections of this plan. Only improved grounds and semi-improved grounds will require mowing as outlined in this plan. Most erosion control will be around new construction and as outlined under the improved and semi-improved ground sections of this plan. Grounds maintenance requirements are provided in Figure 7-3.

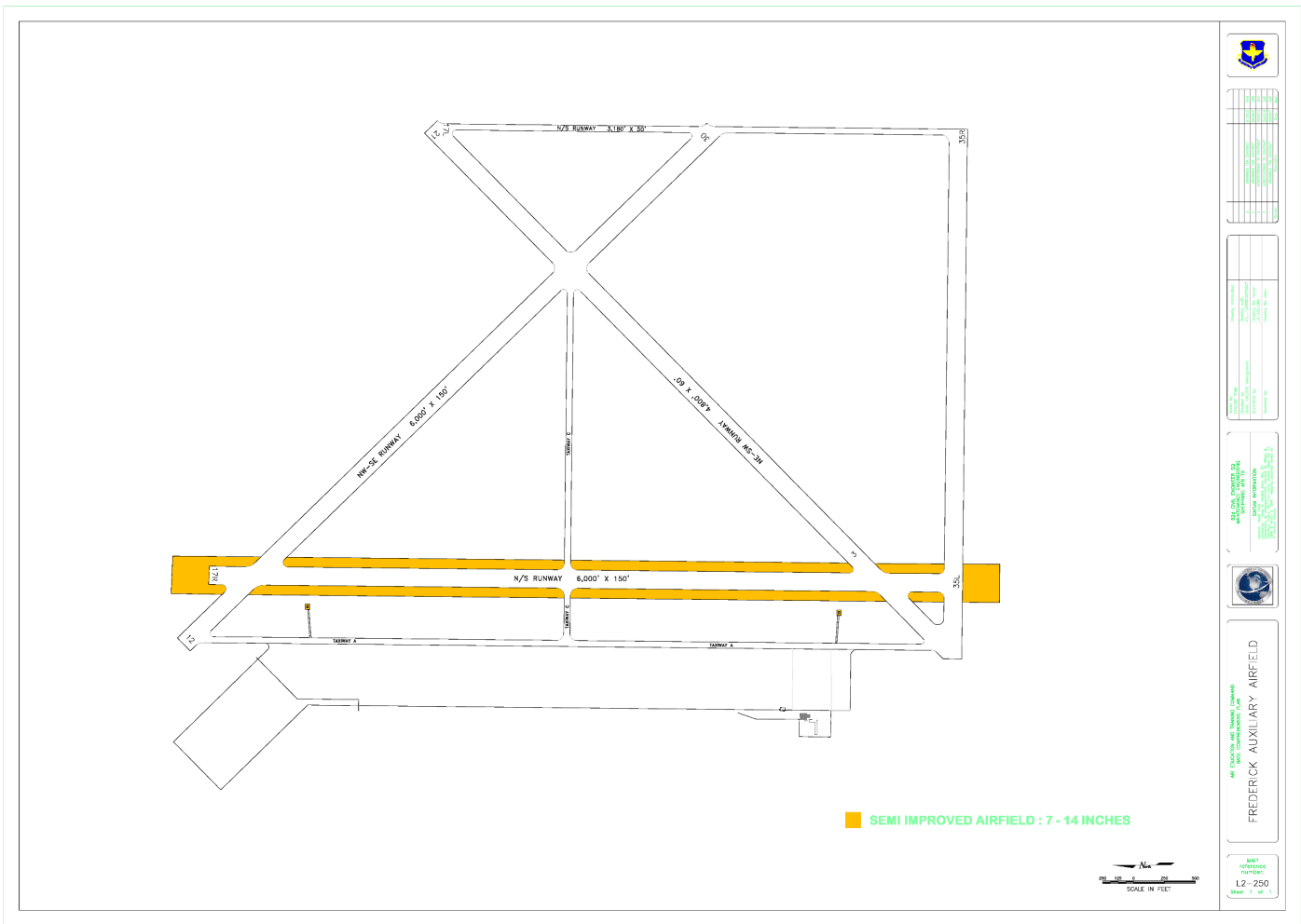


Figure 7-3. Frederick Airfield grounds maintenance.

## 7.8 Forest Management Installation Supplement

### Applicability Statement

This section applies to AF installations that maintain forested land on AF property. This section **IS NOT** applicable to Sheppard AFB.

### Program Overview/Current Management Practices

Sheppard AFB and the surrounding region are typical rolling prairies, dominated by grasses instead of trees. Although trees have been planted and are in good health on the base, the typical native landscape is not forested. No forest habitat types are found on the installation. Therefore, no forest management plans, commercial forestry operations, or timber harvesting operations are taking place on-base.

## 7.9 Wildland Fire Management Installation Supplement

### Applicability Statement

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

### *Program Overview/Current Management Practices*

An effective wildland fire management program minimizes the threat from wildfire and helps to ensure that environmental encroachments to training are minimized while still achieving BASH and natural resource management goals. The WFMP directly supports the military mission. The WFMP covers goals and methods of implementing prescribed burns along with emergency response and containment of wildland fires.

#### *7.9.1 Prescribed Burns*

Sheppard AFB utilizes prescribed burns primarily as a land management tool to help remove invasive plants and to support reseeding projects to prevent invasive species regrowth in support of BASH efforts, to protect life and enhance natural resources, and as a preventative measure before AF events such as the airshows and Fourth of July celebrations. Guidance for the implementation of prescribed burns is outlined in the WFMP, provided as an associated plan.

On Sheppard AFB, prescribed burns used for re-seeding efforts are funded via AFCEC. Fire prevention measures preceding airshows have budget constraints that do not allow airshow funds to be utilized for reseeding. Reseeding and post fire herbicide funds should be acquired prior to a prescribed burn as bare areas attract wildlife and bird species that may conflict with BASH program goals.

Prescribed burns reduce fuel load in the target area and make spontaneous wildland fires easier to control or prevent them from occurring. The goals of a prescribed burn should be established and correspond to management priorities. Each prescribed fire must have its own burn plan that specifies the size of the burn and control measures.

To mitigate the hazards of wildlife strikes, prescribed fires aid in weed control and avian/wildlife control. Prescribed fires generally occur at Sheppard AFB during late February and March as spring begins. Fire is used to remove thatch to ensure proper seed-to-soil contact when planting. In addition to grass seeds, the darkened earth helps promote early weed growth, which facilitates early-effective weed control with herbicides that would otherwise compete with grass seedlings. Exposed dark earth aids in the planting of desirable grasses, resulting in early green-up and seed germination of BASH compatible grasses. Prescribed fire should be used in conjunction with herbicides to prevent the growth of invasive and undesirable species. Immediately after prescribed burns, birds are more attracted to the area due to the lack of vegetation and exposed seeds, however this typically lasts for less than two months and after desirable vegetation grows in, long-term bird strike hazards are reduced.

Prescribed fires should above all account for safety and follow guidance set forth in WMFP. Controlled burning will be used when determined to be necessary on certain areas of unimproved grounds that cannot be mowed.

#### *7.9.2 Wildland Fire Management*

Grass fires may occur at any time; however, fires are more frequent during prolonged periods of dry weather with low humidity and high winds or during winter months when vegetation is dormant.

Risks of wildland fires increase when grass is dry and vegetation is dense and tall. Mowing the grass will be practiced as an important aspect of the fire prevention program. Grass cut at a length prescribed for improved and semi-improved grounds will help limit the spread of grass fires on these areas. These control measures are particularly important around sensitive areas. Assets that may be the most vulnerable to wildland fires are adjacent communities and landowners, air quality, and operational areas on Sheppard AFB such as utility lines, the explosives range, fuel tanks, and aircraft fuel transfer vehicles.

The successful implementation of a wildland fire management program requires the cooperation of multiple agencies and groups including local communities, the City of Wichita Falls Fire Department, and the USDA. Mutual Aid Agreements with surrounding communities have been set up under WFMP.

Wildland fires occurring on or near Sheppard AFB would be extinguished as quickly as possible. Preparedness and training are instrumental to the success of preventing and extinguishing wildland fires. Sheppard Fire Emergency Services currently has two firefighters trained in wildland firefighting for prescribed fires, and maintains relationships with local fire departments. The WFMP contains further information regarding preparedness, detection, reporting, response, and emergency stabilization of wildland fires (Tab 1).



### 7.9.3 Climate Impacts on Wildland Fire Management

Wildland fire will remain a minor factor in the land management of Sheppard AFB. The mission is unlikely to produce substantial numbers of ignitions, limiting the potential for fire occurrence. Precipitation is projected to increase by 2.6 to 6.9 inches annually. Temperature is also expected to increase substantially by 2050, including monthly maximum increases of more than seven degrees (°F) but in the 2030 time frame the increases are more modest, generally in the two- to three-degree (°F) range. Projected vegetation changes trend away from shrublands and toward mixed forests, which could lead to increased total fuel loads but roughly equivalent or decreasing surface fuel loads, relative to current day, that would be less likely to support problematic fire behavior. When considered together, these factors suggest that wildfire frequency and intensity are likely to remain approximately static relative to current conditions (CEMML 2019).

## 7.10 Agricultural Outleasing Installation Supplement

### *Applicability Statement*

This section applies to USAF installations that lease eligible USAF land for agricultural purposes. This section **IS NOT** applicable to this installation.

### *Program Overview/Current Management Practices*

There are no agricultural outleases on Sheppard AFB or any of the annexes. Therefore, there are no management plans for these resources.

## 7.11 Integrated Pest Management Program Installation Supplement

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

The Sheppard AFB integrated pest management (IPM) follows procedures for pesticide application as directed in AFMAN 32-1053 or DoDI 4150.07. For detailed information and guidance, see the installation IPMP, provided as an associated plan in Tab 4.

PREVENTIVE AND NON-TARGET TREATMENT IS NO LONGER ACCEPTABLE UNDER DoDI 4150.07. Prior to implementation of the IPMP, entire buildings were sprayed with a residual pesticide. The procedure killed some of the target pests and many useful animals like birds and lizards. It also resulted in resistance to the pesticide and left a residual for people and pets to breathe, ingest, and absorb through the skin.

Certified personnel, IAW the manufacturer's label and IAW the IPMP, apply pesticides. All contractors and tenant organizations are required to conform to USAF, state and local regulations. The application of pesticides is carefully controlled and monitored. Irrigation applications are delayed after sprayings. Weather conditions are taken into consideration before any pesticides are used. Landscape designs for the base encourage use of xeriscape plants and insect- or disease-resistant plant varieties to reduce use of pesticides, fertilizer, and water for irrigation.

A narrative pest management plan is required by DoD Instruction 4150.07 and as outlined in the Armed Forces Pest Management Board's Technical Guides NO. 18 for installations conducting more than 0.5 work-years of pest management work annually. It describes pest operations and management, health and safety, regulatory compliance, and environmental shop only.

All pesticides applied on base are applied IAW the USEPA pesticide label. Chemicals not listed in Integrated Pest Management Information System master inventory must be approved by IPM coordinator and then verified through AFCEC/Environmental Directorate Operations (CZO) coordinator. Very little pesticide waste is generated. Excess pesticides are used for a later application or will be turned in to supply for redistribution. Container disposal is IAW label recommendations. Contaminated pesticides will be disposed of IAW the base Hazardous Waste Management Plan.

Operating sites include ground and structures on Sheppard AFB, Frederick Auxiliary airfield and SRA. Pest management functions are prioritized based on military readiness, health or disease impact, damage to structures, other economic loss, and morale.

Base Entomology in conjunction with the NRM use pesticides or integrated pest management techniques to control undesirable vegetation, vegetation and urban forest pests, and animal damage. For more information, see the IPMP stored at Bldg. 1402, 82 CES/CEIE or on eDash.

Pesticide label directions regarding environmentally sensitive areas are strictly enforced. Prevention of harm to T&E species and environmentally sensitive areas are coordinated through the NRM. Sensitive Areas on Sheppard AFB where pesticide application could have adverse environmental impact include any area where restricted-use pesticides are considered for application, wetland areas (41.82 acres), and any area where T&E species occur. No aerial pesticide applications are anticipated. Pesticide application in sensitive areas will have appropriate controls for pesticide drift, including inspection of sensitive areas and determination of the wind speed and direction. Sensitive areas requiring these controls would include the following operations.

- Operations involving more than 640 Acres.
- Operations in areas with federal and state listed T&E species
- Operations involving Aerial Application.
- Operations involving Designated Noxious Weeds.
- Operations involving Experimental-Use Permits.
- Operations involving Environmentally Sensitive Areas.

## **7.12 Bird/Wildlife Aircraft Strike Hazard (BASH) Installation Supplement**

### *Applicability Statement*

This section applies to USAF 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*

The following outlines general BASH considerations. For detailed information and guidance, see the installation BASH plan, provided as an associated plan in Tab 2. The BASH plan takes a multi-tiered management approach to reducing bird and wildlife strikes. BASH includes recording and reporting significant wildlife sightings, uses vegetation management as a passive control to prevent birds from nesting and foraging by altering the landscape to indirectly deter birds from the airfield and surrounding areas, and active controls to displace or depredate birds and wildlife that pose a potential strike hazard. The INRMP, IPMP, and BASH plans are designed to be mutually supportive.

This INRMP provides recommendations that follow AFI 91-202, USAF Mishap Prevention Program. To avoid attracting birds to airfields, vegetation (e.g. tall grass) is controlled, reducing the attractiveness of the area as potential habitat. The airfield should be mowed to a height between 7 and 14 inches. Grasses shorter than 7 inches provide suitable foraging habitat to avian species, and grasses over 14 inches provide suitable nesting habitat for certain species and may attract rodents, which, in turn, attract raptors. As necessary, pesticides may be required to reduce the number of pest and rodent species that are attractive to wildlife. Vegetation management should also include species specific management to prevent weeds from outcompeting desirable grasses. Another major attractant to avian species are bare areas. Seeding is necessary to prevent these bare areas from occurring. The BASH plan provides specific vegetation management methods to prevent attracting wildlife to the airfield.

Waterfowl and shorebirds are often attracted to water ponds. Birds use the water for resting and sometimes as a food source. Ponds designed with steep sides and little surface area reduce the attraction to birds. Ponds should be located as far from the runway as possible and be placed so that birds moving from off-base areas to the ponds do not cross runways. The BASH plan provides background and deterrent information for species with the potential to cause strike hazards.

The BASH plan supplies guidelines for dispersal and depredation of wildlife that may threaten flight safety. Active controls include dispersal methods such as sudden loud noises and depredation. Depredation may be used in conjunction with non-lethal control methods. Multiple control methods comprise an effective BASH plan.

#### *7.12.1 Avian Species Control Methods*

Avian species also may be pests by building nests in undesirable areas such as within hangars or within buildings that are in mid-construction. Avian species may carry diseases that are communicable to humans via contact with fecal material. Cleaning up fecal material requires special precautions to prevent spread of disease. Birds should be excluded from areas where nest building could be a nuisance or a public health hazard. Bird exclusion and fecal material removal is the responsibility of the facility manager.

Exclusion of birds from facilities and construction projects must occur to prevent birds from building nests. Bird netting is the most common exclusion tool; however, it is up to the user to fund the purchase of the netting to allow the netting to be installed under a contract. During construction, efforts should be taken to prevent making areas attractive for perches or nests and bird friendly building practices should be considered, such as not utilizing large glass windows that may result in bird collisions.

If bird nests are established and fecal material builds up, public health recommends the following practices to facilitate clean up.

- Use appropriate personal protective equipment such as a mask, eye protection, and gloves.
- Clean the area when wet (never dry), by wetting the area with a ten percent bleach solution. (Bleach must be approved via Enterprise Environmental, Safety & Occupational Health Management Information System).
- Wash hands with soap and water thoroughly after cleaning.

### **7.13 Coastal Zone and Marine Resources Management Installation Supplement**

#### *Applicability Statement*

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

#### *Program Overview/Current Management Practices*

There are no coastal resources on Sheppard AFB or any of the annexes; therefore, there are no management plans for these resources.

### **7.14 Cultural Resources Protection Installation Supplement**

#### *Applicability Statement*

This section applies to USAF 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 prescribes procedures and guidance for the conservation, maintenance and protection of cultural resources and facilities, compatible with the military mission and IAW DoD policy. For detailed information please refer to Sheppard AFB ICRMP at Bldg. 1402, 82 CES/CEIE or on eDash, and provided as an associated plan in Tab 3.

Cultural Resources refers to physical remains of any pre-historical or historical district, site, building, structure, or object significant in American history, architecture, archeology, engineering, or culture on Sheppard AFB.

Sheppard AFB has completed four cultural resource surveys and includes data for the base proper and SRA. These surveys were conducted in 1993, 1994, 2002, and 2012.

The survey in 1993 "Cultural Resources Assessment of Sheppard Air Force Base" concluded that no archeological resources were identified and no further archeological investigations are required.

If archeological materials are uncovered during construction, all work is halted and the cultural resources manager (CRM) notifies State Historic Preservation Officer (SHPO) and any other appropriate parties. Six tribal groups are identified as occupying the Sheppard AFB vicinity and would be contacted if remains were unearthed. These include the Comanche, Wichita, Kiowa, Apache, Kickapoo, and Tonkawa tribes.

During surveys of cultural resources, three facilities have been deemed eligible for the National Register of Historic Places (NRHP). This includes Bldg. 2130 (the Heritage Center or "little Adobe"), Bldg. 2560 (the SAC molehole), and the Alert Apron (also known as the SAC Ramp).

Other than the aforementioned, the Sheppard AFB completed cultural resource surveys indicate that there are no known historical or pre historical archeological sites, and the probability of sites existing is low.

All USAF Forms 332/DSW requiring maintenance or repair require review and coordination by the CRM. Prior to accomplishing any work on cultural resources, the CRM determines whether proposed action could result in a change of character on property in question. In the event of potential effects, the CRM assesses what information is needed and it is forwarded for review and comment to SHPO. SHPO has 30-day review period in each step of consultation process. From initial SHPO review, the consultation process follows the basic steps of Section 106 Review.

### **7.15 Public Outreach Installation Supplement**

#### *Applicability Statement*

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

#### *Program Overview/Current Management Practices*

Sheppard AFB conducts public outreach occasionally with local schools and Wichita County Extension Service in presenting educational programs to different age groups. Potential opportunities may exist with the elementary school on base to install pollinator gardens on the grounds and to use the gardens for education and outreach with students and base personnel. One such outreach activity could include designing an annual pollinator event to occur on National Public Lands Day and/or Earth Day. The installation could also consider coordinating with the Texas Master Naturalist Program, which has a local Rolling Plains Chapter. This group could host education and outreach events on the installation and/or host training classes for those interested in joining the group as a Master Naturalist.

### **7.16 Climate Change Vulnerabilities Installation Supplement**

#### *Applicability Statement*

This section applies to USAF installations that have identified climate change risks, vulnerabilities, and adaptation strategies using authoritative region-specific climate science, climate projections, and existing tools. This section **IS** applicable to this installation.

#### *Program Overview/Current Management Practices*

Vulnerability to climate change generally refers to the extent to which a species, habitat, ecosystem, place, or project is susceptible to harm from climate change impacts (Stein et al. 2014). By this definition, species and systems that are more vulnerable will experience greater harm, while less vulnerable species and systems will be less affected or even benefit from climate change. Based on installation-specific climate change projections (CEMML 2019), Sheppard AFB may be vulnerable to the following changes:

- Increases in temperature, with TAVE projections of up to 4.9 °F above the historical baseline and substantially more HOTDAYS.
- Changes in PRECIP, with projections across all scenarios showing some level of increase in average annual precipitation, although the results are variable between scenarios and months of the year.
- Shifts in ecological systems and associated vegetation driven by increases in temperature, seasonal shifts, and potential changes in drought and flooding patterns.
- Indirect threats to fish and wildlife, such as shifts in the temporal availability of food resources for migratory birds, loss of habitat due to changes in vegetation, and increases in non-native invasive species.
- Greater likelihood of outbreaks of infectious diseases such as rabies and mosquito-borne West Nile virus, which can lead to increased avian mortality and impact human health.
- Lower dissolved oxygen in lentic systems that could impair habitat quality for aquatic wildlife and increase algal blooms.
- Reduced habitat for T&E species.
- Impacts on the mission, including a need for increased maintenance due to substantially more HOTDAYS throughout the year, water stress due to more frequent drought, greater financial burden from extreme weather events, and potential disruption to the supply chains needed for maintenance materials and infrastructure repairs.
- If additional species are listed at the federal or state level, it may lead to an increased regulatory burden to survey for and manage newly listed species if they are present on the base.

The primary resource requirements for the sustainment of the military mission at Sheppard AFB are air space and flat topography for training. The projected changes in temperature and precipitation will have no effect on the topography of the area or the amount of air space available. However, the climate at Sheppard AFB is expected to get hotter, which could have indirect impacts on the mission such as vegetation shifts and species migrations, leading to an increased regulatory environment. Increases in temperature and wind velocity could lead to unsafe environmental conditions for equipment launch, increased dust generation effecting equipment and visibility, and potential wind damage to vital infrastructure (DoD 2014, Sydemann et al. 2014).

Climate-driven changes in extreme weather events cannot be modeled due to limitations associated with the current methodologies; however, climate change is already causing more extreme weather events in many regions, including droughts and floods that surpass historical regimes. In addition to direct damages caused by these storms, they also have the potential to impact natural resources by increasing soil erosion rates and causing heightened physiological stress in plants and animals (Stein et al. 2019).

Climate change can impact military operations by changing how the DoD and its installations maintain readiness and provide support, and may also lead to a loss of future training areas that may be needed in the case of a changing geopolitical landscape and/or base realignment. The DoD Climate Adaptation Plan (2021) states that climate change should be considered in all operations and planning. Adapting to climate change will require that installations assess current operations and procedures to identify gaps that may increase vulnerability to changes in climate and its indirect impacts. Several resources are available to guide climate change adaptation within the DoD (Stein et al. 2019). Climate change adaptation is required to ensure that the DoD can conduct its operations under changing climate conditions while also protecting the natural and built systems essential to the success of the DoD's mission (DoD 2021).

## **7.17 Geographic Information Systems (GIS) Installation Supplement**

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

Sheppard AFB is currently building a GIS database to include natural/cultural resources, other environmental resources and the base comprehensive planning process. This process is still awaiting funding.

## **8 MANAGEMENT GOALS AND OBJECTIVES**

The installation establishes long term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize USAF 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**

#### **GOAL 1: PROVIDE DIRECT SUPPORT AND COORDINATION SERVICES TO SHEPPARD AFB BY UPDATING THE INRMP AS NEEDED, MAINTAINING NATURAL RESOURCES DATABASES, AND SUPPORTING A RESPONSIVE AND PROACTIVE NATURAL RESOURCE STAFF.**

- ***OBJECTIVE 1.1: As required by the Sikes Act (16 U.S.C. 670a) and DODI 4715.03, every five years determine if an update or revision of the INRMP is needed based on management priorities and any changes in environmental conditions or the mission of Sheppard AFB.***
  - Project 1.1.1: Determine if an update or revision is needed and make changes to the INRMP as required.
  - Project 1.1.2: Update component plans, tabs, and appendices as needed, including outdated plans such as the 2016 WFMP.
- ***OBJECTIVE 1.2: Conduct annual external stakeholder review and update the INRMP as needed based on review findings.***
  - Project 1.2.1: Conduct annual review with USFWS and TPWD and utilize stakeholder comments to update the INRMP
  - Project 1.2.2: Incorporate any new biological survey data from the installation into the INRMP as part of the annual review process.
  -
- ***OBJECTIVE 1.3: Provide adequate training and professional development to support knowledgeable natural resources staff.***
  - Project 1.3.1: Review the eDASH Natural Resource Training Matrix on an annual basis and ensure that all natural resources staff can access course material relevant to their duties.
- ***OBJECTIVE 1.4: Use GeoBase system to collect, store, and maintain ecological data for use in natural resources management planning.***
  - Project 1.4.1: Continue transition of installation information into the GeoBase system.

#### **GOAL 2: MAINTAIN GROUNDS AND NATIVE VEGETATION TO PROVIDE FUNCTIONAL ECOSYSTEMS FOR NATIVE SPECIES AND SERVE THE PRESENT AND FUTURE NEEDS OF THE SHEPPARD AFB MISSION AND PERSONNEL.**

- ***OBJECTIVE 2.1: Maximize the benefits of improved and semi-improved areas and improve walkability by providing attractive landscaping while supporting the "collapse to the core" initiative within the Vision 2030 Plan.***
  - Project 2.1.1: Evaluate improved and semi-improved sites slated for decommissioning in the Vision 2030 Plan for their potential to reduce urban heat island effect if converted to park areas or aesthetically pleasing unimproved

areas of native habitat, including pollinator gardens or native plant display areas.

- Project 2.1.2: Complete an urban tree survey and use the resulting GIS tree database to develop an urban forestry management plan that emphasizes drought-tolerant, native species, provides for sufficient shade tree coverage of pedestrian areas, and reduces the effects of heat sinks and impenetrable surfaces such as paved or graveled areas. Include analysis of potential effects of increasing temperatures on relevant tree species and their pests.
- Project 2.1.3: Evaluate the need for a tree inventory and forest health survey at SRA to determine sustainability of forest resources and recreational opportunities as temperature and potential for drought increases due to climate change.
- Project 2.1.4: Coordinate with Pest Management to review the Integrated Pest Management Plan and ensure that the pest management products and practices minimize harm to pollinators in line with U.S. Air Force Pollinator Conservation Reference Guide, Section 3 (USFWS 2017).
- **OBJECTIVE 2.2: Monitor wetlands on Sheppard AFB and SRA to sustain valuable aquatic resources and leverage their benefits to the mission and wellbeing of USAF personnel.**
  - Project 2.2.1: Establish a wetland monitoring program to evaluate wetland health and collect baseline water quality data at SRA and Sheppard AFB. Determine a sampling frequency that will allow water quality trend detection as temperatures and drought potential increase.
- **OBJECTIVE 2.3: Manage native vegetation and invasive plant species at Sheppard AFB and SRA within the constraints of the military mission and available resources.**
  - Project 2.3.1: Incorporate the 2022 vegetation map into the INRMP and evaluate the need for vegetation monitoring to detect trends in vegetation communities that may change as temperatures and drought potential increase.
  - Project 2.3.2: Based on presence of suitable habitat on Sheppard AFB and SRA, evaluate the need for a rare plant survey focusing on six species ranked by TPWD as species of greatest conservation need that have been documented in Wichita or Grayson County and may or may not have suitable habitat on the base or SRA.
  - Project 2.3.3: Evaluate the potential for conducting prescribed burns for vegetation resource benefit and Texas horned lizard habitat improvement in grassland and mesquite habitats. Prioritize sites for burning to achieve a mosaic of habitats and develop a plan for rotational burning at an appropriate interval to maximize benefit to native grasses, presence of thermal refugia such as shrubs, and harvester ant habitat.
  - Project 2.3.4: Continue to restore cheatgrass-invaded sites and bare areas to native grassland with herbicide application and follow-up reseeding with native, BASH-friendly grasses at a rate of 4 acres per year.
  - Project 2.3.5: Develop an invasive plant species program that encompasses regular surveys, control of existing infestations, and restoration of control sites to native-dominated vegetation.
  - Project 2.3.6: Conduct a thorough invasive plant species survey of Sheppard AFB, SRA, and Frederick Airfield and develop an Invasive Species Management sub-plan that prioritizes species and infestations for control within the constraints of budget and personnel available on a yearly basis. Ensure that the plan prioritizes pollinator-friendly control methods, where possible.
  - Project 2.3.7: Annually budget for supplies and personnel to accomplish invasive plant species surveys, control efforts, and follow up restoration.

### **GOAL 3: PROTECT, CONSERVE, AND MANAGE FISH AND WILDLIFE, INCLUDING TREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN, FOR FUTURE GENERATIONS WITHIN THE CONSTRAINTS OF THE MILITARY MISSION.**

- **OBJECTIVE 3.1: Manage wildlife using a systematic approach that includes inventory, monitoring, management, and assessment.**
  - Project 3.1.1: Conduct surveys on Sheppard AFB and SRA that focus on detecting T&E species and SOC, specifically the Texas kangaroo rat, the Texas horned lizard, and the timber rattlesnake.
  - Project 3.1.2: Conduct general wildlife surveys of small mammals, birds, reptiles, amphibians, and insects on Sheppard AFB and SRA every 5-10 years.
  - Project 3.1.3: Conduct acoustic bat surveys in appropriate habitats on Sheppard AFB and SRA
- **OBJECTIVE 3.2: Ensure a sustainable population of Texas horned lizard on Sheppard AFB.**
  - Project 3.2.1: Identify locations of Texas horned lizards and their suitable habitat from the results of Project 3.1.1.
  - Project 3.2.2: Conduct surveys of harvester ant populations on Sheppard AFB, including Texas horned lizard occupied and suitable habitat, and in airfield restoration areas to determine the effects of herbicide application on ant populations.

- **OBJECTIVE 3.3: Support and enhance Texas pollinators, especially those listed as SGCN, where compatible with the mission.**
  - Project 3.3.1: Conduct a survey for American bumblebee, variable bumblebee, and migrating monarchs on the main base and SRA.
  - Project 3.3.2: Identify areas on the installation where habitats could be supplemented with native flowering plants beneficial to pollinators.

**GOAL 4: PROVIDE QUALITY OUTDOOR RECREATION EXPERIENCES IN SUPPORT OF THE OVERALL QUALITY OF LIFE FOR AIRFORCE PERSONNEL.**

- **OBJECTIVE 4.1: Provide maximum recreational opportunities within the limits of the mission for those eligible to use base facilities.**
  - Project 4.1.1: Replace cabins at SRA for guest use, as funding allows.
  - Project 4.1.2: Coordinate with TPWD to host hunter education classes in association with the skeet range on the installation.
  - Project 4.1.3: Partner with installation-adjacent Field and Stream club to offer one new outdoor recreation opportunity for the installation.
  - Project 4.1.4: Evaluate the possibility of sponsoring a rattlesnake training for dogs to improve the safety of those dogs that are with personnel recreating since rattlesnakes have been observed at the SRA.
- **Objective 4.2: Prepare ponds in Wind Creek Park (old golf course) for fish stocking to create fishing opportunities on the installation.**
  - Project 4.2.1: Conduct baseline water quality sampling in ponds to determine suitability for stocking.
  - Project 4.2.2: Conduct survey of existing aquatic community in ponds to determine suitability for stocking.
  - Project 4.2.3: Establish a water temperature monitoring plan that samples frequently enough to detect important thermal thresholds in the pond as the climate continues to warm.
  - Project 4.2.4: Create a plan for installing plantings around ponds to provide shade to help reduce water temperatures on hot days if such habitat can be designed to not increase BASH risk.
- **Objective 4.3: Protect and preserve natural resources for future generations through education and outreach.**
  - Project 4.3.1: Work with elementary school on the installation, or other areas as appropriate, to install pollinator habitats.
  - Project 4.3.2: Design annual pollinator outreach activity to occur on National Public Lands Day.
  - Project 4.3.3: Coordinate with Texas Master Naturalist Program to host education and outreach opportunities on the installation and/or host training classes for the Rolling Plains Chapter.

**9 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS**

**9.1 Natural Resources Management Staffing and Implementation Installation Supplement**

*Work Plans*

Several natural resource programs are to be conducted in-house by base natural resource personnel. Other programs such as sensitive species studies and invasive plant removal will be conducted under contract. Once the survey is completed, other projects for control and removal will be identified and a timeframe for implementation developed. This includes identifying funding and budget requirements, and development of a priority list.

*Natural Resources Management Staffing*

Sheppard AFB maintains trained natural resource personnel to implement the base INRMP. There are no additional staffing requirements or deficiencies at this time.

**9.2 Monitoring INRMP Implementation Installation Supplement**



Annually (ninety days from the date of signature), the INRMP will be reviewed and results briefed at the ESOHC. The plan will be forwarded to the USFWS and the TPWD for review and comment. Once this review is completed, AFCEC/CZOW will be notified of the review and any changes made to the INRMP.

Natural resource personnel will brief the Planning Subcommittee annually or as needed on the INRMP programs and projects implemented and status if projects are on-going.

### **9.3 Annual INRMP Review and Update Requirements Installation Supplement**

The INRMP requires annual review, IAW DoDI 4715.03 and AFMAN 32-7003, to ensure the achievement of mission goals, verify the implementation of projects, and establish any necessary new management requirements. This process involves installation natural resources personnel and external agencies working in coordination to review the INRMP. If the installation mission or any of its natural resources management issues change significantly after the creation of the original INRMP, a major revision to the INRMP is required. The need to accomplish a major revision is normally determined during the annual review with USFWS, the appropriate state, and National Oceanic and Atmospheric Administration (NOAA) (if required). The NRM/POC 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.

The USFWS, the state, NOAA (if applicable), and the NRM/Section conduct an Annual INRMP Review Meeting. This meeting takes place in person with respective representatives for each agency. Individuals may telephone or video call if they cannot attend in person. During this meeting the NRM/Section 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, etc. All parties review the INRMP and begin preliminary collaborative work on updating the INRMP (new policies, procedures, impacts, mitigations, etc.) as applicable.

#### *Installation Supplement*

Integrated natural resource management and planning is an ongoing process at Sheppard AFB. This INRMP serves as a reference document and management tool that is expected to evolve as mission requirements, environmental and regulatory conditions, and natural resources management programs and initiatives evolve.

Sheppard AFB is committed to frequent document reviews to monitor progress of planned action implementation, adjust where necessary and ensure the continued usefulness of this plan. The involvement of a cross section of land users and managers and resource agencies in the ongoing development, review and implementation of this INRMP also helps ensure the continued integration and coordination of natural resources management programs with other base and regional plans, programs and decision making processes.

## **10 ANNUAL WORK PLANS**

The INRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe for implementation is provided (as applicable), as well as the appropriate funding source and priority for implementation. The work plans provide all the necessary information for building a budget within the USAF 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 USAF is non-compliant with the Sikes Act; or that it is specifically tied to an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for Endangered Species Act (ESA) Sec 4(a)(3)(B)(i) critical habitat exemption.
- Medium: Project supports a specific INRMP goal and objective and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112, *Exotic and Invasive*

*Species*. 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 is not directly tied to specific compliance within the proposed year of execution.

**Installation Supplement**

**Table 10-1. Annual Work Plans (Work Plans should extend out to current year plus four additional years, 2022-2026), Sheppard AFB, Texas.**

Resource Category	Goal	Objective	Occurrence	Fiscal Year	Priority Level	Project Number	Description
Natural Resource Program Support	Goal 1. Provide direct support and coordination services to Sheppard AFB by updating the INRMP as needed, maintaining natural resource databases, and supporting a responsive and proactive natural resource staff.	1.1 As required by the Sikes Act (16 U.S.C. 670a) and DODI 4715.03, every five years determine if an update or revision of the INRMP is needed based on management priorities and any changes in environmental conditions or the mission of Sheppard AFB.	Every 5 years	2022-2026	High	1.1.1	Determine whether an update or revision is needed and make changes to the INRMP as required.
Natural Resource Program Support	Goal 1	1.1	Annually	2022-2026	Medium	1.1.2	Update component plans, tabs, and appendices as needed, including outdated plans such as the 2016 WFMP.

Natural Resource Program Support	Goal 1	1.2 Conduct annual external stakeholder review and update the INRMP as needed based on review findings.	Annually	2022-2026	Medium	1.2.1	Conduct annual review with USFWS and TPWD and utilize stakeholder comments to update the INRMP.
Natural Resource Program Support	Goal 1	1.2	Annually	2022-2026	Medium	1.2.2	Incorporate any new biological survey data from the installation into the INRMP as part of the annual review process.
Natural Resource Program Support	Goal 1	1.3 Provide adequate training and professional development to support knowledgeable natural resources staff.	Annually	2022-2026	Medium	1.3.1	Review the eDASH Natural Resource Training Matrix on an annual basis and ensure that all natural resources staff can access course material relevant to their duties.
Natural Resource Program Support	Goal 1	1.4 Use GeoBase system to collect, store, and maintain ecological data for use in natural resources management planning.	Annually	2022-2026	Medium	1.4.1	Continue transition of installation information into the GeoBase system.
Maintenance of Grounds and Native Vegetation	Goal 2. Maintain grounds and native vegetation to provide functional ecosystems for native species and serve the present and future needs of the Sheppard AFB mission and personnel.	2.1 Maximize the benefits of improved and semi-improved areas and improve walkability by providing attractive landscaping while supporting the "collapse to the core" initiative within the Vision 2030 Plan.	Annually	2022-2026	Medium	2.1.1	Evaluate improved and semi-improved sites slated for decommissioning in the Vision 2030 Plan for their potential to reduce urban heat island effect if converted to park areas or aesthetically pleasing unimproved areas of native habitat, including pollinator gardens or native plant display areas.

Maintenance of Grounds and Native Vegetation	Goal 2	2.1	Every 5 years	2022-2026	Medium	2.1.2	Complete an urban tree survey and use the resulting GIS tree database to develop an urban forestry management plan that emphasizes drought-tolerant, native species, provides for sufficient shade tree coverage of pedestrian areas, and reduces the effects of heat sinks and impenetrable surfaces such as paved or graveled areas. Include analysis of potential effects of increasing temperatures on relevant tree species and their pests.
Maintenance of Grounds and Native Vegetation	Goal 2	2.1	Every 5 years	2022-2026	Medium	2.1.3	Evaluate the need for a tree inventory and forest health survey at SRA to determine sustainability of forest resources and recreational opportunities as temperature and potential for drought increases due to climate change.

Maintenance of Grounds and Native Vegetation	Goal 2	2.1	Annually	2022-2026	Medium	2.1.4	Coordinate with Pest Management to review the Integrated Pest Management Plan and ensure that the pest management products and practices minimize harm to pollinators in line with U.S. Air Force Pollinator Conservation Reference Guide, Section 3 (USFWS 2017).
Maintenance of Grounds and Native Vegetation	Goal 2	2.2 Monitor wetlands on Sheppard AFB and SRA to sustain valuable aquatic resources and leverage their benefits to the mission and wellbeing of USAF personnel.	Annually	2022-2026	High	2.2.1	Establish a wetland monitoring program to evaluate wetland health and collect baseline water quality data at SRA and Sheppard AFB. Determine a sampling frequency that will allow water quality trend detection as temperatures and drought potential increase.
Maintenance of Grounds and Native Vegetation	Goal 2	2.3 Manage native vegetation and invasive plant species at Sheppard AFB and SRA within the constraints of the military mission and available resources.	Annually	2022-2026	High	2.3.1	Incorporate the 2022 vegetation map into the INRMP and evaluate the need for vegetation monitoring to detect trends in vegetation communities that may change as temperatures and drought potential increase.

Maintenance of Grounds and Native Vegetation	Goal 2	2.3	Annually	2022-2026	Medium	2.3.2	Based on presence of suitable habitat on Sheppard AFB and SRA, evaluate the need for a rare plant survey focusing on six species ranked by TPWD as species of greatest conservation need that have been documented in Wichita or Grayson County and may or may not have suitable habitat on the base or SRA.
Maintenance of Grounds and Native Vegetation	Goal 2	2.3	Annually	2022-2026	Medium	2.3.3	Evaluate the potential for conducting prescribed burns for vegetation resource benefit and Texas horned lizard habitat improvement in grassland and mesquite habitats. Prioritize sites for burning to achieve a mosaic of habitats and develop a plan for rotational burning at an appropriate interval to maximize benefit to native grasses, presence of thermal refugia such as shrubs, and harvester ant habitat.
Maintenance of Grounds and Native Vegetation	Goal 2	2.3	Annually	2022-2026	Medium	2.3.4	Continue to restore cheatgrass-invaded sites and bare areas to native grassland with herbicide application and follow-up reseeding with native, BASH-friendly grasses at a rate of 4 acres per year.

Maintenance of Grounds and Native Vegetation	Goal 2	2.3	Every 5 years	2022-2026	Medium	2.3.5	Develop an invasive plant species program that encompasses regular surveys, control of existing infestations, and restoration of control sites to native-dominated vegetation.
Maintenance of Grounds and Native Vegetation	Goal 2	2.3	Every 5 years	FY2024	Medium	2.3.6	Conduct a thorough invasive plant species survey of Sheppard AFB, SRA, and Frederick Airfield and develop an Invasive Species Management sub-plan that prioritizes species and infestations for control within the constraints of budget and personnel available on a yearly basis. Ensure that the plan prioritizes pollinator-friendly control methods, where possible.
Maintenance of Grounds and Native Vegetation	Goal 2	2.3	Annually	2022-2026	Medium	2.3.7	Annually budget for supplies and personnel to accomplish invasive plant species surveys, control efforts, and follow up restoration.

Fish and Wildlife and threatened and endangered species and species of concern	Goal 3. Protect, conserve, and manage fish and wildlife, including threatened and endangered species and species of concern, for future generations within the constraints of the military mission.	3.1 Manage wildlife using a systematic approach that includes inventory, monitoring, management, and assessment.	Annually	2022-2026	Medium	3.1.1	Conduct surveys on Sheppard AFB and SRA that focus on detecting T&E species and SOC, specifically the Texas kangaroo rat, the Texas horned lizard, and the timber rattlesnake.
Fish and Wildlife and threatened and endangered species and species of concern	Goal 3	3.1	Every 5 years	2022-2026	Medium	3.1.2	Conduct general wildlife surveys of small mammals, birds, reptiles, amphibians, and insects on Sheppard AFB and SRA every 5-10 years.
Fish and Wildlife and threatened and endangered species and species of concern	Goal 3	3.1	Every 5 years	FY2024	Medium	3.1.3	Conduct acoustic bat surveys in appropriate habitats on Sheppard AFB and SRA.
Fish and Wildlife and threatened and endangered species and species of concern	Goal 3	3.2 Ensure a sustainable population of Texas horned lizard on Sheppard AFB.	Annually	2022-2026	High	3.2.1	Identify locations of Texas horned lizards and their suitable habitat from the results of Project 3.1.1.



Fish and Wildlife and threatened and endangered species and species of concern	Goal 3	3.2	Every 5 years	FY2023	High	3.2.2	Conduct surveys of harvester ant populations on Sheppard AFB, including Texas horned lizard occupied and suitable habitat, and in airfield restoration areas to determine the effects of herbicide application on ant populations.
Fish and Wildlife and threatened and endangered species and species of concern	Goal 3	3.3 Support and enhance Texas pollinators, especially those listed as SGCN, where compatible with the mission.	Every 5 years	FY2023	High	3.3.1	Conduct a survey for American bumblebee, variable bumblebee, and migrating monarchs on the main base and SRA.
Fish and Wildlife and threatened and endangered species and species of concern	Goal 3	3.3	Every 5 years	FY2023	High	3.3.2	Identify areas on the installation where habitats could be supplemented with native flowering plants beneficial to pollinators.
Outdoor Recreation	Goal 4. Provide quality outdoor recreation experiences in support of the overall quality of life for USAF personnel.	4.1 Provide maximum recreational opportunities within the limits of the mission for those eligible to use base facilities.	Every 5 years	2022-2026	Low	4.1.1	Replace cabins at SRA for guest use, as funding allows.
Outdoor Recreation	Goal 4	4.1	Annually	2022-2026	Low	4.1.2	Coordinate with TPWD to host hunter education classes in association with the skeet range on the installation.

Outdoor Recreation	Goal 4	4.1	Annually	2022-2026	Low	4.1.3	Partner with installation-adjacent Field and Stream club to offer one new outdoor recreation opportunity for the installation.
Outdoor Recreation	Goal 4	4.1	Every 5 years	2022-2026	Low	4.1.4	Evaluate the possibility of sponsoring a rattlesnake training for dogs to improve safety for personnel recreating since rattlesnakes have been observed at the SRA.
Outdoor Recreation	Goal 4	4.2 Prepare ponds in Wind Creek Park (old golf course) for fish stocking to create fishing opportunities on the installation.	Annually	2022-2026	High	4.2.1	Conduct baseline water quality sampling in ponds to determine suitability for stocking.
Outdoor Recreation	Goal 4	4.2	Annually	2022-2026	High	4.2.2	Conduct survey of existing aquatic community in ponds to determine suitability for stocking.
Outdoor Recreation	Goal 4	4.2	Annually	2022-2026	High	4.2.3	Establish a water temperature monitoring plan that samples frequently enough to detect important thermal thresholds in the pond as the climate continues to warm.
Outdoor Recreation	Goal 4	4.2	Every 5 years	2022-2026	Medium	4.2.4	Create a plan for installing plantings around ponds to provide shade to help reduce water temperatures on hot days if such habitat can be designed to not increase BASH risk.

Outdoor Recreation	Goal 4	4.3 Protect and preserve natural resources for future generations through education and outreach.	Annually	2022-2026	High	4.3.1	Work with elementary school on the installation, or other areas as appropriate, to install pollinator habitats.
Outdoor Recreation	Goal 4	4.3	Annually	2022-2026	High	4.3.2	Design annual pollinator outreach activity to occur on National Public Lands Day.
Outdoor Recreation	Goal 4	4.3	Biannually	FY2023-2025	Medium	4.3.3	Coordinate with Texas Master Naturalist Program to host education and outreach opportunities on the installation and/or host training classes for the Rolling Plains Chapter.

**\*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, Conservation Law Enforcement Officer (CLEO)	Outsourced Environmental Services, CN	Mgt, Invasive Species	Recordkeeping, Other	Interagency/Intraagen Government, Sikes Act
Outsourced Environmental Services, CN	Supplies, CN	Mgt, Nuisance Wildlife	Outreach	Outsourced Environmental Service CN
Supplies, CN	Supplies, CN, CLEO	Interagency/Intraagency, Government, Sikes Act		
Supplies, CN, CLEO	Vehicle Leasing, CN	Interagency/Intraagency, Government, Sikes Act, CLEO		
Equipment Purchase / Maintain, CN		Outsourced Environmental Services, CN		

Vehicle Leasing, CN		Supplies, CN		
Vehicle Fuel & Maintenance, CN		Supplies, CN, CLEO		
Mgt, Wildland Fire		Equipment Purchase / Maintain, CN		
Plan Update, 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 REFERENCES**

### ***Standard References*** (Applicable to all USAF installations)

- [AFMAN 32-7003, Environmental Conservation](#)
- [Sikes Act](#)
- [eDASH Natural Resources Program Page](#)
- [Natural Resources Playbook](#)
- [DoDI 4715.03, Natural Resources Conservation Program](#)
- [AFI 32-1015, Integrated Installation Planning](#)
- [AFI 32-10112, Installation Geospatial Information and Services \(IGI&S\)](#)

### **Installation Supplement**

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## **12 ACRONYMS**

***Standard Acronyms*** (Applicable to all USAF installations)

- [eDASH Acronym Library](#)
- [Natural Resources Playbook – Acronym Section](#)
- [U.S. EPA Terms & Acronyms](#)

## **Installation Supplement**

### 12.1 Standard Acronyms (Applicable to all USAF installations)

- [eDASH Acronym Library](#)
- [Natural Resources Playbook—Acronym Section](#)
- [U.S. EPA Terms & Acronyms](#)

### 12.2 Installation Acronyms

Acronym	Definition
80 FTW	80th Flying Training Wing
82 CES/CEIE	82D Civil Engineer Squadron/Environmental Element
82 TRW	82d Training Wing
AETC	Air Education and Training Command
AF	Air Force (also USAF)
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AICUZ	Air Installation Compatible Use Zone
BASH	Bird/Wildlife Aircraft Strike Hazard
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
Bldg.	Building
°C	Degrees centigrade
CECOS	Civil Engineer Corps Officers School
CEMML	Center for Environmental Management of Military Lands
CLEO	Conservation Law Enforcement Officer
CRM	Cultural Resources Manager
CWA	Clean Water Act
CZ	Environmental Directorate
CZC	Environmental Directorate, Compliance Program Management Office
CZO	Environmental Directorate, Operations



<b>CZOW</b>	Environmental Directorate, Operations Western Region
<b>CZT</b>	Environmental Directorate, Technical Support
<b>dB</b>	Decibel
<b>DBH</b>	Diameter at Breast Height
<b>DoD</b>	Department of Defense
<b>DoDI</b>	Department of Defense Instruction
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>EO</b>	Executive Order
<b>ESA</b>	Endangered Species Act
<b>ESOHC</b>	Environmental, Safety, and Occupational Health Council
<b>°F</b>	Degrees Fahrenheit
<b>FEMA</b>	Federal Emergency Management Agency
<b>FSS</b>	Force Support Squadron
<b>GIS</b>	Geographic Information System
<b>IAW</b>	In Accordance With
<b>ICRMP</b>	Integrated Cultural Resources Management Plan
<b>INRMP</b>	Integrated Natural Resources Management Plan
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IPMP</b>	Integrated Pest Management Plan
<b>IPM</b>	Integrated Pest Management
<b>IRP</b>	Installation Restoration Program
<b>MBTA</b>	Migratory Bird Treaty Act
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NCAR-CCSM</b>	National Center for Atmospheric Research-Community Climate System Model
<b>NRCS</b>	Natural Resources Conservation Service
<b>NRHP</b>	National Register of Historic Places
<b>NRM</b>	Natural Resources Manager
<b>POC</b>	Point of Contact
<b>PRECIP</b>	Average Annual Precipitation

<b>RCP</b>	Representative Concentration Pathway
<b>SHPO</b>	State Historic Preservation Officer
<b>SGCN</b>	Species of Greatest Conservation Need
<b>SOC</b>	Species of Concern
<b>SRA</b>	Sheppard Recreation Annex
<b>TAVE</b>	Average Annual Temperature
<b>TMAX</b>	Average Annual Maximum Temperature
<b>TMIN</b>	Average Annual Minimum Temperature
<b>T&amp;E</b>	Threatened and Endangered
<b>TPWD</b>	Texas Parks and Wildlife Department
<b>TRG</b>	Training Group
<b>TRS</b>	Training Squadron
<b>UHI</b>	Urban Heat Island
<b>USACE</b>	United States Army Corps of Engineers
<b>USAF</b>	United States Air Force (also AF)
<b>U.S.C.</b>	United States Code
<b>USDA</b>	United States Department of Agriculture
<b>USDI</b>	United States Department of the Interior
<b>USEPA</b>	United States Environmental Protection Agency
<b>USFWS</b>	United States Fish and Wildlife Service
<b>WFMP</b>	Wildland Fire Management Plan

## **13 DEFINITIONS**

***Standard Definitions*** (Applicable to all USAF installations)

- [Natural Resources Playbook – Definitions Section](#)

### **Installation Supplement**

#### ***13.2 Installation Definitions***

- No installation-specific definitions

## **A ANNOTATED SUMMARY OF KEY LEGISLATION RELATED TO DESIGN AND IMPLEMENTATION OF THE INRMP**

### Federal Public Laws and Executive Orders

National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program	Amends two Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program	Establishes the "Legacy Resource Management Program" for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats.
EO 11514, <i>Protection and Enhancement of Environmental Quality</i>	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, <i>Protection and Enhancement of the Cultural Environment</i>	All Federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
EO 11987, <i>Exotic Organisms</i>	Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters which they administer.
EO 11988, <i>Floodplain Management</i>	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, <i>Off-Road vehicles on Public Lands</i>	Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed.

EO 11990, <i>Protection of Wetlands</i>	Requires Federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative, and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
EO 12088, <i>Federal Compliance with Pollution Control Standards</i>	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 12898, <i>Environmental Justice</i>	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13112, <i>Invasive Species</i>	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, <i>Responsibilities of Federal Agencies to Protect Migratory Birds</i>	The 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.
<b>United States Code</b>	

<p>Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468)</p>	<p>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.</p>
<p>Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c</p>	<p>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.</p>
<p>Clean Air Act, (42 U.S.C. § 7401– 7671q, July 14, 1955, as amended)</p>	<p>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.</p>
<p>Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended</p>	<p>Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.</p>
<p>Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq.</p>	<p>Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities.</p>

Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669j; 50 Stat. 917) (Pittman-Robertson Act)	Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering.
Federal Noxious Weed Act of 1974, 7 U.S.C. § 2801–2814	The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.
Federal Water Pollution Control Act (Clean Water Act [CWA]), 33 U.S.C. §1251–1387	The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the US EPA.
Fish and Wildlife Conservation Act (16 U.S.C. § 2901–2911; 94 Stat. 1322, PL 96-366)	Installations encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	Directs installations to consult with the USFWS, or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting.
Lacey Act of 1900 (16 U.S.C. § 701, 702, 32 Stat. 187, 32 Stat. 285)	Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife related Acts or regulations.

Leases: Non-excess Property of Military Departments, 10 U.S.C. § 2667, as amended	Authorizes DoD to lease to commercial enterprises Federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act 16 U.S.C. § 703–712	The Act implements various treaties for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful without a valid permit.
National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. § 4321 et seq.	Requires federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment. The Council of Environmental Quality (CEQ) created Regulations for Implementing the National Environmental Policy Act [40 Code of Federal Regulations (CFR) Parts 1500–1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended.
National Historic Preservation Act, 16 U.S.C. § 470 et seq.	Requires federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 U.S.C. § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.

<p>Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)</p>	<p>Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.</p>
<p>Sale of certain interests in land, 10 U.S.C. § 2665</p>	<p>Authorizes sale of forest products and reimbursement of the costs of management of forest resources.</p>
<p>Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)</p>	<p>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.</p>



<p>Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended</p>	<p>Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees.</p> <p>NOTE: AFI 32-7064 sec 3.9. Staffing. As defined in DoDI 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.9.1. Outsourcing Natural Resources Management. As stipulated in the Sikes Act, 16 U.S.C. § 670 et. seq., the Office of Management and Budget Circular No. A-76, Performance of Commercial Activities, August 4, 1983 (Revised May 29, 2003) does not apply to the development, implementation and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources.</p>
<p><b>DoD Policy, Directives, and Instructions</b></p>	
<p>DoD Instruction 4150.07 <i>DoD Pest Management Program</i> dated 29 May 2008</p>	<p>Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.</p>
<p>DoD Instruction 4715.1, <i>Environmental Security</i></p>	<p>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.</p>

DoD Instruction (DoDI) 4715.03, <i>Natural Resources Conservation Program</i>	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.
OSD Policy Memorandum – 17 May 2005 – <i>Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands</i>	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 – <i>Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews</i>	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 – <i>Implementation of Sikes Act Improvement Act: Updated Guidance</i>	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance <i>Implementation of the Sikes Act Improvement Amendments</i> . 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.
<b>USAF Instructions and Directives</b>	

32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process (EIAP)	Provides guidance and responsibilities in the EIAP for implementing INRMPS. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement.
AFI 32-1015, <i>Integrated Installation Planning</i>	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations..
AFMAN 32-7003, <i>Environmental Conservation</i>	Implements AFD 32-70, <i>Environmental Quality</i> ; DoDI 4715.03, <i>Natural Resources Conservation Program</i> ; and DoDI 7310.5, <i>Accounting for Sale of Forest Products</i> . It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFMAN 32-7003, <i>Environmental Conservation</i>	This Manual implements AFD 32-70 and DoDI 4710.1, <i>Archaeological and Historic Resources Management</i> . It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFI 32-10112 <i>Installation Geospatial Information and Services (IGI&amp;S)</i>	This instruction implements Department of Defense Instruction (DoDI) 8130.01, <i>Installation Geospatial Information and Services (IGI&amp;S)</i> by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and Air Force Policy Directive (AFPD) 32-10 <i>Installations and Facilities</i> .
AFPD 32-70, <i>Environmental Quality</i>	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

**B WILDLAND FIRE MANAGEMENT PLAN**  
**Installation Supplement**





# SHEPPARD AFB FIRE EMERGENCY SERVICES

## 2016 WILDLAND FIRE MANAGEMENT PLAN

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# WFMP Signatures

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Date 3/15/2016

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**SHEPPARD AFB WILDLAND FIRE MANAGEMENT PLAN**

**SECURITY INSTRUCTION**

1. The long title of this plan is Sheppard AFB Wildland Fire Management Plan. The short title is SAFB WFMP. Both titles are UNCLASSIFIED.
2. This document is "UNCLASSIFIED".
3. Reproduction of this document, in whole or in part, to assist tasked organizations in development of supporting operating instructions/checklists, is authorized.

**RECORD OF ANNUAL REVIEW**

**DATE**

**REVIEWED BY**

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**RECORD OF CHANGES**

DATE ENTERED

POSTED BY

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## **Scope of Approved Activities under this Wildland Fire Management Plan (WFMP)**

Wildland fire management activities approved under this plan include wildfire suppression by personnel meeting qualification standards as outlined in DoDI 6055.06, Section E3.8 and/or AFI 32-7064, *Integrated Natural Resources Management*, Chapter 13 and prescribed fire activities on improved and semi-improved grounds as defined in AFI 32-7064, pages 73-74 within the main cantonment area. Examples of covered prescribed fire activities include debris pile burning or burning of main airfield to support air show and Bird/Wildlife Aircraft Strike Hazard (BASH) requirements.

The completion of this plan alone does not satisfy the requirements of a Prescribed Fire Plan.

### **Chapter 1. Introduction**

#### **1.1. Purpose of the Wildland Fire Management Plan**

The purpose of the Sheppard Air Force Base (SAFB) WFMP is to help guide wildland fire management and ensure appropriate measures are taken in both wildfire and prescribed fire to enhance and maintain the installation mission, natural and cultural resources management and BASH goals. Ultimately, the WFMP will guide the actions to reduce wildfire potential, outline program safety, protect and enhance valuable natural resources, integrate applicable State and local permit and reporting requirements, and implement ecosystem management goals outlined in the BASH Plan and Integrated Natural Resource Management Plan (INRMP) at SAFB.

An effective wildland fire management program minimizes the threat from wildfire thereby helping to ensure that environmental encroachments to training are minimized while still achieving BASH and natural resource management goals. This WFMP directly supports the military mission and is consistent with installation emergency operations plans.

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

#### **1.2. General Description of the Area in the WFMP**

SAFB covers 5,736 acres of land and is relatively flat in elevation at 1,027 feet measured at the airfield. The installation sits 10 miles south the Red River in the Central Texas Rolling Plains (see Appendix A). The terrain consists of rolling hills with rounded slopes and shallow broad valleys. The climate is humid-subtropical with hot summers (see Appendix B). It is also continental, characterized by a wide annual temperature range. Winters are mild but "blue-northers" occur about three times each winter month. These events are typically accompanied by precipitous drops in temperature. Periods of extreme cold occasionally occur but are short-lived



so that even in January mild weather frequently occurs. The highest temperatures of summer are associated with fair skies, westerly winds, and low humidity. Characteristically, hot spells in summer are broken into three-to-five day periods by thunderstorm activity except during el-Niño years. There are only a few nights each summer when the low temperature exceeds 80°F. Summer daytime temperatures frequently exceed 100°F. Average high and low temperatures range from 37°F in January to 98°F in August. Throughout the year, rainfall occurs more frequently during the night. Usually, periods of rainy weather last for only a day or two, and are followed by several days with fair skies. A large part of the annual precipitation results from thunderstorm activity, with occasional heavy rainfall over brief periods of time. Thunderstorms occur throughout the year, but are most frequent in the spring. Hail falls about two or three days a year, ordinarily with only slight and scattered damage. Windstorms occurring during thunderstorm activity are sometimes destructive. The average length of the warm seasons (freeze-free period) is about 249 days, or about 8.3 months. The average last occurrence of 32°F or below is mid-March, and the average first occurrence of 32°F or below is in late November. The average temperature ranges from a high of 98°F in July to a low of 29°F in January. Rainfall averages 27 inches per year and the growing season averages 221 days per year. The average annual wind speed for North Texas is 10.7 mph with gust exceeding mph during July – September (peak fire seasons).

### **1.3. General description of the Military Mission**

The 82d Training Wing and the 80th Flying Training Wing serves as the hub for training pilots for many NATO-partnered nations and also civilian aircraft transiting the Wichita Falls Regional Airport. While SAFB has specific aircraft (T-6's, T-38's) assigned, any type of aircraft could be routed through the airfield for various reasons. At any point in time, over 200 aircraft are based at the airfield. On average, there are approximately 400 training sorties per day at SAFB. SAFB's airfield is served by four runways: 15R/33L; 15C/33C; 15L/33R; and 17/35 (lengths are 13,100', 10,000', 6,000', and 7,021' respectively).

#### **1.3.1. General Discussion of Wildland Fire Impacts to the Military Mission**

Prescribed fires at SAFB fulfills two distinct and separate mission requirements. In support of the 80 FTW flying mission, prescribed fire is used to mitigate wildlife strike threats. In support of the SAFB Open House Airshow, prescribed fire is used to pre-burn areas of pyrotechnic display to suppress probability of wildfire.

#### **Bird/Wildlife Aircraft Strike Hazards**

Invasive weeds of indigenous and non-indigenous origin serve as food sources and/or escape cover for wildlife on the SAFB airfield, generating wildlife strike threats to the 80 FTW flying mission. An Integrated Pest Management (IPM) strategy is used by the SAFB BASH Program to mitigate such weeds via prescribed fire, herbicides, and sowing of BASH compatible grasses.

Prescribed fire is executed at SAFB during late February and into March, as North Texas transitions from winter to spring. The exposed, blackened earth warms quicker than unburned areas, resulting in early green-up and seed germination of both warm-season weeds and BASH compatible grasses. Early green-up of desirable grasses, promotes early spread of these grasses,

increasing grass competition against weeds. Herbicides are subsequently used to selectively cull weeds from BASH compatible grasses. Herbicides are most effective when target plants are healthy and actively growing; prior to plant stressors of summer. As prescribed fire expedites plant emergence, it also facilitates early herbicide treatments to occur while plants are healthy and soil moisture is adequate; this improves herbicide efficacy. In addition to aiding in weed control, prescribed fire is used to prepare a clean seed bed surface for no-till seeding of BASH compatible grasses; these grasses serve as long-term competition against weed re-infestations.

Prescribed fire, when used in an IPM strategy, favorably impacts the flying mission by reducing long-term bird strike threats. Birds are temporarily attracted (typically  $\leq 2$  months) to the denuded post-fire landscape to feed on exposed seeds and invertebrates. However, this activity rapidly declines as grasses re-establish, provided that hazardous seeded weeds are subsequently treated with herbicides. Deleterious effects of prescribed fire on wildlife are minimal, as it occurs outside the nesting season of grassland birds and most reptiles or mammals trapped within the burn site will escape fire via unburned fuels or subterranean burrows. In March 2015, SAFB successfully executed its first large-scale prescribed fire on the airfield in support of BASH, burning approximately 100 acres.

### **Open House Airshow**

Airshows showcase the mission to fellow military members and the public, and further serves to bolster community relations and recruitment. Airshows are typically every other year. During such events, Installation Commanders may select vendors that specialize in pyrotechnic displays, such as the Pearl Harbor reenactment of "Tora!-Tora!-Tora!" Prescribed fires are executed in advance, at the display site to reduce probability of an uncontrolled wildfire occurring during the airshow. Herbicides are subsequently necessary control weeds that result from the fire, in order to mitigate creation of new wildlife strike threats to aircraft. In September 2012, SAFB successfully executed an airshow pre-burn of 14 acres.

### **1.3.2. General Discussion of Military Mission Impacts to Wildland Fire Activities**

SAFB does not have a military mission that affects the wildland fire activity. The mass majority of area is in a secure location on the airfield, and has established entry control points. The prescribed fire would be coordinated with the 80 FTW to avoid the control burn during flying operations. There have been several small fires started by lightning strikes on the airfield that have temporarily suspended flying. The state threatened Texas Horned Lizard (*Phrynosoma cornutum*) is found in and around the airfield from time to time, but primarily on the very northern portion of the airfield. There will be no significant effects to the lizard with the prescribed burns and the burns will generally take place before the start of spring, and before the lizard comes out of hibernation.

### **1.4. Significant values to Protect**

- Adjacent Communities and Landowners - SAFB has a small number of residences outside the perimeter fence. The majority of land is used for agriculture or ranching needs.
- Air Quality – Smoke from prescribed or wildland fires may impair visibility on Sheppard Access road or cause health problems to installation personnel and local residents.

- Operational Areas on SAFB - Utility and/or electrical cable lines, an EOD explosive range, Aircraft fuel transfer vehicles, and fuel tanks located at the municipal airport, and various structures located in Medical Readiness area.

### **1.5. Effects of Climate Change on Biotic Composition and Impacts to Wildland Fire Management**

According to the Report titled: *Texas Facing Major Climate Change Impacts*, by [Kiah Collier](#), by 2050's Texas will see:

- The number of extremely hot days per year – with temperatures exceeding 95 degrees – more than double, from an average of 43 to 106.
- About 4,500 additional heat-related deaths per year with nearly half that increase coming in the next five to 15 years. (For comparison's sake, the study points out there were about 3,400 total automotive fatalities in Texas in 2013.)
  - A sea level rise of up to 2 feet in Galveston.
  - A \$650-million-per-year increase in storm-related losses along the coast, bringing the state's total annual damages to more than \$3.9 billion.
  - A marked decrease in both worker productivity and crop yields.

The majority of prescribed burns for SAFB will be less than 100 acres. Based on the NEPA documentation there is no significant impacts to the climate/environment from a prescribed burn under a 100 acres on SAFB. Fire is a natural part of grassland ecology and controlled fire can be a tool for foresters. Prescribed burning stimulates the germination of some desirable plants, thus renewing the grassland. Some seeds remain dormant until fire breaks down the seed coating. The prescribed burn on the airfield can also rid the area of eggs and instars of army caterpillars and grasshoppers that come out in numbers during the spring, which also cause a BASH issue by attracting the birds into the area to feed.

Prescribed Burns of less than 100 acres can have minimal impacts on local air quality, visibility and human health. Emissions from fires can travel large distances, affecting air quality and human health far from the originating fires. These emissions include:

- particulate matter,
- carbon monoxide,
- atmospheric mercury,
- ozone-forming chemicals, and
- volatile organic compounds.

It should be noted that although fires present the potential for elevated exposure to PM<sub>2.5</sub>, they are relatively infrequent events compared to residential wood burning during winter months.

## **Chapter 2. Policy, Land Management Planning, and Partnerships**

### **2.1. USAF Wildland Fire Policy**

The governing policy for wild fire management can be found in DoDI 6055.06 and AFI 32-7064, Chapter 13.

#### **2.1.1. Federal Interagency Wildland Fire Policy**

This WFMP meets the AFI and Federal Wildland Fire Management Policy by implementing and following these guiding principles:

- Firefighter and public safety is the first priority in every fire management activity.
- Support the Air Force military mission by managing wildland fire fuels.
- The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the planning process.
- BASH/INRMP and pertinent resource management plans set the objectives for the use and desired future condition of the various DoD lands.
- Wildfire Management, programs, and activities support land and resource management plans and their implementation.
- Sound risk management is a foundation for all wildland fire management activities. Risks and uncertainties relating to wildland fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity.
- Wildland Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
- WFMPs and activities are based upon the best available science.
- WFMPs and activities incorporate public health and environmental quality considerations.
- Federal, State, tribal, local, interagency, and international coordination and cooperation are essential.
- Standardization of policies and procedures for wildland fire management among Air Force installations is an ongoing objective.

#### **2.1.2. Air Force Wildland Fire Cost Effectiveness Policy**

Maximizing cost effectiveness of any fire operation is the responsibility of all involved, including those who authorize, direct, or implement operations. Cost effectiveness is the most economical use of resources necessary to accomplish project/incident objectives. Accomplishing the objectives safely and efficiently will not be sacrificed for the sole purpose of “cost-saving.” Appropriate oversight will ensure that expenditures are commensurate with values to be protected. Other factors besides those in the biophysical environment may influence decisions, including those from the social, political, and economic realms. The Wildland Fire Center will provide direction and support in this area.

### 2.1.3. Cohesive Wildland Fire Management Strategy

This WFMP meets the direction in The National Strategy, The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy (National Strategy) because it emphasizes the following primary goals: Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.

Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.

Wildfire response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions. The National Strategy sets broad, strategic, and national-level direction as a foundation for implementation of actions across the Nation.

### 2.1.4. Air Force Instruction (AFI)

The WFMP incorporates and adheres to DoD and AF policy by giving full consideration to the use of wildland fire as a natural process and as a tool in the land management planning process and by providing for the following:

- Wildfires, whether on or adjacent to lands administered by the Air Force, which threaten life, improvements, or are determined to be a threat to natural and cultural resources or improvements under the Air Force's jurisdiction, will be considered emergencies and their suppression given priority over other Air Force programs.
- Installations shall cooperate in the development of interagency preparedness plans to ensure timely recognition of approaching critical wildfire situations, to establish processes for analyzing situations and establishing priorities, and for implementing management responses to these situations.
- Installations will enforce rules and regulations concerning the unauthorized ignition of wildfires, and aggressively pursue violations.
- Firefighter and public safety is the first priority of the wildland fire management program and all associated activities.
- Only trained and qualified leaders and agency administrators will be responsible for, and conduct, wild fire management duties and operations.
- Trained and certified employees will participate in the wildfire management program as the situation requires, and non-certified employees will provide needed support as necessary.
- Fire management planning, preparedness, wildfire and prescribed fire operations, other hazardous fuel operations, monitoring, and research will be conducted on an interagency basis with involvement by all partners to the extent practicable.
- The responsible agency administrator has coordinated, reviewed, and approved this WFMP to ensure consistency with approved land management plans, values to be protected, and natural and cultural resource management plans, and that it addresses public health issues related to smoke and air quality.
- Fire, as an ecological process, has been integrated into INRMF and related

resource management plans and activities on a landscape scale, across agency boundaries, based upon the best available science.

- Wildfire is used to meet identified resource management objectives and benefits when appropriate.
- Management response to wildfire will consider firefighter and public safety, cost effectiveness, values to protect, and natural and cultural resource objectives. Staff members will work with local cooperators and the public to prevent unauthorized ignition of wildfires on Air Force lands.

#### **2.1.5. Installation specific fire management policy**

Sheppard Fire Emergency Services (FES) may engage in offensive wildland operations past the incipient fire stage during emergency operations and will request mutual aid during more advanced wildland fire events. Support to off-base fires events are generally incident-specific. Normally a water tanker is used to support local FES brush trucks. National Wildfire Coordination Group (NWCG) certifications are required for prescribed fires only and the following operational guides will be followed for all wildfire operations.

- FES Standard Operating Guide 32-3.5
- FES Services Standards of Cover

### **2.2. Land/Resource Management Planning**

The governing policy for SAFB is AFI 32-7064, along with the Integrated Natural Resource Management Plan (INRMP), the Integrated Cultural Resource Management plan (ICRMP), and the Bird Aircraft Strike Hazards Plan (BASH)

#### **2.2.1. Land Management Plans**

The goals listed in the SAFB BASH/INRMP pertain to the operation of the wildfire suppression program, or to the application of prescribed fire to SAFB habitat, are supported by the WFMP. The BASH/INRMP further identifies the specific management objective of using fire as a tool to mitigate wildlife strike threats. The WFPM should be viewed as a companion documents to the BASH/INRMP. Implementation of the WFPM will contribute to attainment of the BASH/INRMP goals and objectives and vice versa.

The WFMP for SAFB is a detailed program of action to carry out fire management policies and objectives. As a companion document to the BASH/INRMP, the WFPM describes specific wildland fire management strategies for SAFB. The ultimate goal of wildland fire management for SAFB is to carry out the AF mission, insure the safety of AF personnel, private citizens, and valuable public and private assets.

### **2.3. Wildland Fire Management Partnerships**

SAFB currently has partnership with the US Department of Agriculture Animal and Plant Health Inspection Service Wildlife Services. The USDA Wildlife Biologist is part of the 80 FTW/SE and is an essential component to help reduce wildlife hazards to aircraft

operations, protect human health and safety, and alleviate damage to property caused by wildlife at SAFB. (See Appendix D for USDA agreement).

### **Chapter 3. Wildland Fire Management Unit (FMU) Characteristics**

#### **– OPTIONAL**

The majority of the land on SAFB is developed, landscaped, or disturbed. However, the focus of this plan is set on the airfield and runway areas which are surrounded by short grasses where the fuel load is reduced by regular mowing. Appendix E, demonstrates the area where the prescribed burns will take place. Every year will be at a different location; therefore, an exact FMU cannot be pinpointed on the WFMP. A 21-element Burn Plan that is required for each burn will have the exact FMU's for each particular burn.

### **Chapter 4. Wildland Fire Operational Guidance**

#### **4.1. Management of Wildfires (Unplanned Ignitions)**

Wildfires occurring on or near SAFB would be extinguished as quickly as logistically possible by FES personnel. Any wildland fire that poses a direct threat to mission assets or a safety danger to firefighters or the public would prompt a mutual aid response from several volunteer departments located around SAFB. There are three different types of DoD deployments. Their descriptions and requirements are listed below:

1. Mutual Aid – This type of response, common for both FES and natural resource wildland firefighters, is to the local area, typically through a mutual aid agreement and for short durations, usually within the first operational period.

2. Automatic aid – Agreements with the local communities around SAFB require the response of the department to fire or emergency situation located in particular box alarm areas. This response has been pre-arranged with the wing leadership and requires no notification of initial response.

3. Immediate Response Authority (IRA) – This type of response, which requires approval through the Installation Commander, allows base assets, to be deployed from the installation to the local area to protect civilian life and property in emergency situations. As part of each installation's WFMP, the AFWFC will be notified when IRA is required for wildfire response.

##### **4.1.1. Preparedness**

Preparedness is defined as activities that lead to a safe, efficient, and cost-effective fire management program in support of land and resource management objectives through appropriate planning and coordination.

###### **4.1.1.1. Training and Qualifications**

The FES currently has two Firefighters trained in wildfire firefighting for prescribed fires. All prescribed fire activities will be conducted utilizing trained personnel from Mutual aid agreement departments. Several local departments have wildfire trained Burn Bosses, and will supervise any Prescribed fires on SAFB. The FES training includes Basic Wildland Fire

Behavior, Incident Command and Basic Wildland Firefighter Standards. Training records are maintained in the Fire Training Data base Automated Civil Engineering System (ACES). Annual reviews and training sessions are conducted so that all personnel remain current with training requirements. These training records are available for review in the FES training office.

#### **4.1.1.2. Delegation of Authority to Air Force Wildland Fire Program Management**

This WFMP is not a stand-alone document, and has an associated BASH/INRMP and NEPA documentation. Therefore, no further wildland fire management authority is necessary.

#### **4.1.1.3. Readiness**

Rescue and firefighter safety are the top priorities. Grass fires can occur at any time. Grass fires are more frequent during prolonged periods of dry weather with low humidity and high winds. Grass fires are also predominant in winter months when the grass/vegetation is dormant. The National Weather Service provides Red Flag watches/warnings when weather conditions are right for the spread of wildfires. County Officials may institute Burn Bans which SAFB is required to follow. FES has the capability to provide the following resources to any emergency response.

#### **Staffing**

FES has an initial emergency response force of 11 firefighters, 1 safety Officer and 1 Incident Commander to all emergencies during flying hours. The authorized number of firefighters assigned to FES is 50. The FES currently has two Firefighters trained as wildfire firefighting type 1, for the use at prescribed fires.

#### **Equipment**

SAFB has the capability to respond with three rapid intervention vehicles, two water tenders, one Aircraft Rescue Firefighting Vehicle, and one structural pumper to any fire within the response area. A complete list of response vehicles are listed in Appendix C.

#### **4.1.1.4. Wildland Fire Aviation Management**

SAFB does not possess enough wildland acreage to support the request for an aviation wildfire management plan. However, if needed a direct request for support would be made utilizing mutual aid agreements with the City of Wichita Falls Fire Department. (Appendix D)

#### **4.1.1.5. Wildfire Detection**

The majority of wild fires on or near SAFB are reported by the aircraft control tower via direct line. The geographic area is relatively flat and the entire base can be seen from the 110 foot tower. A functioning 911 service is operated in the Emergency Communications Center that functions as a direct reporting station for all emergency operations.



#### 4.1.1.6. Initial Report of Wildfire and Initial Attack (Response) Dispatching

The minimum response for any grass fire will be an Engine Company, a Rescue Company, and a Command vehicle. One firefighter from the Engine Company may be designated to drive the Mobile Supply Water Tender to the scene. The P-34 Rapid Intervention Vehicle may be the best choice for fire attack. Crash vehicles may also be dispatched at the discretion of the Senior Fire Officer (SFO). The SFO can upgrade anytime, or downgrade the response after arriving on scene. Responding crews should approach upwind and be alert to changing fire weather. Attack flames from the flank and work to pinch off the head. Large lines may be required to protect exposed structures. Responding crews must be cognizant of terrain features. All firefighters in the Immediate Life Hazard (IDLH), as determined by the SFO, will wear full Personal Protective Equipment (PPE) and Self Contained Breathing Apparatus (SCBA). Initial fire attack can be made with hand held extinguishers. Hand tools may have to be used. A Safety Officer will be designated.

#### 4.1.1.7. Incident Commander Responsibilities (for all incident types)

All wildfires occurring on an Air Force installation and staffed with Air Force employees, cooperators or contractors will be supervised by a qualified incident commander (IC). If a qualified IC is not available, one will be ordered through the local Dispatch Center. The IC is a single individual responsible to the installation for all incident activities, including the development of incident management strategies and tactics, and the ordering, deployment, and release of resources. The IC is responsible to:

- Provide a size-up to dispatch as soon as possible upon arrival on scene. A size-up checklist is in the Interagency [Incident Response Pocket Guide \(IRPG\)](#).
- All Incident Commanders will complete and file an incident report with the installation dispatch center.
- Assess the potential management by suppression activities or by wildfire for resource benefits as incident objective(s). Contact the Wildland Fire Center with incident updates and recommended plan of action
  - Use guidance in this WFMP. Secure a Delegation of Authority to implement the selected suppression response and manage an organization to implement effective strategies and tactics. Minimize suppression impacts where possible without reducing the effectiveness of the actions being undertaken.
  - Determine resource needs and order as needed through local dispatch.
  - Ensure all resources assigned and those incoming receive a briefing. Document these briefings. Refer to the Briefing Checklist in the IRPG.
  - Continually re-assess incident complexity using the checklist in the IRPG. When a more qualified IC is needed, inform dispatch and delegated unit administrator and place the order for a higher level IC.
  - Depending on incident complexity, additional responsibilities for the IC may apply. Utilize AFI, NWCG Fireline Handbook, and Wildland Fire Center for more detailed description of IC responsibilities.
- All resources, including mutual aid resources, will report to the IC (in person or by radio) to receive an incident briefing prior to tactical assignment deployment.

- All wildfires must be investigated to determine fire cause. Document findings on ICS-214, determine if negligence or criminal intent were factors. If the IC suspects a fire cause is suspicious, a qualified wildland fire investigator can be ordered to assist with investigation. The point of origin should be protected for investigation purposes.

#### **4.1.1.8. Wildland Fire Mutual Aid and/or Cross Boundary Operations**

A representative from FES, can request firefighting equipment or hazardous materials incident responses from any of the surrounding FES Departments. Personnel from that FES will be dispatched to any point within the firefighting or hazardous materials incident response jurisdiction of the FES. The FES maintains mutual aid agreements with nine different departments to include City municipalities and volunteer community departments.

#### **4.1.2. Wildland Fire Incident Management**

Sheppard Fire Emergency Services SOG 32-3.6

Command shall be established at all incidents utilizing the National Incident Management System. This includes all accidental or prescribed burns, exercises, drills, and other situations that involve hazards similar to those encountered at actual emergency incidents and to simulated incidents that are conducted for training and familiarization purposes.

##### **4.1.2.1. Dispatching beyond Initial Attack**

The IC will notify the Dispatcher whenever it appears a fire will escape initial response efforts, leave installation lands, or when fire complexity will exceed the capabilities of command or operational forces. When additional resources are needed, they will be ordered through the local Dispatch Center, which will mobilize any additional resources, including higher level ICs and Incident Management Teams. The Dispatcher or Wildland Fire Program Manager will notify the Air Force Wildland Fire Center, which will provide assistance with extended attack support including:

- Assisting the Wildland Fire Program Manager complete a WFMIS analysis.
- Assisting the Wildland Fire Program Manager complete a Delegation of Authority, if needed.

##### **4.1.2.2. Delegation of Authority to Incident Commander (IC)**

A Delegation of Authority will be provided to any Type 3 or higher level IC. The installation will use the current AFI for supporting guidelines which include Briefing to the Incident Management Team (IMT).

##### **4.1.2.3. Resource Allocation and Prioritization**

The risk assessment of a Fire Demand Zone (FDZ) may include defining the differences between a single-family dwelling, a multiple-family dwelling, an industrial building, or an

airfield and placing each in a separate category. Fire stations and apparatus may have to be equally distributed to provide an initial attack capability to all of them. Conversely, fire station locations and staffing patterns must be prepared to respond to a worst-case scenario in the high-consequence areas to represent concentration of services. The objective of risk assessment is to reduce the probability of a serious loss occurring in a very unusual event. This involves keeping routine emergencies from becoming serious loss situations. Resources must arrive quickly, with sufficient strength to stop escalation of the emergency.

#### **4.1.2.4. Regulatory Compliance for Managing Wildfires (Unplanned Ignitions)**

- National Environmental Policy Act (NEPA) analysis is not required for wildfires because they are unplanned events. Suppression activities are Categorically Excluded from NEPA.

- Endangered Species Act (ESA) Consultation may be conducted on the response to a wildfire to help set boundaries for the area in danger of the wildfire.

- Minimizing potential smoke incursions into non-attainment areas will require aggressive suppression actions during periods of air quality alerts.

#### **4.1.2.5. Use of Decision Support Tools**

Wildland Fire Use strategies will not be pursued on SAFB due to lack of large unimproved tracts.

#### **4.1.2.6. Wildfire Reporting Requirements**

The local Dispatcher or Wildland Fire Program Manager will notify the Air Force Wildland Fire Center of any wildfire incident larger than 100 acres.

The Wildland Fire Center will also be notified regardless of wildfire size, if following are threatened or likely to be threatened within 48 hours.

- significant infrastructure/resources
- critical Air Force missions
- loss of life
- negative impact to public health and safety
- threat to Threatened and Endangered Species

Notification to the Wildland Fire Center will be accomplished within the first operational period. Wildfires 100 acres or larger in timber fuels, or 300 acres or larger in grass fuels will require completion of an Incident Status Summary (ICS-209) daily for the incident duration. The ICS-209 will be sent to the State Interagency Dispatch (Coordination Center) and the Wildland Fire Center.

All Wildfires will be recorded in ACES-FD by the installation FES. An AFWFC report will be completed by the IC and returned to the AFWFC for entry into WFMIS.

#### **4.1.2.7. Wildfire Suppression Damage Repair**

Identifying the impacts of suppression activities is the responsibility of the IC. The repair activities to the environment will require support of the 82 CES/CEI and 82 CES/CEO. Such work should be completed by incident resources prior to final demobilization or whenever practical. It is the responsibility of the Wildland Fire Program Manager to ensure that suppression activity damage repair is completed. Repair of suppression damage will occur prior to crew release from the fire, including:

- Removing all trash from incident facilities, work areas and fire lines.
- Replace soil dug from fire lines to refill them to level.
- Roll back and compact sod overturned by plowing (with a grader or by hand) to

preserve native grass root stock.

#### **4.1.3. Emergency Stabilization (ES)**

Planned actions are in place to stabilize and prevent degradation to natural and cultural resource. This will help minimize threats to life or property resulting from the effects of a fire. The prescribed burn areas will not be in an area where there are cultural resources, nor are there any federally listed endangered or threatened species. The area that is on the air field will be left alone to allow the remaining seeds in the area to germinate. Once germinated the seedlings will be removed with herbicides. From that point a no-till drill will be brought in and native seeds will be placed in the soil to germinate. The area will be covered with hay to prevent erosion and prevent the birds from eating the seeds.

##### **4.1.3.1. Emergency Stabilization Planning and Post-Fire Assessments**

The Wildland Fire Program Manager is responsible for assigning teams to develop ES plans. The installation may not have sufficient expertise to conduct burned area assessments. Resource specialists from cooperating installations/partner agencies and/or the Wildland Fire Center may be needed to assist in developing a plan. After prescribed burns the area will be re-seeded by a grass seeding contract as stated above. The USDA wildlife Biologist will be the post burn evaluator for the project.

##### **4.1.3.2. Emergency Stabilization Post-wildfire Issues and Values to Protect**

Fires over ten acres will be evaluated by the USDA Wildlife Biologist Staff to determine rehabilitation needs. If deemed necessary, a seeding plan will be developed within 90 days of evaluation. Native seeds will be used if available.

##### **4.1.3.3. Emergency Stabilization Treatment Maintenance and Monitoring**

The USDA Wildlife Biologist determines post rehabilitation monitoring needs on a site by site basis.

##### **4.1.3.4. Emergency Stabilization Reporting Requirements**

Year-end reporting to the US Air Force Fire Management Information System 2610 (USAFMS) includes the total acreage burned on SAFB and a breakdown of post-fire treatments.

#### **4.2. Burned Area Rehabilitation (BAR) - OPTIONAL**

#### **4.3. Management of Planned Fuels Treatments**

A copy of the AF standard template for a Prescribed Fire Plan can be found on the Wildland Fire Center eDash page.

[https://csl.eis.af.mil/sites/edash-workspaces/wfmws/Shared%20Documents/Plans/Prescribed\\_Fire\\_Plans/USAF\\_PFP\\_06-08-2014new.docx](https://csl.eis.af.mil/sites/edash-workspaces/wfmws/Shared%20Documents/Plans/Prescribed_Fire_Plans/USAF_PFP_06-08-2014new.docx)

##### **4.3.1. Processes to Identify and Prioritize Fuels Treatments**

The areas associated with a wildfire on SAFB only contain low level grass fuels or medium level mesquite trees; therefore, there are no fuels treatment that is necessary. The Airfield is under contract to be mowed as needed to support the BASH program. The grass height is not to exceed 10 inches and will be maintained according to the contract. Mowing is conducted between the runways and taxiways. The estimated cost of the contract varies from year to year due to the amount of rain fall in the area. A map of the airfield has been provided. (Appendix E).

## **Chapter 5. WFMP Evaluation**

### **5.1. Wildland Fire Management Plan Review**

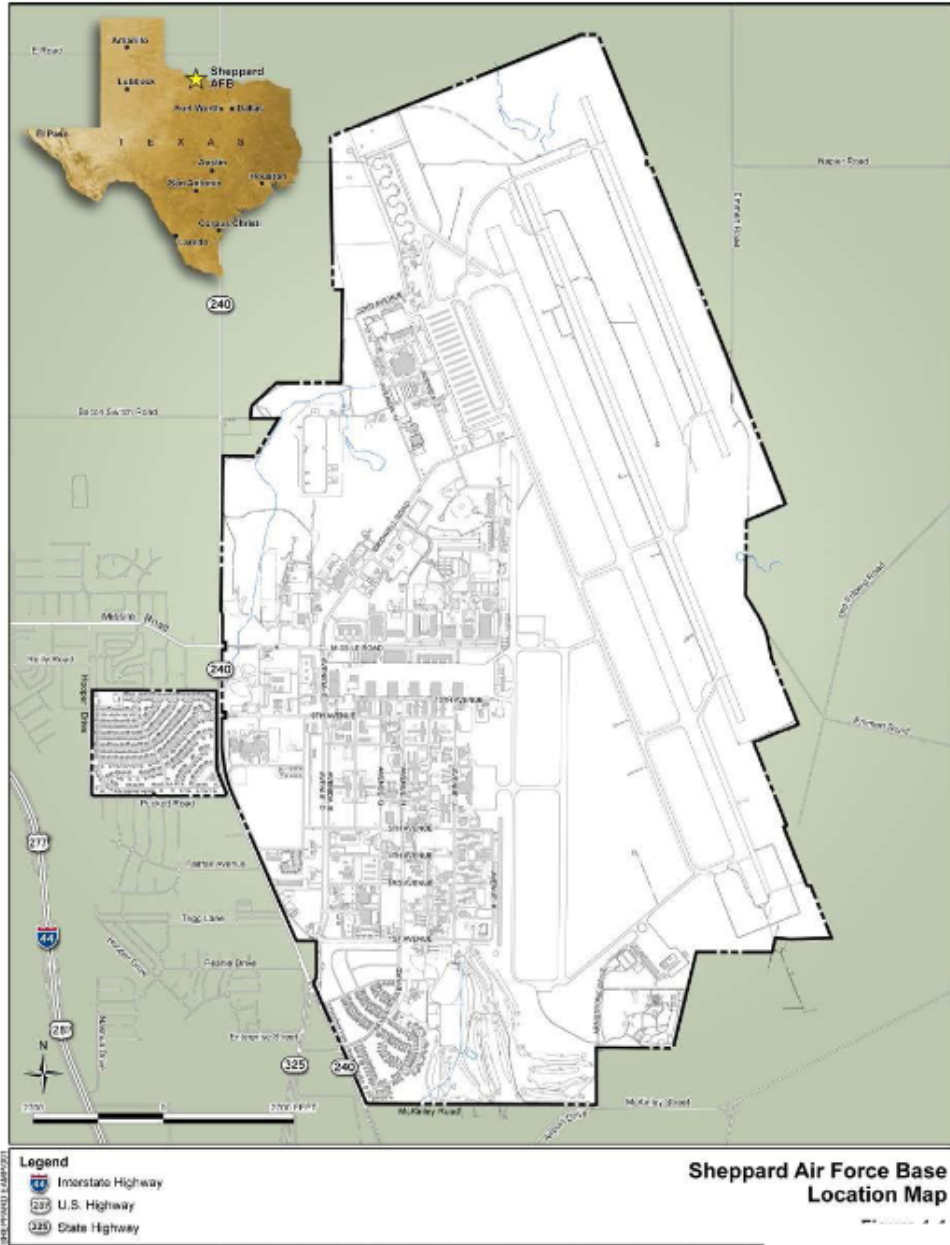
This WFMP will be reviewed annually for any updates and changes. The plan will be reviewed by FES Chief and approved by the Installation Commander. Updates and changes may include but not limited to:

- Change in template format
- Addition or deletion of T&E species that require Rx fire for habitat management
- Change to military mission
- Change in Rx fire strategies
- Additional properties or GSU's

SAFB will contact the Wildland Fire Center of needed updates to plan.

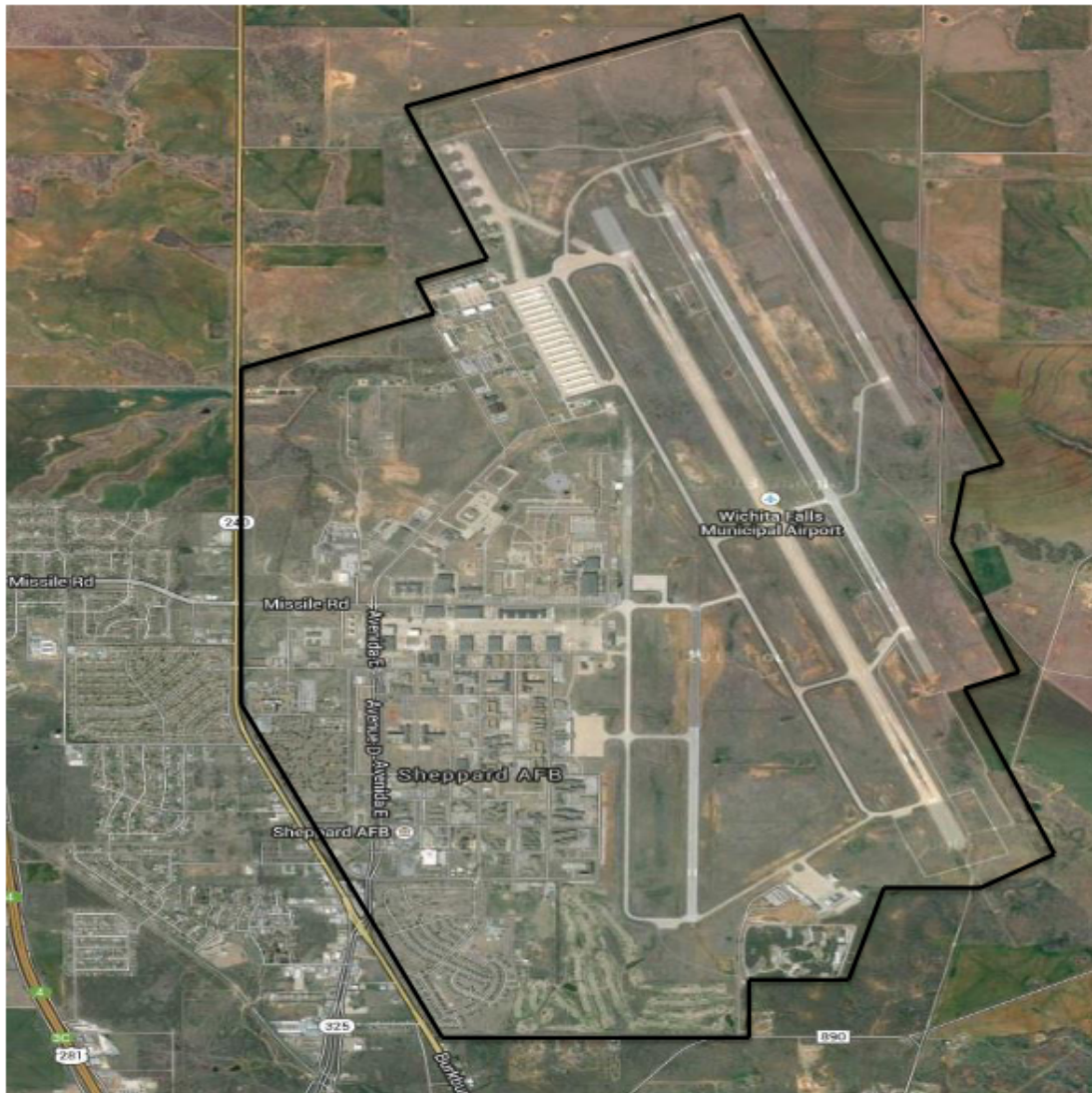
# APPENDIX A

## Boundary and Vicinity Map





Satellite Boundary and Vicinity Map



# Appendix B

## Weather

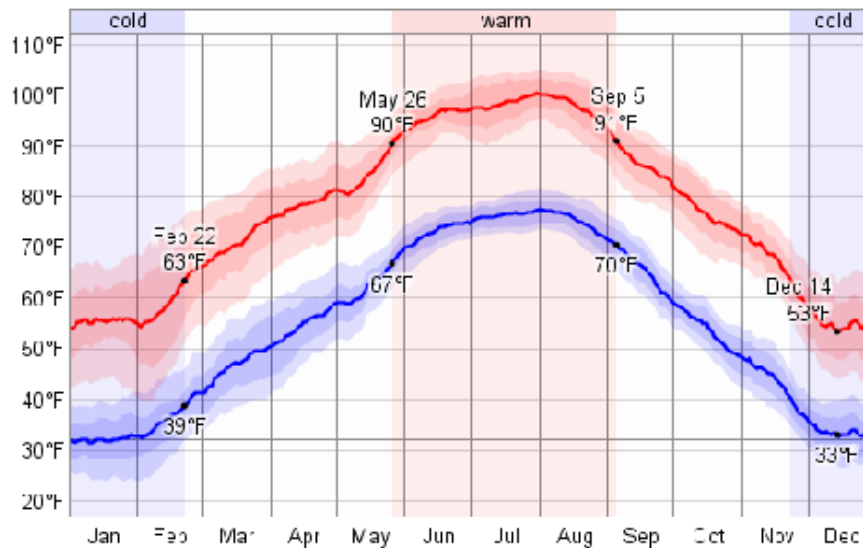
### Average Weather for Wichita Falls, Texas, USA

This report describes the typical weather at the Kickapoo (Wichita Falls, Texas, United States) weather station over the course of an average year. It is based on the historical records from 2008 to 2012. Earlier records are either unavailable or unreliable.

Wichita Falls, Texas has a warm humid temperate climate with hot summers and no dry season. The area within 25 miles of this station is covered by *grasslands* (87%), *croplands* (10%), and *lakes and rivers* (3%).

Over the course of a year, the temperature typically varies from 31°F to 100°F and is rarely below 24°F or above 105°F.

#### Daily High and Low Temperature



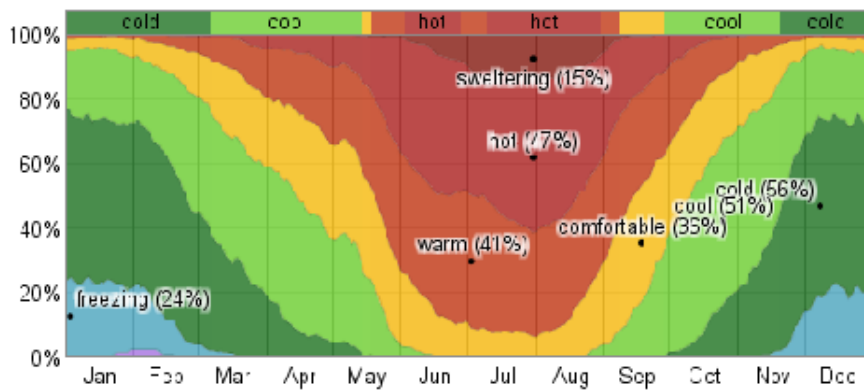
The daily average low (blue) and high (red) temperature with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

The *warm season* lasts from May 26 to September 5 with an average daily high temperature above 91°F. The hottest day of the year is July 31, with an average high of 100°F and low of 77°F.

The *cold season* lasts from November 23 to February 22 with an average daily high temperature below 63°F. The coldest day of the year is January 11, with an average low of 31°F and high of 55°F.



## Fraction of Time Spent in Various Temperature Bands

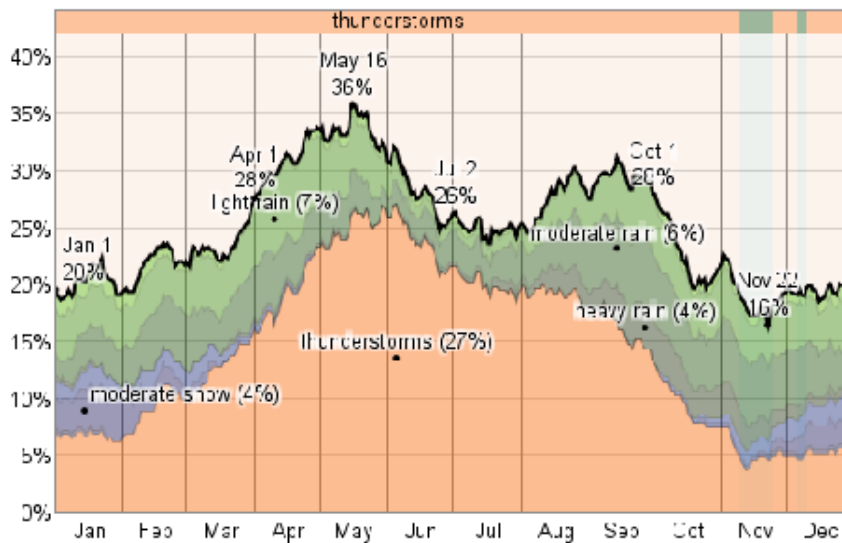


The average fraction of time spent in various temperature bands: frigid (below 15°F), freezing (15°F to 32°F), cold (32°F to 50°F), cool (50°F to 65°F), comfortable (65°F to 75°F), warm (75°F to 85°F), hot (85°F to 100°F) and sweltering (above 100°F).

## Precipitation

The probability that precipitation will be observed at this location varies throughout the year. Precipitation is most likely around May 16, occurring in 36% of days. Precipitation is least likely around November 22, occurring in 16% of days.

## Probability of Precipitation at Some Point in the Day



The fraction of days in which various types of precipitation are observed. If more than one type of precipitation is reported in a given day, the more severe precipitation is counted. For example, if light rain is observed in the same day as a thunderstorm, that day counts towards the thunderstorm totals. The order of severity is from the top down in this graph, with the most severe at the bottom.

## Average Annual Precipitation

The normal precipitation is the arithmetic mean for each month over the 30-year period, adjusted as necessary, and includes the liquid water equivalent of snowfall. Wichita Falls, Texas - 28.92 inches

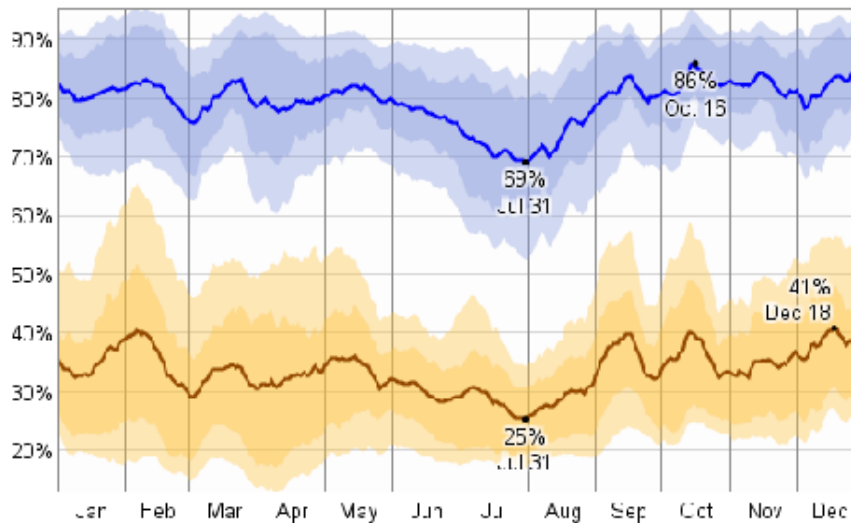
Distribution of Average Annual Precipitation

## Humidity

The relative humidity typically ranges from 25% (dry) to 86% (very humid) over the course of the year, rarely dropping below 13% (very dry) and reaching as high as 95% (very humid).

The air is *driest* around July 31, at which time the relative humidity drops below 31% (comfortable) three days out of four; it is *most humid* around October 16, exceeding 81% (humid) three days out of four.

### Relative Humidity



The average daily high (blue) and low (brown) relative humidity with percentile bands (inner bands from 25th to 75th percentile, outer bands from 10th to 90th percentile).

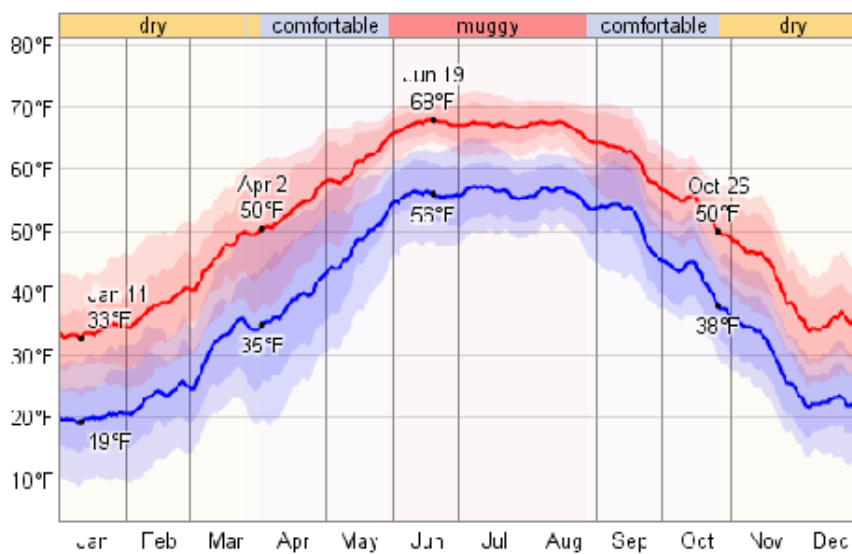
## Dew Point

Dew point is often a better measure of how comfortable a person will find the weather than relative humidity because it more directly relates to whether perspiration will evaporate from the skin, thereby cooling the body. Lower dew points feel drier and higher dew points feel more humid.

Over the course of a year, the dew point typically varies from 19°F (dry) to 68°F (muggy) and is rarely below 9°F (dry) or above 73°F (very muggy).

There are two periods in the year that are most comfortable: The first is between April 1 and May 30 and the second is between August 27 and October 27. The air feels neither too dry nor too muggy during these periods.

### Dew Point



The daily average low (blue) and high (red) dew point with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

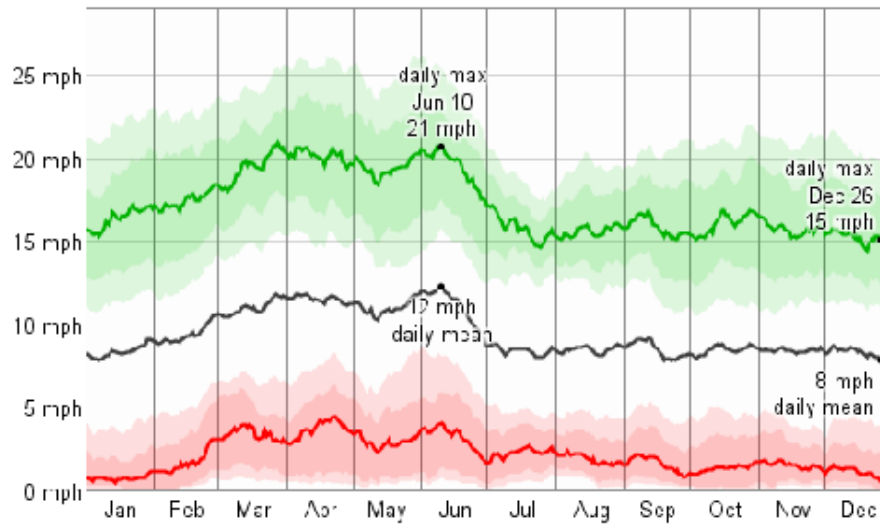
## Wind

Over the course of the year typical wind speeds vary from 0 mph to 21 mph (calm to fresh breeze), rarely exceeding 26 mph (strong breeze).

The *highest* average wind speed of 12 mph (moderate breeze) occurs around June 10, at which time the average daily maximum wind speed is 21 mph (fresh breeze).

The *lowest* average wind speed of 8 mph (gentle breeze) occurs around December 26, at which time the average daily maximum wind speed is 15 mph (moderate breeze).

### Wind Speed



The average daily minimum (red), maximum (green), and average (black) wind speed with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

The wind is most often out of the *south* (31% of the time), *south east* (15% of the time), and *north* (14% of the time). The wind is least often out of the west (4% of the time).

• Cedar Lake Ventures, Inc., Average Weather For Wichita Falls, Texas, USA, n.d, Retrieved from <https://weatherspark.com/averages/30000/Wichita-Falls-Texas-United-States>







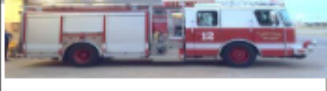


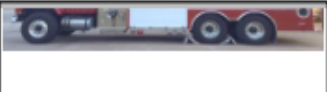

# Appendix C

## Vehicles



## SHEPPARD FIRE EMERGENCY SERVICES VEHICLE CAPABILITY LISTING



VEHICLE CALL SIGN	VEHICLE TYPE	CAPACITIES WATER & FOAM		SPECIAL EQUIPMENT
CHIEF ONE	 Jeep Patriot	NONE		COMMAND AND CONTROL UNIT Cell Phone (704-8613)
CHIEF TWO	 Chevy Tahoe	NONE		COMMAND AND CONTROL UNIT CELL-PHONE (704-8612)
FREDERICK 17	 F-350 3/4 Ton	NONE		Light Rescue, First Responder Medical Kits, (STATIONED AT FREDERICK AUX. FIELD, OK)
Squad 4/5/6	 Rapid Intervention Vehicle	400 gallons of water	16 gal. class A foam 57 gal class B foam	Rapid Intervention Vehicle, high pressure low GPM pump
RESCUE 8	 	NONE		Extrication Tools, Ventilation Fans, High Angle Rescue Equipment, Light Tower, Generator.
ENGINE- 12	 1250 GPM Engine	530 Gal. Water	30 gal. Class A 30 Gal. Class B	Four Man Crew, Pump Rated at 1250 GPM at 150 PSI, 700 ft. 5" hose, Three - 1 3/4" Attack lines
TRUCK - 11	 75 ft. Ladder Truck	500 Gal. Water	25 gal. Class A 25 Gal. Class B	Four Man crew, Pump Rated at 1250 GPM at 150 PSI, 75 ft. Rear Mounted Areal, 600ft. 5" hose, Two- 1 3/4" Attack lines
CRASH - 3	 Aircraft Fire Fighting Vehicle	1500 Gal. water	210 Gal. Class B	300' 13/4" HOSE, 1950 GPM PUMP, Aircraft Egress Tools, Extrication Saw, 450 LBS Dry Chemical
Tanker 10	 Water Tender	4000 Gal. Water		Two man crew, 5000 gal drop tank, Float pump, Wild land tools and Equipment.
Crash-5	 Aircraft Fire Fighting Vehicle	1000 GAL WATER	130 GAL FOAM	300' 1" HOSE, 950 GPM PUMP, AIRCRAFT EGRESS TOOLS, EXTRICATION SAW, 500 LBS DRY CHEMICAL , ( FREDERICK AUX. FIELD, OK)



**SHEPPARD A.F.B.  
VEHICLE CAPABILITY LISTING**



VEHICLE CALL SIGN	VEHICLE TYPE	CAPACITIES WATER & FOAM		SPECIAL EQUIPMENT
COMMAND 21	 Utility Van	NONE		First Response Hazardous Materials Vehicle and Fire Ground Rehab
Maintenance 9	 Stake Bed	NONE		Stake Bed Vehicle with Lift Gate and Towing Capacity
Air Trailer	 Air Trailer	NONE		Capable of Filling Two Bottles at a time, Pintle Hook Hitch, Diesel Fuel Operated
Foam Trailer	 Foam Trailer	500 Gallon AFFF		Gas Operated Jockey Pump, Pintle Hook Hitch
TANKER 13/16	 Water Tender	2000 GAL WATER	N/A	500 GPM Pump, 150' 1" Hose, 300' 1 3/4" Hose, 300' 3" Hose, (Frederick Aux. Field, OK)
HazMat/Decon Trailer	 30 FT. Trailer	Mass Decon capability, Level A HazMat Response Capability		Tank Patch kits, 3 Pool Decon, Cylinder Kits, HazMat library, Cemical PPE, Chemical Detection and Mitigation. 2 5/16" ball hitch
Fire Prevention Trailer	 38 ft. trailer	2 5/16" ball hitch, two levels, provides training for kitchen fires, escape routes, 911 procedures, fire extinguisher, and smoke detectors.		

## **Appendix D**

### **Mutual Aid Agreements**





**DEPARTMENT OF THE AIR FORCE  
AIR EDUCATION AND TRAINING COMMAND**

15 Jan 16

MEMORANDUM FOR RECORD

FROM: 82 CES/CEF  
1024 Avenue K  
Sheppard AFB TX 76311-2365

SUBJECT: Annual Review of Mutual Aid Agreements

1. I have reviewed all mutual aid agreements and all remain in effect until either organization wishes to change the existing agreement.

2. The following Fire Emergency Services organizations currently have agreements with Sheppard AFB Fire Emergency Services for fire and hazardous materials responses:

City of Wichita Falls City of  
Burkburnett City of Iowa Park  
City of Electra  
City of Henrietta City of Duncan OK  
City of Frederick OK  
Cameron Gardens Fire Protection District

3. All mutual aid agreements were re-accomplished in 2014-2015 timeframe.

//Signed/dlm/15 Jan 16//  
DAVID L. MOUNSEY, GS-13, CFO, MIFirE  
Installation Fire Chief

# Appendix E

## Airfield Map

Prescribed Fire Area, Mowing Areas, and Entry Control Points



Mowing area – low grass

▲ Entry control points

### C BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN Installation Supplement

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**SHEPPARD AIR FORCE BASE  
BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) PLAN**

**SHORT TITLE: SAFB BASH PLAN**

**15 September 2021**



**OPR: 80 FTW/SE**

**80TH FLYING TRAINING WING  
82D TRAINING WING  
SHEPPARD AIR FORCE BASE, TEXAS**

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**Process Coordinator Identification Page**  
**SAFB BASH PLAN**  
**Plan OPR: Capt Silver 80 FTW/SE**

This form is completed by the plan OPR (plan owner) and placed inside the plan directly behind the front cover sheet. The form contains four parts: Part I identifies (name and/or office symbol) the individual that will conduct the administrative review (spelling/grammar). Part II identifies the Subject Matter Experts (SME) who should review and provide corrections/comments during the review process. Part III identifies the individuals who need to coordinate on the rewritten/changed plan.

---

**Part I. Administrative Review Identification**

Tracy Dorgan 80 FTW/SE Flight Safety Program  
Manager

---

**Part II. SME Identification**

Capt Logan Silver 80 FTW/SE (x1003)	Ted Pepps USDA/WS (x2908)
Maj Daniel McKinley 80 OG/OGV (SOF) (x4956)	Mark Schaffer 82 TRW/SEG (x7308)
Linda Demuro 80 OSS/OSAA (x7119)	Capt Abigayil Oilar 80 OSS/OSA (x5605)
2d Lt Ebony Bryant 82 TRW/PA (x5407)	John Ingle, Mr. Woodward 82 TRW/PA (x7250)
Michael Boydston 82 TRW/JAC (x4262)	Lisa Black 82 CES/SP/CEI (x5720)
Lt Col Jon Jones, 82 CES/CC (x2158)	James Christman 82 CES/SP/CEO (x6524)
Paul Bethel 82 SFS/S5 (x2106)	Colby Manry 82 CES/CEIV (x2410)

---

**Part III. Coordination Process**

Identification:

80 FTW/SE  
80 OG/CC  
80 FTW/CV  
82 MSG/CC  
82 TRW/IGP  
82 CES/CC  
82 SFS/CC  
82 TRW/CV  
82 TRW/JA  
82 TRW/PA  
82 TRW/SE  
82 CES/SP/CEIV  
USDA/WS  
Wichita Falls Municipal Airport Manager

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DEPARTMENT OF THE AIR FORCE  
AIR EDUCATION AND TRAINING COMMAND

MEMORANDUM FOR DISTRIBUTION (See Annex Z)

FROM: 80 FTW/SE

SUBJECT: SAFB BASH Plan

1. The attached plan is the 82d Training Wing and 80th Flying Training Wing supporting plan required by AFI 91-202.
2. This plan is in effect upon receipt. Execution will be continuous.
3. Requests for additions, deletions, and/or changes should be directed to the plan OPR, 80 FTW/SE.
4. Supporting implementing instructions, operating instructions, or checklists must be prepared by tasked organizations and forwarded to 80 FTW/SE for review and coordination within 30 days of publication.
5. This plan supersedes SAFB BASH Plan, Chg 1, (16 Oct 20), which should be destroyed IAW *Records Disposition Schedule, Series 10, Table 10-04, Rule 04.00*.

//signed/jg/2 Jun 21//  
JOSEPH A. GAGNER, Maj, USAF  
80 FTW Chief of Safety

Attachment:  
SAFB BASH Plan

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82d Training Wing/80th Flying Training Wing  
Sheppard Air Force Base, Texas  
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SAFB BASH PLAN

SECURITY INSTRUCTIONS AND RECORD OF CHANGES/REVIEWS

1. The long title of this plan is Sheppard Air Force Base Bird/Wildlife Aircraft Strike Hazard (BASH) Plan. The short title is SAFB BASH Plan. Both titles are unclassified.
2. This document is UNCLASSIFIED - For Official Use Only.
3. Reproduction of this document in whole or in part to assist tasked organizations in development of supporting operating instructions/checklists is authorized.
4. The provisions of AFI 10-701, *Operations Security (OPSEC)*, were considered during the formation of this plan.

RECORD OF CHANGES

Change No. and Date	Date Entered	Posted By:
None		

RECORD OF REVIEW

Date	Reviewed By:
31 May 21	Capt Silver, 80FTW/SE

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SAFB BASH PLAN  
PLAN SUMMARY

1. PURPOSE: To provide a comprehensive base-wide program designed to reduce aircraft exposure to potentially hazardous wildlife strikes, where all flying units from SAFB conduct flying operations.
2. SUMMARY OF PLAN: All Air Force instructions and guidance should be complied with by using all SAFB resources to effectively reduce or eliminate BASH risks.
3. CONDITIONS FOR IMPLEMENTATION: This plan is based on hazards associated with local and migratory wildlife populations. Implementation will be continuous and tailored to each threat.
4. OPERATIONS TO BE CONDUCTED:
  - a. Specific operations include:
    - (1) The establishment of a Bird Hazard Working Group (BHWG).
    - (2) Procedures for reporting hazardous bird and animal activity, as well as altering or discontinuing flying operations as appropriate.
    - (3) Provisions to provide information to all assigned and transient aircrews for specific wildlife hazards and procedures for avoidance.
    - (4) Actions to eliminate/reduce environmental factors that pose wildlife strike threats.
    - (5) Procedures to disperse/depredate wildlife on the airfield and within the local area.
    - (6) Establish a database for education and continuity; to include species of wildlife struck, altitude, location, phase of flight, damage costs, and Bird Watch Condition (BWC) at the time of strike.
  - b. Tasked organizations: As listed in ANNEX A.
  - c. Supporting plans: Any supporting plans will be developed as required by the BASH Officer, USDA personnel, and/or the CE contract service provider.
5. KEY ASSUMPTIONS: None.
6. OPERATIONAL CONSTRAINTS: None.
7. OPSEC: Normal.

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8. TIME TO COMMENCE EFFECTIVE OPERATIONS: Implementation of specific portions of this plan is continuous, while other portions require implementation as dictated by wildlife activity.

9. COMMAND RELATIONSHIPS: Normal.

10. LOGISTICS APPRAISAL: None.

11. PERSONNEL APPRAISAL: In order to be effective, this plan requires constant wildlife observation and the expertise from USDA Wildlife Service's personnel.

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SAFB BASH PLAN (FOUO)  
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SAFB BASH PLAN  
BASIC PLAN

**REFERENCES:**

- a. AFI 13-204v3, *Airfield Operations Procedures and Programs*
- b. AFMAN 32-1053, *Integrated Pest Management Program*
- c. AFI 32-7064, *Integrated Natural Resources Management*
- d. AFI 91-202, *The US Air Force Mishap Prevention Program*
- e. DAFI 91-204, *Safety Investigations and Reports*
- f. DESR 6055.9 AFMAN 91-201, *Explosives Safety Standards*
- g. AFMAN 91-223, *Aviation Safety Investigations and Reports*
- h. AFI 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management Program*
- i. SAFBI 32-7002, *Unit Environmental Coordinator*
- j. FAA Order 5200, *Hazardous Wildlife Attractants on or near Airports*
- k. Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*
- l. BASH Team Staff Assistance Visit Reports
- m. Field Guides to Regional Birds
- n. MOU between 82 TRW, 80 FTW and City of Wichita Falls Pertaining to BASH Mitigation in Wichita Falls TX as of 12 Jun 12 to indefinite or review

**TASK ORGANIZATION:** Reference Annex A.

**1. PURPOSE:** This plan exists to combine agency efforts in order to minimize wildlife strike threats to SAFB and civilian aircraft.

a. **General:** Wildlife-aircraft strike hazards exist at SAFB and in its vicinity due to resident and migratory wildlife populations. Daily and seasonal wildlife movements create various hazardous conditions. This plan establishes procedures to minimize those hazards at SAFB. No single solution exists to this BASH problem and a variety of techniques and organizations are involved.

b. **Assumptions:** This plan takes into consideration that frequent aircraft traffic will exist in the area where habitat alteration, harassment and depredation will take place. The plan requires the involvement of USDA-WS personnel for expertise, consistency, and continuity of execution.

**2. CONDITIONS FOR IMPLEMENTATION:** Immediate and Continuous.

**3. OPERATIONS TO BE CONDUCTED:**

a. **Concept of Operations:** This plan outlines the operating area of SAFB aircraft and identifies wildlife threats in that area. It discusses the impact of habitat management on wildlife activity and outlines topics of depredation and harassment.

b. **Tasks:** ANNEX C outlines the general and continuing tasks and responsibilities for each

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organization and gives the specific hazard reduction measures for varying wildlife hazard conditions.

- (1) Establish a Bird Hazard Working Group (BHWG).
- (2) Identify hazards to aid supervisors and aircrew to modify flying operations when required.
- (3) Establish aircraft and airfield operating procedures to mitigate high-risk situations.
- (4) Provide avenues for disseminating information to all assigned and transient aircrew on wildlife hazards and procedures to minimize strike potential.
- (5) Establish guidelines to manage habitat to deter wildlife activity IAW AFI 91-212 and recommendations of USDA-WS.
- (6) Provide guidelines for dispersal and depredation of wildlife that may threaten flight safety.

**4. ASSUMPTIONS:**

- a. **Administration:** Normal.
- b. **Logistics:** Normal.

**5. OPERATIONAL CONSTRAINTS:** None.

**6. COMMAND RELATIONSHIPS:** Normal.

**7. OPSEC:** Normal (See Annex L).

PETERSON.KIRK  
K.W.1013762828

Digitally signed by  
PETERSON.KIRK.W.1013762828  
Date: 2021.10.04 08:45:01 -0500

KIRK W. PETERSON, Colonel, USAF  
Vice Commander, 82d Training Wing

Annexes:

ANNEX A – TASK ORGANIZATION  
ANNEX C – OPERATIONS  
ANNEX L – OPERATIONS SECURITY  
ANNEX Z – DISTRIBUTION

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ANNEX A TO SAFB BASH PLAN

TASK ORGANIZATION

82 TRW/CV  
/PA  
/SE  
/JA

80 FTW/CV  
/SE

80 OG/CC  
/OGV (Supervisor of Flying)

80 OSS/CC  
/OSAT  
/OSAA  
/OSAR

88 FTS/CC  
89 FTS/CC  
90 FTS/CC  
459 FTS/CC  
469 FTS/CC

82 MSG/CC

82 CES/CC

82 SFS/CC

USDA/WS

Wichita Falls Municipal Airport Manager

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ANNEX C TO SAFB BASH PLAN  
OPERATIONS

1. GENERAL: This annex outlines specific actions to be accomplished by tasked agencies.
2. 82D TRAINING WING VICE COMMANDER (82 TRW/CV) will:
  - a. Chair the BHWG meeting.
  - b. Promote a base-wide environment that mitigates wildlife hazards to aircraft.
  - c. Ensure tasked 82 TRW personnel comply with the contents of this plan and decisions of the BHWG.
  - d. Approve recommendations of the BHWG and task agencies as necessary to implement/comply with those recommendations.
3. 82D TRAINING WING PUBLIC AFFAIRS (82 TRW/PA) will:
  - a. Provide, upon request, a public information program designed to inform base personnel, dependents, and the general public on the hazard and costs of uncontrolled wildlife activity, as well as measures being taken to minimize those hazards.
  - b. Provide a representative to the BHWG.
  - c. Provide photographic services to document wildlife strikes and related activities, as requested.
  - d. Provide graphic support to publicize wildlife hazards and actions taken to minimize them, as requested.
4. 82D TRAINING WING SAFETY (82 TRW/SE) will:
  - a. Provide a representative to the BHWG.
  - b. Coordinate on all AF Forms 332, submitted by 80 FTW Flight Safety and Airfield Management, requiring Risk Assessment Codes (RAC).
  - c. Coordinate with 80 FTW/SE on all AF Forms 332 that could potentially cause wildlife threats to aviation.
5. 82D TRAINING WING JUDGE ADVOCATE GENERAL (82 TRW/JA) will:
  - a. Provide a representative to the BHWG.

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- b. Assist and advise 80 FTW/SE in legal matters.
6. 80TH FLYING TRAINING WING VICE COMMANDER (80 FTW/CV) will:
    - a. Promote a flying safety program that emphasizes mitigating wildlife hazards to aircraft.
    - b. Ensure tasked 80 FTW personnel comply with this plan and decisions of the BHWG.
  7. 80TH FLYING TRAINING WING FLIGHT SAFETY (80 FTW/SE) will:
    - a. Perform duties as the OPR for this BASH Plan.
    - b. Ensure all aircraft wildlife strikes or hazards are reported IAW AFI 91-202, DAFI 91-204 and APPENDIX 5 of this annex to this plan.
    - c. Monitor all tasked organizational activities for compliance with this directive.
    - d. Monitor wildlife activity, maintain wildlife strike statistics and advise BHWG chair when meetings are deemed necessary.
    - e. Report all wildlife strikes.
    - f. Disseminate BASH data to the BHWG and all 80 FTW flying units.
    - g. Provide BHWG with the current BASH guidance from higher headquarters, the USAF BASH Team, FAA and USDA-WS.
    - h. As a minimum, conduct BHWG Meetings semi-annually.
    - i. Participate with Airfield Management in the completion of the BASH "Self-Inspection Checklist."
    - j. Monitor SAFB wildlife take/dispersal activities and ensure the appropriate wildlife dispersal equipment is maintained by tasked organizations.
    - k. Respond to and disperse wildlife hazards in coordination with USDA-WS. Under Bird Watch Condition (BWC) MODERATE or SEVERE, to the maximum extent possible, monitor and/or disperse wildlife until the BWC returns to LOW.
  8. 80TH OPERATIONS GROUP COMMANDER (80 OG/CC) will:
    - a. Issue specific guidance for aircrews and the Supervisor of Flying (SOF) on procedures to be followed under BWC (APPENDIX 2).
    - b. Make operational changes to avoid areas and times of known hazardous bird

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concentrations, mission permitting. Consideration shall be given to the following during periods of increased bird activity:

- (1) Avoid takeoffs/landings at dawn/dusk +/-1 hour; limit or prohibit formation takeoffs and landings.
- (2) Depart pattern in trail formation; rejoin 3,000 feet AGL or higher.
- (3) Reschedule local training to when bird hazard conditions are less severe.
- (4) Raise altitude enroute to low-level or training areas.
- (5) Limit time on low-level routes to minimum for training requirements.
- (6) Select low-level routes or training areas based on bird hazard data from USDA-WS, US Fish and Wildlife Service, and other BASH resources, such as the United States Avian Hazard Advisory System (AHAS).
- (7) Raise the minimum altitude in specific wildlife hazard areas of low-level training routes.
- (8) Split up or modify formations during recovery.
- (9) Discontinue formation approaches.
- (10) Direct recovering aircraft to perform only full-stop landings.
- (11) Ensure all pilots and flight line aircraft maintenance personnel are aware of the specific guidance to follow for reporting wildlife strikes (see APPENDIX 5).

9. 80TH OPERATIONS GROUP SUPERVISOR OF FLYING (SOF) will:

- a. Declare and disseminate applicable BWCs or animal hazards on SAFB based on ground observations, pilot reports, and all other available information during wing flying. Listen to recommendations from 80 OSS/OSAA/OSAT and USDA-WS when determining current BWC. BWC codes are the current condition on the airfield. Reference BWC Code descriptions in AFI 91-212 Attachment 1 (see APPENDIX 2, p. C-2-1 of this document), AFI 11-2T-6 Volume 3 80 OG Supplement, and AFI 11-2T-38 Volume 3 80 OG Supplement.
- b. Elevate BWC to MODERATE whenever there are active mowing operations on the airfield.
- c. When BWC is elevated, notify Airfield Management, 80 FTW/SE, the Runway Supervisory Units (RSU), the Air Traffic Control Tower Watch Supervisor, Command Post,

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and squadron operations desks of the precise location of the wildlife hazard.

d. Use all available tools for making the BWC determination. Available tools include AHAS, Bird Avoidance Model (BAM), and recommendations from USDA-WS, 80 FTW/SE, Airfield Management, Tower WS, and RSUs. In addition, the SOF will ensure the active runways are checked visually for wildlife hazards by Airfield Management prior to opening wing flying under an instrument status.

10. 80TH OPERATIONS GROUP RUNWAY SUPERVISORY UNITS (RSU) will:

a. Report significant wildlife sightings to the SOF as soon as possible. The following information should be included:

- (1) Location
- (2) Altitude
- (3) Time of sighting
- (4) Type of bird (if known)
- (5) Approximate number of birds
- (6) Behavior of birds (soaring, flying to or from a location, etc.)

11. 80TH OPERATIONS GROUP STANDARDIZATION/EVALUATION DIVISION (80 OG/OGV) will:

- a. Review with 80 OG/CC all proposed new low-level routes and training areas or changes to existing routes/areas for BASH potential.
- b. Ensure all SOF personnel are fully trained on BASH and BWC procedures.

12. 80TH OPERATIONS SUPPORT SQUADRON AIR TRAFFIC CONTROL (80 OSS/OSAR/OSAT) will:

- a. Report observed wildlife activity to the SOF or Airfield Management as appropriate. In the absence of the SOF, will declare and disseminate BWCs or wildlife hazards on SAFB in coordination with 80 OSS/OSAA, USDA-WS, and 80 FTW/SE.
- b. Issue bird watch advisories to aircrews as required. Ensure any BWC other than LOW is stated on Automatic Terminal Information Service (ATIS). Do not transmit BWC on guard frequencies unless it is an emergency situation.
- c. Provide Airfield Management, 80 FTW/SE (Safety 1 or Wildlife 2) and USDA-WS

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(Wildlife 1) priority access to the runway under BWCs MODERATE or SEVERE or as required (APPENDIX 2).

d. Identify radar targets as possible bird activity when appropriate, to provide warning to pilots.

13. 80TH OPERATIONS SUPPORT SQUADRON AIRFIELD MANAGEMENT (80 OSS/OSAA) will:

- a. Notify 80 FTW/SE when a hazardous bird or wildlife condition on the airfield is identified.
- b. Remove dead wildlife located on the runways and/or taxiways immediately. If a wildlife strike with an aircraft is suspected, forward the remains to 80 FTW/SE for identification, IAW APPENDIX 5.
- c. Brief airfield contractors on responsibilities for bird control on or near the airfield during preconstruction (PRECON) briefings.
- d. Conduct periodic spot inspections of the airfield and open drainage systems for:
  - (1) Standing water.
  - (2) Vegetation identified as a contributing hazard to aircraft safety (trees, bushes, shrubs, weeds, etc.).
  - (3) Correct grass height (7 to 14 inches in height or IAW grass height waivers).
- e. Inform 80 FTW/SE of submittal, status, and completions of all AF Forms 332, *Work Order Request*, to be performed on or near the airfield when directly related to flight safety. Additionally, coordinate with USDA-WS to ensure the project will not introduce wildlife attractants to the airfield.
- f. In the absence of the SOF, will declare and disseminate BWCs or wildlife hazards on SAFB in coordination with 80 OSS/OSAT, USDA-WS, and 80 FTW/SE.
- g. Post the current BWC in Flight Planning room for all aircrews. Update the change in the condition once notified by the SOF.
- h. Keep an accurate daily log of times vehicles executing BASH depredation enter and exit the airfield. These vehicles will use the callsigns "WILDLIFE 1" and "WILDLIFE 2". Depredation operations will be assumed to commence whenever these callsigns report entering the airfield and whenever "Wildlife depredation in effect" is added when the callsign "SAFETY 1" reports entering the airfield. Depredation operations will not be assumed complete until all of these callsigns report exiting the airfield.

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(1) When deprecation operations commence in accordance with the above paragraph, 80 OSS/OSAA personnel will notify 82 SFS BDOC controller of deprecation operations commencing.

(2) 80 OSS/OSAA personnel will notify 82 SFS BDOC controller if deprecation operations will continue after OSAA facilities close.

(3) When all callsigns above have reported exiting the airfield, 80 OSS/OSAA personnel will notify the 82 SFS BDOC controller of deprecation operations terminating. When 80 OSS/OSAA facilities are closed, BASH personnel will notify 82 SFS BDOC controller of termination of deprecation operations.

- i. Respond to and disperse wildlife hazards when USDA-WS and/or 80 FTW/SE are unavailable or need assistance.
- j. Recommend BWC's to the SOF when activity is observed.
- k. Suspend or restrict operations to affected movement surfaces, to include all runways and taxiways, in coordination with the SOF, if available. The Airfield Manager (AFM) will serve as a member of the BHWG and brief issues and trends relating to Airfield Management's role.

14. SQUADRON ASSIGNED FLIGHT SAFETY OFFICERS (SAFSOs) will:

- a. Ensure aircrews are familiar with the BASH program to include:
  - (1) Prompt reporting of all wildlife strikes and hazardous conditions IAW APPENDIX 5 of this plan.
  - (2) Reporting of significant wildlife sightings to the SOF/Air Traffic Control (ATC)/RSU as soon as possible. The following information should be included:
    - (a) Location
    - (b) Altitude
    - (c) Time of sighting
    - (d) Type of bird (if known)
    - (e) Approximate number of birds
    - (f) Behavior of birds (soaring, flying to or from a location, etc.)

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- b. Ensure pilots are aware of proper flight operations during different BWCs. This includes procedures on low-level training routes as determined by AHAS (see APPENDIX 2).
  - c. Ensure that Operations Supervisors post and brief the bird watch condition at step and include the AHAS level for low-level routes and any applicable out-bases. Aircrews will be informed of any BWC change status at SAFB via ATIS and ATC.
  - d. Brief aircrews on seasonal bird hazards. Educational material will be provided by the 80 FTW/SE BASH program manager.
15. 82D MISSION SUPPORT GROUP COMMANDER (82 MSG/CC) will:
- a. Attend all BHWG Meetings. In the absence of the 82 MSG/CC, 82 MSG/CD must attend.
  - b. Ensure subordinate 82 MSG squadrons comply with the contents of this plan and the decisions of the BHWG.
  - c. Notify 82 TRW/CV and 80 FTW/CV if deployments, funding, or other resource limitations might impact the BASH program.
16. 82D CIVIL ENGINEER SQUADRON COMMANDER (82 CES/CC) will:
- a. Attend all BHWG Meetings. In absence of 82 CES/CC, 82 CES/CL must attend.
  - b. Provide representatives from operations, grounds, environmental and entomology to the BHWG. These representatives will provide expertise in their related fields as it applies to the BASH program.
  - c. Ensure subordinate personnel are tasked as appropriate in the mitigation of BASH hazards.
    - (1) Develop plans and budgets to establish, maintain, and promote production of desirable vegetation on the airfield.
      - (a) Develop, maintain, and annually revise an airfield vegetation management plan. This will be used to identify vegetative and soil problems that impact BASH. Long-term solutions to correct those areas will be defined.
      - (b) Coordinate all airfield seeding projects with Natural Resource Manager (NRM) and USDA-WS to ensure appropriate seed blends are selected for site specific BASH and environmental concerns.
      - (c) Ensure construction projects on the airfield that disturb soils are followed by re-seeding programs to promote desirable grasses and minimize establishment of plants

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that will attract wildlife.

- (d) Minimize, as appropriate, weeds that compete against desirable grasses and/or generate BASH concerns on the airfield.
  - (e) Reduce airfield rutting by encouraging a flexible mowing regime that minimizes or eliminates mowing during times of saturated soils.
- (2) Maintain airfield grass height at 7 to 14 inches or in accordance with waivers, and ensure mowers notify Airfield Management when active mowing operations commence on the airfield.
  - (3) Develop plans and budgets to continue reduction of permanent and temporary water sources on the airfield.
  - (4) As necessary, develop plans and budgets to apply pesticides on the airfield to manage invertebrates and rodents that serve as prey base. This will require prior approval from AFCEC/CZOW, with planning and action prompted by 80 FTW/SE. All pesticide applications will be on a case-by-case basis and in concurrence with base NRM and IPM Coordinator.
  - (5) Reduce availability of perching sites on airfield when deemed necessary.
  - (6) Reduce availability of roosting and nesting habitat on base, when deemed necessary.
    - (a) Install exclusionary material to deny bird access to structures (e.g., pigeons in hangars)
    - (b) Under guidance/approval of NRM, remove or prune roost trees. All trees to be planted shall be IAW with the SAFB tree planting list.
  - (7) Inspect perimeter fence regularly and make prompt repairs to reduce large mammal access.
  - (8) Assist Airfield Management, 80 FTW/SE, and USDA-WS in the removal of dead, dying, or wounded wildlife from the airfield or adjacent areas, when notified.
  - (9) Provide direct assistance to 80 FTW/SE and USDA-WS during Blackbird, Grackle, and Starling dispersal projects within base populous. This includes consecutive evenings of utilizing vehicle mounted propane cannons (provided by USDA-WS).
  - (10) Coordinate with 80 FTW/SE on requests for waivers to the approach zone management criteria as per UFC 3-260-01, Airfield and Heliport Planning and Design.
  - (11) Provide maps, diagrams, and GPS/GIS capability to Airfield Management, 80

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FTW/SE, and USDA-WS, when requested.

(12) Promote environmental conditions that will decrease BASH potential at SAFB and include them in the Installation Development Plan: SAFB TX.

(13) Ensure the SAFB Natural Resource Management and Integrated Pest Management Plans are reviewed by 80 FTW/SE for major revision or during five-year plan rewrite cycles.

(14) Modify airfield habitat consistent with runway lateral and approach zone management criteria IAW current regulations.

17. 82D SECURITY FORCES SQUADRON COMMANDER (82 SFS/CC) will:

- a. Provide a representative to the BHWG.
- b. Provide weapons training, non-routine maintenance, and repair for 80 FTW/SE and designees in order to conduct BASH depredation operations.
- c. Ensure all SFS personnel are aware that 80 FTW/SE and USDA-WS personnel are authorized to carry and discharge firearms to mitigate wildlife hazards. Personnel shall also be aware of the vehicle(s) used by 80 FTW/SE and USDA-WS personnel along with normal BASH operating times and AOR as defined in APPENDIX 3 to this annex.
- d. Dispatch adequate personnel in an emergency wildlife situation, as manning and FPCON measures permit, at or near the airfield.

18. USDA-WILDLIFE SERVICES (USDA-WS) will:

- a. Actively monitor wildlife populations and habitats generating strike threats to aviation.
- b. Provide technical assistance to mitigate hazardous wildlife species and habitats.
- c. Serve as the primary operational expert for the direct control of wildlife strike threats.
- d. Conduct technical assistance and/or direct control at off-base locations when deemed necessary to reduce wildlife strike threats to SAFB aircraft.
- e. Report all relevant wildlife activity to 80 FTW/SE.
- f. Notify 82 SFS when initiating and terminating wildlife depredation operations outside the shaded region on the BASH AOR Map or outside the normal BASH operating times.

19. WICHITA FALLS MUNICIPAL AIRPORT MANAGER should:

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- a. Provide a representative to the BHWG.
- b. Support the BASH program as appropriate.
- c. Report hazardous wildlife activity to Airfield Management, 80 FTW/SE, or USDA-WS, as appropriate.

//signed/jg/2 Jun 21//

JOSEPH A. GAGNER, Maj, USAF

80 FTW Chief of Safety

APPENDICES:

APPENDIX 1: BACKGROUND

APPENDIX 2: BIRD HAZARD WARNING SYSTEM

APPENDIX 3: BASH AOR AND OPERATING TIMES

APPENDIX 4: BASH GRID

APPENDIX 5: REPORTS AND FORMS

APPENDIX 6: BIRD HAZARD WORKING GROUP LIST

APPENDIX 7: WILDLIFE ABATEMENT

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APPENDIX 1 TO ANNEX C SAFB BASH PLAN  
BACKGROUND

1. GENERAL:

a. Purpose: This appendix provides BASH information that references the local geographic area and associated wildlife hazards. General background information is provided, as well as actions to mitigate specific threats.

b. Mission: See Basic Plan.

2. GENERAL BASH INFORMATION:

a. SAFB is located in the extreme north central part of Texas, adjacent to the City of Wichita Falls.

(1) North Texas is within the Central Flyway, a natural migratory flight corridor for migratory birds. Pilots conducting pattern work, low-level sorties, and final approaches are at increased risk during periods of active migration; a high percentage of bird strikes occur at or below 3,000 ft above ground level (AGL) and such phases of flight increase the duration and probability of an aircraft and bird occupying the same altitude/space. Safety alerts are distributed to flying squadrons to inform them of upcoming migration periods and pilots are required to report any bird activity along the routes which may pose hazards to safe flight.

(2) Low-level routes pose the most significant hazard due to the altitudes and airspeeds employed during training. The routes around SAFB are usually flown at 500 ft AGL and at airspeeds from 210 to 420 knots groundspeed. Thermal generating terrain and small lakes along the routes are unavoidable. Pilots are required to report any bird activity along the routes which may pose a hazard to safe flight.

(3) The City of Wichita Falls contains numerous bodies of water, structures, landscape designs, and undeveloped land providing habitat for a variety of birds. Many of these birds will traverse and/or land upon the airfield during foraging activities. The City of Wichita Falls and SAFB have a MOU to directly manage strike hazards at the source (in town), when deemed necessary by 80 FTW/SE.

(a) Lake Wichita, a 1,200-acre reservoir located on the south side of Wichita Falls, is used as a roost site by overwintering gulls and pelicans. Gulls are present from Oct-Apr, while some pelicans are present year-round. Gulls from the lake will utilize the airfield. Pelicans pose threats to VFR sorties over this and other large reservoirs. Lake Wichita and numerous bodies of water throughout town are utilized by non-migratory, resident Canada Geese throughout the year.

(b) Feral Pigeons are well established in the city. These birds roost beneath

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overpasses and within many other man-made structures.

(c) Seasonal night roosts containing thousands of grackles and starlings are common in ornamental trees adjacent to well-lit areas in Wichita Falls. These birds will also roost within Cattails and Phragmites (reeds) in the local area. These birds will form multiple roosts within Wichita Falls and surrounding areas from late summer through fall. However, as quality of roost habitat declines in winter, roost locations become fewer and the quantity of birds within each roost increases substantially. Some historic roosts sites are located below:

- 1 Trees adjacent to hotels at intersection of Maurine Street and Hwy 287
- 2 Cattail vegetation within small lake behind Atwood's at Loop 11
- 3 Phragmites behind SAFB
- 4 Automotive, south of Freedom Estates
- 5 Phragmites adjacent to the eastern perimeter fence of airfield
- 6 Phragmites behind residence, NW of the Airport Drive and Hwy 240 intersection
- 7 Phragmites near McDonald's restaurant on Enterprise Street
- 8 Phragmites located 3.8 miles southwest of base at 3715 Old Iowa Park Road
- 9 Trees at the intersection of Southwest Pkwy and Kemp Blvd
- 10 Sikes Center Mall
- 11 McDonald's on Southwest Pkwy and McNiel Ave
- 12 Trees adjacent to United Regional Hospital
- 13 Trees adjacent to Kentucky Fried Chicken at the I-44 and Airport Drive intersection

(d) Red-winged Blackbirds, Common Grackles, and Brown-headed Cowbirds occasionally form communal roosts with the great-tailed grackles and starlings in the local area. They are rarely observed roosting at SAFB or within the tree locations listed above. Known historical roost sites of these birds are listed below.

- 1 Private land near Bacon Switch Road and Hwy 240 intersection (roost habitat (Cattails) is only available when area remains flooded for an extended period of time)

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2 Phragmites listed in (c) 3, 4, 5, 6, and 7 above

3 Cattails on small lake behind Atwood's at Loop 1

4 Flood plain habitat (rushes and cattails) along southern portion of Lake Wichita. This roost is currently not a threat to the flying operations, but should be monitored

(e) Egret rookeries (nesting colonies) have a history of establishing within the city of Wichita Falls. They will typically select undeveloped tracts of land for nesting, but it is not uncommon for Egrets to nest within inhabited areas. From 2009 - 2016, the BASH Team dispersed 9 rookeries/roosts within city limits to offset flight paths of these birds away from the airfield; this further involved the removal of nesting habitat of five of those properties. In 2019, Egrets moved from the East side rookery to behind the Crossroads apartments off of the Archer City Highway. This rookery has presented new strike hazards to Kickapoo Downtown Airport and SAFB. The BASH team is currently working to disperse this rookery in order to mitigate this years' hazard. Plans are underway to remove the habitat when the birds migrate this winter with the goal of permanent habitat removal. In 2020, Egrets relocated to the McGregor property behind Walmart and the apartment complex on Southwest Parkway/Archer City Highway. (Approximately 1 mile west of their previous location). The rookery was identified to be a threat to SAFB due to past migratory patterns and was removed IAW local and federal regulations/guidance. A memorandum of understanding/standard operating procedure (SOP) was drafted by SAFB USDA representative Ted Pepps to further streamline the process/coordination of rookery removals. Reference the "Cattle Egret Management to Protect Aviation Safety at SAFB" memorandum for more information. Egret rookery sites and flight patterns are continually monitored by the BASH team at SAFB.

b. SAFB is 5,719 acres with wildlife strike hazards originating from multiple on-base locations. The BASH Program categorizes the base into four general areas.

(1) Developed Area. Consumes most of the west side of base and consists of office buildings and aircraft hangars, as well as a variety of miscellaneous structures, training areas, and residential dwellings. Ornamental trees and shrubs are abundant throughout this area, along with native and introduced grasses.

(a) Feral pigeons, European starlings, American kestrels, and Barn owls, as well as many Passerine birds, roost and nest within the cavities provided by these structures. Skunks, Raccoons, and Gray foxes, a lesser BASH concern, will also occupy these structures and forage on the airfield.

(b) Raptors utilize the numerous light poles, telephone poles, and many other elevated

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structures within this area for perch hunting. The same birds found hunting in developed areas also utilize the airfield.

(c) Barn swallows build mud nests and brood young beneath building overhangs, venturing onto the airfield to feed on insects.

(d) During spring and summer, ornamental trees provide ample nesting habitat for many bird species (e.g., Western kingbird and Mourning dove).

(e) Outside of nesting season, trees located within lighted distance of building and parking lot lights are preferred night roosts by large flocks of European starlings and grackles; buildings serve as thermal cover and lights aid in the detection of nocturnal predators. As deciduous trees drop leaves in the fall, flocks seek evergreen trees on base in similar locations for protection. Starlings and grackles from surrounding areas will migrate to these evergreen tree roosts by winter, joining the SAFB roosting population. As a result, the SAFB population can increase substantially during winter months. Without significant human intervention, winter roosts will remain on base until spring nesting season.

(f) Open grounds within this area are typically well maintained and mowed shorter than adjacent areas. Many bird species utilize this short grass for feeding and staging; food is more accessible (exposed) in short grass and groups of birds can maintain visual communication with each other, as well as easily detect most predators.

(g) The mosaic pattern of this habitat provides ideal foraging, loafing, and nesting habitat for black-tailed jackrabbits; these rabbits migrate to the airfield.

(2) Frisbee Golf Course/Outdoor Recreational Area. Is located on the southwest side of base and adjacent to final approach of Runway 35. Birds that use this area will randomly traverse the airfield. Associated wildlife hazards predominately stem from short turf grasses, three ponds, and mature trees.

(a) An assortment of small-to-medium sized bird species feed and loaf within the short grasses.

(b) Waterfowl utilize the closed golf course ponds. Resident Canada Geese and Mallard Ducks will occasionally nest and brood young on the ponds during spring and summer. Migratory waterfowl are not uncommon at these ponds during fall, winter, and early spring.

(c) Wading birds, such as Great Blue Herons and Great Egrets, fish along the pond banks.

(d) Mississippi kites nest within the trees and will occasionally hunt in groups on the airfield.

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(e) The three ponds of the closed golf course are currently closed to fishing. Should a fishing program be desired, careful planning with 80 FTW/SE, NRM, and USDA-WS is mandatory to minimize negative impacts to aviation safety.

(3) Natural Areas. Dominate the northwest side of base, consisting of riparian zones and rangeland. Large trees with dense understory growth are associated with these riparian zones. A mesquite-grassland savannah dominates most of the rangeland areas.

(a) Large mammals that gain access to base, such as deer, often seek refuge in these habitats. Strike threats are generated when large animals leave the natural areas and enter the airfield.

(b) Beavers are relatively common in the riparian zones. Rapid dam construction contributes to the flooding of an adjacent private property, which stems the production of cattails used by roosting blackbirds. This flooding also generates growth of desirable food sources for winter waterfowl and further serves as a breeding source for mosquitos. With culverts dammed, excessive rainfall also threatens the integrity of nearby perimeter fencing and graveled road beds. Trees and telephone poles in this area are frequented by raptors. As these birds soar with day-time heating, strike threats increase to pattern sorties and civilian aircraft on approach to Runway 17/35. The same Raptors found within natural areas on base also utilize the airfield.

(4) Airfield. Located on the east side of base and comprising approximately 2,000 acres. This contiguous grassland provides suitable habitat for many hazardous wildlife species. Perennial grasses dominate this landscape, intermixed with annual grasses, broadleaf weeds, and legumes, to include mesquite shrub. Numerous structures exist on the airfield and are used by birds for perching. Paved surfaces, graveled road beds, and sparse ground cover also exist and are exploited by wildlife. Permanent and temporary water sources are also present, providing additional food and water resources. The base perimeter fence, is greatly depended upon to minimize large mammal access to the airfield.

(a) Ground-nesting grassland birds (e.g., Meadowlarks) rely almost entirely on large contiguous grasslands during spring and summer for nesting, foraging, and roosting. Those that overwinter on base will forage and form night roosts within airfield grasses. Well camouflaged, these birds are highly adept at eluding BASH patrols, preferring to escape by hiding in grasses and not necessarily flying away; these birds can be difficult to detect and even more difficult to disperse entirely from the airfield.

(b) During spring, summer, and early fall, most of the birds foraging on the airfield are in pursuit of invertebrates, although some will opportunistically forage on seeds. As invertebrate populations decline in fall, most birds remaining on the airfield become dependent on seed for winter subsistence. Doves are one of the few exceptions, feeding entirely on seed and grain throughout the year.

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(c) Airfield vegetation provides suitable habitat for black-tailed jackrabbits and many small rodents, such as white-footed mice and hispid cotton rats. Jackrabbits are a direct strike threat to aircraft, but any of these small mammals can attract predatory mammals and raptors onto the airfield and are significantly exploited by predators in freshly mowed areas.

(d) Johnson grass is the most problematic perennial grassy weed on the airfield. This plant can exceed 4 feet and generates vertical re-growth quicker than other grasses, requiring frequent mowing; each mowing generates additional strike threats, attracting birds by displacing, maiming, or killing invertebrate and rodent species. Seeds of this grass are also utilized by birds. Due to the clump-like growth structure of this plant, once mowed, inadequate ground cover exists between plants and birds utilize the sparse cover as feeding lanes and screening cover. With successive, timely mowing, the vigor of Johnson grass is diminished and other weeds that can also negatively impact BASH may become established.

(e) Varying with seasonal environmental conditions, numerous species of annual grasses may exist throughout the airfield. Annual grasses tend to increase when perennial grasses are weakened or killed by soil disturbances, hard winters, drought, saturated soils, or indiscriminate use of herbicides. Some of these plants do not pose hazards to BASH while others compete heavily with desired grasses and/or produce seed desired by birds. Barnyard grass and foxtail are two examples of these plant types that grow on the airfield.

(f) There are numerous species of broadleaf weeds on the airfield. Like annual grasses, these plants typically increase with excessive environmental conditions and disturbed soil. Some of these plants are long-lived perennials, while others are short-lived annuals or bi-annuals. Some do not pose hazards to BASH while others compete heavily with desired grasses and/or produce seed desired by birds. Western ragweed, a perennial plant, is the most abundant and wide spread broadleaf weed on the airfield with seeds that are highly desired by birds and small rodents.

(g) Legumes are numerous throughout the airfield and can produce seeds desired by wildlife. Some are perennial, while others are bi-annuals or annuals. Many annual legumes are cool-season plants that under proper mowing regimes and elevated temperatures, quickly die off by late spring. Legumes growing along the edge of paved surfaces, on bare ground, or in thin grass stands, can be especially problematic; seeds are readily exposed to birds. Prairie Bundle Flower and Slim-pod Milkvetch are just two examples of legumes that can be problematic on the airfield.

(h) Mesquite is a woody-stemmed legume. Undisturbed, this plant will grow into a mature tree. Under airfield mowing regimes, this plant remains a low-lying scrub bush that can be difficult to control. Vertical stems of this plant often peak above grasses, providing perch sites and cover for birds. In late summer, bean pods are

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produced by this plant and become relished food for coyotes and other wildlife. Also a nuisance, this plant produces many thorns exceeding 1" in length, puncturing tires of airfield vehicles and creating a puncture wound hazard to personnel.

(i) Numerous structures on the airfield provide artificial perch sites for birds. These structures are used for hunting prey and detecting threats, as well as general loafing. During breeding season, perches are commonly used by grassland birds for courtship and guarding territories. Many of these perches (e.g., distance remaining markers) are located immediately adjacent to runways, with birds traversing runways to squabble.

(j) There are several sparsely covered ground locations on the airfield that lack sufficient vegetation. Absence of vegetative cover increases the probability of food or grit (aids in digestion) being exploited by birds. Several bird species also seek this habitat for loafing and nesting, with plumage and egg color patterns matching that of graveled bare ground. These areas are often the result of poor soils and/or erosion. Compacted soils associated with construction projects and other off-road vehicle use also contribute. The abundant stretches of paved and graveled surfaces on the airfield are heavily exploited by birds; invertebrates and seed are totally exposed on these surfaces.

(k) Two permanent water sources and several temporary water sources exist on the airfield.

1 One open ditch runs west to east, from Runway 17/35 to Taxiway Delta. At Taxiway Delta, the ditch becomes an enclosed and buried culvert system until it reaches the outflow, located adjacent to the SE corner of the airfield's perimeter fence. Though fenced out and appearing to be on private land, a considerable portion of the outflow ditch is property of SAFB. Numerous small bird species utilize portions of this entire ditch for watering and feeding, with foraging ducks commonly observed during winter. Herons and Egrets also utilize these waters and are typically observed fishing near ditch headwalls. Beavers will occasionally erect a series of dams within the outflow area, increasing the attractive features of this ditch to birds.

2 In 2012, SAFB completed a project that enclosed an open ditch running north to south, along the eastern edge of Runway 15/33C, to include airfield portions of Bear Creek. The outflow basin of Bear Creek, located on the eastern portion of the airfield, is the only visible remnant of this ditch. This shallow basin remains a permanent water source, but bird utilization has greatly diminished since ditch enclosure. Doves, Shorebirds, and Passerines are the predominate birds observed at this location.

3 Several low-lying areas on the airfield hold water for an extended period following precipitation. These areas are occasionally utilized by Herons, Egrets, and waterfowl and frequently used by small-to-medium-sized insectivorous

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perching birds and shorebirds.

(1) The perimeter fence consists of seven feet of chain-link fencing, with the top foot of fence supporting three strands of barbed wire on 45-degree outriggers. One-way water gates and other materials have been installed beneath the fence in areas that receive considerable water run-off. Coyotes, dogs, deer, and occasionally feral hogs, utilize spaces beneath the remaining fence to gain access to the base. Erosion and over-elevated fence bottoms contribute to these spaces, but many gaps are the result of coyote digs.

c. Rural areas in the vicinity of SAFB are dominated by cultivated lands and rangeland, with many stock ponds interspersed throughout. The resources within these lands cause birds to traverse the airfield, or utilize airspace frequented by approaching/departing aircraft.

(1) Winter wheat is the dominant grain crop in the local area impacting BASH. Wheat fields exist for many square miles and are adjacent to the airfield. Feral pigeons and doves from SAFB, as well as surrounding communities will traverse the airfield to feed on wheat kernels made available from harvesting, resting, plowing, and sowing of fields. This bird activity is highest from May-October. Geese are occasionally observed foraging in actively growing wheat fields.

(2) Rangeland exists throughout the local area and adjacent to SAFB. These lands are predominately used for cattle grazing. Supplemental watering and feeding of livestock attract pigeons, blackbirds, grackles, and starlings, especially when cattle are confined to pens or lots. Vultures are occasionally attracted to these locations following livestock mortalities and during calving. Cattle Egrets and flocks of Brown-headed Cowbirds frequently feed next to cattle, hunting invertebrates displaced by grazing activity.

(3) Numerous duck species forage and roost on stock ponds in the local area. Peak activity is during fall and winter months.

d. Through a joint-use contract, T-6 aircraft from SAFB utilize a small auxiliary field in Frederick, Oklahoma, called Hacker. This airfield is adjacent to a federal wildlife management area called Hackberry Flats which is approximately 7,000 acres and is located 8 miles SE of Frederick. The area was designed for recreational bird and waterfowl hunting and conservation, containing 4,000 acres of wetland habitat and 3,000 acres of upland habitat. A wide variety of birds utilize this area, including migratory waterfowl, wading birds, and shorebirds.

e. R-5601 (Falcon Range) is used by T-38 aircraft from SAFB and is just south of the Wichita Mountains. These mountains provide optimal nesting and roosting habitat for vultures. The thermal generating terrain of this area is utilized by many additional raptors, such as Red-tailed hawks and Mississippi kites.

3. BASH MITIGATION: This appendix provides general information on mitigating some of

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the known wildlife hazards to SAFB aircraft. A brief description of methods to mitigate habitat issues and aircraft strikes with wildlife is included. Each control measure may require action by one or more tasked organizations as described in the basic plan.

a. AIRFIELD HABITAT

(1) Johnson Grass. A pioneer species that prefers disturbed soils for initial establishment. Prevention is the best control practice and accomplished by establishing and maintaining competitive grasses on the airfield. In new plantings, herbicide applications are often necessary to prevent this plant from establishing and competing against desired grasses. Johnson grass can be culled from established stands of desirable vegetation through a selective herbicide program. Dense, monolithic Johnson grass should be chemically removed, followed by seeding with competitive grasses. Ideally, removal involves herbicide treatments in late summer to kill or weaken roots, followed by additional herbicide applications and seeding with desirable grasses during the following spring or early summer. *(Note: Considerable acreage of Johnson grass on the airfield has been controlled under the FY14, FY15, FY16, FY17, FY18, FY19, FY20 and FY21 Airfield Restoration Program.)*

(2) Annual Grasses. These plants are unavoidable, but can be minimized through proper management that promotes the establishment, growth, and vigor of desirable perennial grasses. On a case-by-case basis, thin strands of annual grasses may need to be selectively controlled with herbicides, while dense stands may need to be removed completely and replaced with desirable grasses. Due to fluctuations in the presence of these plants, site specific control practices will need to be decided upon as they occur.

(3) Broadleaf Weeds. These plants are unavoidable, but can be mitigated through proper management practices that promote the establishment, growth, and vigor of desirable perennial grasses. Mowing is a vital tool to reduce broadleaf weed competition against grasses, but many can still survive and flourish under the mandated 7-14" mowing regime. On a case-by-case basis, broadleaf weeds should be controlled with selective herbicides to give adjacent grasses the competitive edge. In areas of monolithic weed growth, all undesirable vegetation should be chemically and/or mechanically removed, and seeded with competitive grasses. *(Note: Considerable acreage of monolithic Western ragweed has been identified on the airfield and is being controlled under the FY14, FY15, FY16, FY17, FY18, FY19, FY20 and FY21 Airfield Restoration Program.)*

(4) Legumes. As with other weedy species, most problematic legumes are best controlled through proper grass management practices. When legumes are growing in a manner that becomes a genuine BASH threat, selective herbicides should be used to specifically target those plants, leaving perennial grasses unharmed. In extreme cases, legumes would need to be mechanically removed and replaced with desirable grasses. Few circumstances are likely to exist on the airfield that would warrant the mechanical removal of legumes, except for Mesquite.

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(5) Mesquite. Establishing and maintaining strong perennial grasses is the best long-term solution to minimize Mesquite invasions. Mowing reduces vertical growth of this plant, but also encourages lateral growth, which compounds the problem. Mesquite can be controlled through reoccurring herbicide spot treatments or mechanical removal. Mechanical removal involves the use of an excavator with a "grubbing" implement that pulls the entire plant from the soil. Any excavated soils should be leveled and seeded with desirable grasses.

(6) Perch Sites. SAFB has installed bird spikes throughout many airfield structures and should continue doing so where deemed necessary. Structures on the airfield that are no longer operational should be promptly removed. Projects have been executed to remove trees growing along the perimeter fence. Regrowth of these trees should be monitored, with removal efforts being re-accomplished as necessary.

(7) Sparse Ground. Utilization of sparse ground by birds on the airfield varies greatly from one location to another. Some locations have been bare for many years with very little use by birds; it is important to use site specific, historical bird observations to identify areas in need of prompt correction, with plans made accordingly.

(a) Due to naturally poor soil conditions, many of these areas may require additional topsoil and/or unique seed blends to support any significant vegetation.

(b) Some soils are too saline, requiring frequent applications of gypsum amendments to the soil, additional topsoil, and/or sowing of unique seed blends of grasses that will grow under saline conditions.

(c) Minimize the size of areas disturbed during construction projects and promptly correct soil compaction or disturbances. This includes associated staging areas and off-road vehicle routes taken by heavy equipment.

(d) Encourage off-road vehicle operators to rotate travel paths taken through airfield grasses; this reduces the occurrence of dirt paths created by tire compaction of soil.

(e) Avoid mowing saturated soils. Inattention to this will result in soil compaction and deteriorating grass density/health. Rutting will also result and lead to standing water, erosion, and problematic weeds. Rutting further denudes shallow soils of existing vegetation, taking years to recover.

(8) Permanent and Temporary Water.

(a) Continue base plans to modify open ditches on the airfield into enclosed and buried culvert systems.

(b) Until all flowing ditches on the airfield are enclosed, maintain steep ditch banks to reduce emergent vegetation and use by wading birds.

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(c) Monitor outflow basin of Bear Creek for debris and sediment deposits. Remove these materials as necessary to prevent establishment of microhabitats that will attract birds.

(d) Remove vegetation or debris from ditches when deemed to be impeding water flow or generating other BASH concerns.

(e) Monitor and repair areas around airfield drainage grates to ensure proper drainage is not being impeded by debris, rutting, sediment deposits, or settling soils.

(f) Continue base plans to fill or otherwise modify low-lying areas on the airfield that temporarily hold water following precipitation.

(9) Perimeter Fence. Inspect frequently for deficiencies that permit large mammal access to base. Loose or broken strands of barbed wire should be repaired promptly to minimize ease in which deer can jump the fence. Lengthy gaps and large holes beneath the fence should be promptly corrected with additional soil, rocks, or other exclusion materials. Water gates should be inspected regularly to ensure they are properly closing and clear of debris. Design and seek funding to install an apron fence beneath the existing perimeter fence as well as deer "jump-outs" to provide deer easy escape from the airfield when required.

b. BIRD SPECIES

(1) Ground Nesting Grassland Birds. Includes numerous species, but those that are most frequently observed on the airfield are Horned lark, Upland sandpiper, Eastern meadowlark, and Western meadowlark.

(a) Horned larks prefer areas of short grass, sparse ground cover, and pavement on the airfield. In spring and summer, breeding pairs and offspring are typically seen together at any given time. During fall and winter, these birds form large flocks with other sparrow-sized grassland birds, typically feeding in short grasses and bare-gravelly areas. In general, maintaining dense grass stands are critical to avoiding this species. Avoid prescribed burns in preparation for October airshows on the airfield, if at all possible. Any areas that do not regenerate a dense stand of grass by first frost will be utilized by these birds throughout winter. Shooting is an effective means of reducing annual spring/summer breeding populations on the airfield. Repetitive harassment with shooting, pyrotechnics, and vehicle chase can be marginally effective against winter flocks, but habitat management is critical to mitigate winter populations.

(b) Upland sandpipers are most abundant on the airfield from early April to mid-May, during staging periods of their spring migration north. Small concentrations are observed in late summer and early fall. These species will utilize a wide variety of

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habitats in pursuit of invertebrates and do not respond well to non-lethal harassment. A targeted invertebrate control program within areas of critical flight on the airfield would likely benefit BASH.

(c) Eastern meadowlarks are most abundant on the airfield during spring and summer. This bird is attracted to the airfield due to suitable ground nesting habitat and an abundance of invertebrate prey species. March through July is the courting, breeding and nesting season of this bird. A grass mowing height of 5-12 inches during this time of year may cause nest abandonment and direct failure of nests, which reduces strike threats. Although a grass height waiver has been secured through AFSEC/SEFW to maintain grasses below 7 inches at SAFB, this should only be executed when requested by 80 FTW/SE and USDA-WS. Targeted invertebrate control within critical area of flight on the airfield, combined with cutting grasses shorter during the breeding season, are likely the best long-term control strategies for this species. Lethal control during the breeding season and year-round hazing are also essential in mitigating this species.

(d) Western meadowlarks are most abundant on the airfield from late summer into early spring. During this time of year, flock size can exceed 50 birds. This species will feed on living and deceased invertebrates as available. Once invertebrates decline in late fall, these birds feed on seeds and waste grains found on and near the airfield environment. During warm winter days and in early spring, caterpillars are frequently observed on the airfield and are readily pursued by meadowlarks and other insectivorous birds; early fall invertebrate control practices may aid in mitigating meadowlark hazards. Repetitive harassment with lethal shooting, pyrotechnics, and vehicle chase can be effective against winter flocks. However, this species will often come back to the same general area once hazing operations have ceased; habitat management that minimizes weeds and promotes dense grass is critical. A targeted invertebrate control program to reduce caterpillar densities would further reduce meadowlark strike threats.

(2) Blackbirds, Grackles, Cowbirds, and Starlings. These birds can be particularly hazardous due to large flocks containing thousands of birds.

(a) When observed feeding on the airfield, both pyrotechnics and shooting are effective methods for immediate dispersal.

(b) During times of year when these birds are known to be traversing the airfield in great masses, as a result of communal roosting activity, at all costs, minimize flying during the first and last hour of daylight; this is the time when these birds migrate across the airfield to reach feeding and roosting sites. The best long-term solution is to reduce availability of known roost habitat. This involves the removal or significant pruning of specific evergreen trees adjacent to specific lighted areas that are known winter roost locations. Note that NRM must approve the tree removal. When deemed safe by 82 TRW/SE, turning off lights near known roost sites will also help to keep birds from roosting at select locations.

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(c) Roost dispersal is often the most acceptable and practical means of moving roosts from SAFB. This is best accomplished after leaf drop of deciduous trees (leaves provide thermal cover), which minimizes the availability of alternate roost habitat on base, as well as habitats adjacent to base. Roost dispersal is achieved via pyrotechnic and propane cannon harassment beneath roost trees for at least five consecutive evenings.

(d) Off-base roost habitats should be reviewed IAW Wichita Falls MOU with SAFB. If at all possible, off-base roost habitat should be altered to keep these birds from roosting near base and flying over the airfield. SAFB has previously worked with the city to have high risk phragmite areas mowed at no cost when possible.

(3) Cattle Egrets. Migrate to North Texas in late March, with fall dispersal initiated by late September. During spring and summer, this flocking species establishes large nesting colonies called rookeries. If left undisturbed, Egrets will return to the same rookery for subsequent years. These birds prefer to feed in open fields, feeding on invertebrates that are typically displaced by active mowing, farming, or livestock grazing.

(a) The primary threat associated with any nearby rookery is movement across the airfield enroute to and upon return from feeding grounds, beyond base boundaries. When USDA- WS warns 80 FTW that these birds are traversing the airfield in great masses, as a result of communal roosting activity, at all costs, minimize flying during the first and last hour of daylight. While brooding young, these birds make multiple feeding trips across the airfield throughout the day. By August, most of the young have fledged from nests, resulting in large flocks that traverse the airfield twice, shortly after sunrise and just prior to sunset. However, Egrets will occasionally feed throughout the day on the airfield, if permitted. Such activity is generally attributed to airfield mowing and areas that collect standing water following precipitation.

(b) There are no Egret rookeries on base and none will be permitted.

(c) Off-base rookeries that generate strike threats to SAFB aircraft will be mitigated IAW MOU between SAFB and Wichita Falls. This requires a cooperative effort among the City of Wichita Falls, SAFB, USDA-WS, and private landowners. All legal options will be considered. Ref page C-1-3 para (e) for more Egret information

(d) When airfield mowing operations attract these birds, AMOPS should be notified and mowing cease until the birds have been dispersed. Hazing and shooting will be used as needed to disperse Egrets that land on the airfield.

(e) The proactive removal of standing water should continue on the airfield.

(f) Insecticide applications should also be considered, when warranted.

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(g) In July 2013 a SAFB T-38 crashed after striking a Cattle Egret on the airfield.

(4) Migratory Waterfowl (ducks and geese). Migrating waterfowl are particularly dangerous to flight safety due to large numbers and generally higher altitude of the birds. Vast quantities of waterfowl travel through North Texas along traditional flyways to their breeding and wintering grounds during spring and fall. Flocks may stop along the route awaiting favorable weather conditions to continue, with many choosing to overwinter in the local area.

(a) Active migration is driven by many factors and occurs throughout many months, with some species migrating earlier or later than others. The highest numbers of migratory waterfowl are present in the local area during fall, winter, and early spring. During active migration periods, avoidance of flying during late evening and early morning hours are generally safest. Known wintering concentration areas should be avoided.

(b) The primary attraction for these birds on the airfield is standing water. SAFB should continue proactive measures to reduce the presence of standing water on the airfield, with harassment and shooting being utilized to disperse these birds as necessary.

(5) Non-Migratory Waterfowl (Mallard duck and Canada geese). Though many Mallard ducks and Canada geese are highly migratory, there are resident populations that remain in the local area year-round.

(a) Resident Mallard ducks will utilize areas of standing water on the airfield for feeding and loafing. SAFB should continue proactive measures to reduce standing water on the airfield and utilize harassment, shooting, or trapping when necessary to control resident duck populations.

(b) Resident Canada geese in the local area are the result of conservation efforts from the 1980's and 90's when goslings were transported to Oklahoma to establish a sustainable goose population for hunter harvest. Without adults to instill migratory behavior, the goslings lost their instinct to migrate and became resident birds in many urban areas, expanding their range and populations considerably since. These birds weigh 10-12 pounds and there are over 500 known breeding pairs within the vicinity of SAFB.

(c) Select removal of breeding adults and a long-term egg oiling program has been implemented by USDA-WS in the local area to reduce local population growth and subsequent threats of this species.

(d) In 2016, USAD-WS initiated a local goose banding program to gather data on this species for future management.

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(e) Geese that are found loafing on or near the flight line will be dispersed or depredated at the discretion of the BASH operator. Resident geese have been observed feeding and nesting on the closed golf course and will not be tolerated on SAFB property. Upon discovery, any adults or associated nests and eggs will be promptly removed.

(6) Diurnal Raptors. These are birds of prey that hunt during daylight hours and are particularly hazardous to aircraft because of their size, behavior and/or widespread distribution throughout the local area. Many raptors (especially vultures) use thermals to their advantage in search for prey. Soaring activity increases with daytime heating and thermal-generating terrain. Airfield mowing and adjacent farming activities will often attract raptors. Caution should be used by pilots when active mowing or farming is taking place on or near the airfield. The coordination of mowing schedules to take place during non-flying times should be considered when possible. Airfield structures that provide hunting perches for raptors should be modified with anti-perching devices or removed entirely when no longer operational. When warranted, an insecticide or rodenticide program should be considered to reduce prey base of these birds. The diurnal raptors frequently observed at SAFB are:

(a) American kestrel. Observed year-round. During spring, summer, and early fall, this bird predominately feeds on invertebrates, but changes diet to small rodents and small birds in fall/winter. Kestrels are challenging to deter with anti-perching devices. These birds will readily hover within the path of aircraft while hyper-focusing on prey; this makes them very susceptible to being struck. Kestrels will be managed through shooting, harassment, trap-and-relocate, or trap-euthanize program.

(b) Mississippi kite. Common on airfield and adjacent areas during summer. Diet consists predominately of large insects. This species will hunt in large groups and is especially attracted to the airfield during mowing operations. When airfield mowing operations attract kites, AMOPS should be notified and mowing cease until the birds have been dispersed. These birds often nest within populated areas of SAFB and on the closed golf course and will be managed via shooting, harassment, or nest destruction. Nest destruction will only be used in extreme scenarios.

(c) Northern harrier. Common on airfield during fall and winter. Diet consists predominately of small rodents and small-to-medium sized birds. Unlike most raptors, harriers spend minimal time hunting from perches, with most of the day spent on the wing or resting on the ground. Though they can reach considerable altitude, harriers typically glide back and forth across the airfield, just above the vegetation in pursuit of prey. Like kestrels, they also have a tendency to hyper-focus on prey. Harriers will be managed through shooting, harassment, and a trap-relocate program.

(d) Red-tailed hawk. Observed year-round. Highly opportunistic, taking a wide variety of prey species. This hawk species spends considerable time hunting from perches, but will also readily hunt by soaring. These birds are especially attracted to

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mowing operations, but in lesser quantities than Mississippi kites or Swainson's hawks. Red-tailed hawks will be managed through shooting, harassment, trap-band-relocate, or trap-euthanize program.

(e) Swainson's Hawk. Observed on airfield during spring, summer, and early fall. Highly opportunistic, this bird feeds on invertebrates, reptiles, small mammals, and small-to-medium sized birds. During spring and late summer, Swainson's Hawks migrate through North Texas in large groups (aka kettles), sometimes containing well over 50 individual birds. Mowing and farming operations, as well as spikes within invertebrate or rodent populations, attract these large groups onto and within the immediate vicinity of the airfield. When airfield mowing operations attract these birds, it is paramount that AMOPS be notified and mowing cease until the birds have been dispersed. Several pair of Swainson's hawks will breed/nest near SAFB during the summer. This species will be managed through shooting, harassment, trap-band-relocate, or trap-euthanize program.

(f) Vultures (Turkey and Black vulture). Common in Wichita Falls area from mid-February through early November, but migrates a short distance south for the winter. Turkey vultures are strictly scavengers, while Black vultures are both scavengers and predators. To find food sources, turkey vultures rely on their vision, sense of smell, and ability to soar for lengthy durations. Black vultures have a tendency to follow Turkey vultures to find carrion. These birds are cavity nesters, and will often nest in rock outcropping, cliff facings, and numerous types of manmade structures. Outside the nesting season, vultures often form communal roosts in mature trees or upon rock outcroppings, water towers, cellular telephone towers, and electrical transmission towers.

1 Soaring activity increases with daytime heating and thermal-generating terrain such as lake dams and hilltops, which should be avoided when possible. Landfills are also particularly attractive to soaring vultures and should also be avoided.

2 Areas surrounding Falcon Range serve as ideal nesting and roosting habitat for these birds. The rough topography of this landscape also generates ideal thermal activity for soaring raptors. Pilot's utilizing Falcon Range should use caution during times of year when these birds are present and request visual inspection by the Range Control Officer prior to conducting range operations.

3 Airfield mowing, vehicle activity, and adjacent farming activities will inevitably kill wildlife and attract vultures. Any dead animals observed on the airfield should be reported to Airfield Management for prompt removal. Road kill along state and county roads adjacent to SAFB should be removed when deemed a threat. Should farming or dead livestock result in vulture activity, SAFB should enter dialogue with the private landowner in an attempt to remove carrion.

4 There are currently no vultures roosting or nesting at SAFB, but suitable habitat exists adjacent to base property. Should off-base vulture roosts generate

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strike threats, USDA-WS through cooperative agreements, will provide technical assistance and/or direct control at the location to mitigate the threat.

(g) Gulls. Ring-billed and Franklin's gulls begin arrival in North Texas by late October. Ring-billed gulls leave the local area by late April and Franklin's gulls leave by mid-May. Gulls become problematic on the airfield when significant rainfall results in mass earthworm migrations along paved surfaces (i.e., runways/taxiways). This activity should be expected whenever significant rain falls between late October and mid-May. BASH patrols will use lethal shooting and harassment to rapidly disperse these birds from the airfield. Sweeper will be requested to vacuum worms in order to keep the birds from returning.

(h) Doves. Species of Dove found at SAFB are Mourning dove, White-winged dove, Eurasian-collared dove, and Feral pigeon. All of these species are seed eaters and attracted to grain crops, weed seeds, and sparse ground. The promotion of dense grass to deny access to seeds and grit are the best preventive measures in keeping these birds from landing on the airfield. However, many dove threats are associated with these birds merely traversing the airfield to feed at off-base locations. Pyrotechnics and propane cannons are generally not effective in frightening these birds for a sustainable duration nor are they considerably effective in altering the flight paths of these birds.

1 Most Mourning dove strikes at SAFB occur during spring and summer, and are the result of resident populations. Breeding populations must be controlled through intense depredation during this period.

2 White-winged and Eurasian-collared doves are becoming established in the area and will inevitably become a significant strike threat in upcoming years as populations grow. Intense depredation will be necessary in future years to mitigate the occurrence of this species on the airfield. It may also become necessary to alter daily flying operations to avoid peak feeding flights of these birds.

3 Primary threats from feral pigeons are the result of feeding routes that bring these birds across the airfield; pigeons from roosts on base and from within Wichita Falls traverse the airfield to feed east of base boundaries. An integrated approach to reduce roost site availability and populations has been implemented on base. This includes structural repairs and modification to exclude these birds from roosts and also includes routine depredation. Depredation is accomplished predominately through night shooting at roost sites and trapping

4 When off base pigeon roosts generate strike threats to SAFB aircraft, USDA-WS through cooperative agreements may, at the agency's discretion, provide technical assistance and/or direct control at the location to mitigate the strike threats.

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(i) Nighthawks (these are not raptors). These birds hunt by remaining airborne and catching flying insects. Nighthawks nest in areas of bare ground or gravel. It is not uncommon to find these birds loafing on paved surfaces. Reducing areas of gravel and bare ground are long-term solutions to minimize the presence of this bird. Harassment and shooting is used as necessary to control nighthawks on the airfield.

(j) Cliff and Barn Swallows. These birds eat insects in flight and are commonly found on the airfield. Though small in size, these birds have caused significant damage to T-38 engines and should not be overlooked within the airfield environment. Targeted applications of insecticides on the airfield, as well as the installation of exclusionary material at nest sites, should be considered when deemed necessary to control these birds. Harassment and lethal control are currently used to manage small populations on the airfield.

1 The I-44 Bridge in Burkburnett, Texas, contains over 32K nests and is the source of many Cliff Swallows observed within approach corridors to 15 Runways.

2 Some buildings on base provide nesting habitat for barn swallows.

3 During late September and October migratory flocks containing thousands of swallows will occasionally use the airfield for consecutive days. This does not occur each year, but has happened. These situations are extremely difficult to resolve with harassment, shooting, or aerosolized repellants. When these events occur, all airfield moving should cease, as this activity stirs up flying insects. 80 FTW/SE will recommend that flying operations cease until birds leave.

4. MAMMAL HAZARDS. While concern is mostly centered on birds, several mammalian species also pose threats to flight operations and must be considered.

a. Deer. White-tailed deer are occasionally observed on the airfield. Although deer are capable of jumping the security fence at SAFB, this requires significantly more motivation than most deer are willing to commit. It is critical to maintain fence bottoms low to the ground and repair all large gaps, including those beneath gates to keep them from crawling under. Deer pose a significant threat to aviation safety and will not be tolerated on base. Deer will be removed by USDA-WS at the operator's discretion. This includes removal on the airfield and within the northwest natural area/wetland. When deemed a viable option, deer can be herded along the perimeter fence and out the south gate. 80 FTW/SE has requested deer "jump-outs" to be built in the NW and SE corners of the installations perimeter fence, where deer naturally travel. Jump-outs will provide a passive, easy escape route for deer to permanently exit the installation. Deer Jump Outs will be designed by CE in 2020.

b. Coyotes. These canines are omnivores, feeding on a variety of mammals, birds, reptiles, invertebrates, and fruits. Territories and daily travel routes of coyotes can encompass

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numerous square miles, so eliminating a particular food source will not necessarily prevent coyotes from occupying or traversing the airfield. The installation of an apron fence that is buried to a minimal depth of 2 feet and attached to the pre-existing perimeter fence is the most effective method of keep coyotes from gaining airfield access. In 2017, 80 FTW/SE requested an apron fence be installed, releasing a MFR and submitting a work order #77276). This request was later assigned project status "VNVP184101 – Repair Perimeter Fence F30211" and is scheduled to be designed by CE in 2020. Until an apron fence is installed, coyotes will be managed through vehicle chase, shooting, snares, and modified foot traps.

c. Black-tailed Jackrabbits. Proper grass management will reduce the number of these animals on the airfield. Populations are cyclical, with booms and busts naturally occurring. As needed, shooting rabbits at night with the aid of a spotlight will be used to control the population.

d. Small rodents. When extreme populations of mice, rats, voles, or gophers are deemed to be significantly attracting raptors, rodenticides should be considered. Some control is accomplished by maintaining airfield vegetation at proper heights.

e. Beaver. Through the construction of dams, these rodents create environments attractive to waterfowl, wading birds, and large flocks of roosting blackbirds. The mere destruction of dams will not alleviate the problem, due to this mammals' ability to rapidly rebuild. Beavers will be trapped with conibears, snares, or modified foot traps, and dams will be removed.

f. Feral hogs. Feral hogs are occasionally found on SAFB. These mammals generally forage on plant materials and invertebrates, but are also very effective predators. The most efficient method to keep feral hogs from accessing the airfield is to keep perimeter fence bottoms low to the ground and repair all holes or gaps. The most absolute method to keep feral hogs from SAFB entry is to install an apron fence. Vegetative manipulation, frightening devices, and repellants are ineffective. Shooting, as well as cage traps and snares, will be used to manage this population when necessary.

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APPENDIX 2 TO ANNEX C TO SAFB BASH PLAN  
BIRD HAZARD WARNING SYSTEM

1. GENERAL: This appendix establishes procedures to be used for the immediate exchange of information between ground agencies and aircrews concerning the existence and location of birds/animals that could pose a hazard to flight safety.

2. MIGRATORY PHASES: With reference to AFI 91-212, the Phase I SAFB non-migratory bird activity period occurs from May to September, and the Phase II migratory period is from October to April. During Phase II, migratory bird activity peaks in North Texas and Southern Oklahoma posing a different threat to flying operations. The purpose of the phase is to highlight the threat to aircrew and is listed in the AP/1 under SAFB.

Note: While Phase I represents a historical decrease in *migratory* bird activity, there remains a significant bird strike threat during Phase I. For example, airfield mowing operations, which take place primarily during Phase I, attract Swainson's Hawks and Swallows, elevating the bird strike threat. Additionally, resident Cattle Egret populations are active during Phase I and pose a significant aircraft strike hazard. In July 2013 (mid-Phase I), a SAFB T-38 crashed and was destroyed after striking a Cattle Egret shortly after takeoff. Refer to Appendix 1, Section 3b, BIRD SPECIES, for more information.

3. AIRFIELD/RANGE BIRD WATCH CONDITIONS:

a. All airfield/range BWCs will be set IAW the BWC code descriptions in AFPAM 91-212 Attachment 1. Personnel establishing the BWC will also consider AHAS risk level, any applicable bird activity reports from aircrew, RSUs, or ground personnel, any data reported by local USDA personnel, radar observations, and their own observations.

b. While not restrictive in nature, 80 FTW/SE recommends the following guidelines for designating BWCs.

BWC LOW is recommended when bird activity on and around the airfield represents a low potential for strikes.

BWC MODERATE should be declared when bird activity near the active runways represents an increased potential for strikes. Examples of observed bird activity for which BWC MODERATE would be recommended are any of the following if observed in locations that represent a hazard to flight operations:

- Approximately 5-15 large birds
- Approximately 15-30 small birds
- 3 or more flocks of any size in a 15-minute period

BWC SEVERE is recommended when the aforementioned criteria are exceeded or anytime bird activity represents a high potential for strikes.

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- c. If the situation permits, the location of any bird activity should be relayed to aircrews with the applicable BWC.
  - d. The SOF will determine, maintain, and communicate the SAFB airfield BWC. When the SOF is not available, Airfield Management will declare the BWC. While SOFs may designate a local flying status, they will not designate a BWC prior to reporting to the tower for an opening SOF tour.
  - e. The RSU controller at the T-6A auxiliary field, callsign Hacker, will determine, maintain, and communicate the Frederick Regional Airport BWC.
  - f. The Range Control Officer will determine and maintain the Falcon Range BWC and communicate the information to crews as they report into the range or if the BWC changes.
4. PROACTIVE BWC INCREASE: Special scenarios occur at SAFB that require proactive elevation of BWC to a minimum of MODERATE. In such instances, BWC is elevated due to an increased strike threat associated with a predictable, known species and wildlife pattern. In these cases, a specific observation of bird activity is not required in order to increase the BWC level.
- a. Traversing Flocks: 80 FTW/SE combines current field observations with historical data to forecast threats associated with flocks of resident bird species that are traversing the airfield enroute to or from roost sites. Two common examples at SAFB are blackbirds and cattle egrets. Forecasts will be provided to SOF regularly, identifying the species and associated flight paths, as well as estimated altitudes and peak times of activity. SOF should *proactively* elevate BWC and maintain a minimal level of MODERATE during forecasted times and dates of concern. 80 FTW/SE will determine appropriate field response by BASH personnel, per forecasted situation. (Wildlife dispersal teams may determine that no response on the airfield is required, as efforts to depredate or harass bird populations may be counterproductive against passing flocks.)
  - b. Airfield Mowing: SOF shall elevate to BWC MODERATE during airfield mowing. Mowing displaces invertebrates and rodents, which frequently attract birds that are not easily visible from tower, nor readily seen by mowers or RSU controllers. SOF shall notify 80 OSS/OSAA of any verified bird activity associated with mowing and consider BWC SEVERE. Upon notification, 80 OSS/OSAA will coordinate with 80 FTW/SE to deploy BASH personnel to investigate. The two agencies will work to ensure mowing operations either cease, or move to a safer location.
5. AIRCREW ACTIONS:
- a. Pilots should report any threatening bird activity to Radar Approach Control (RAPCON), the RSU controller, the RCO, and/or the SOF. Pilots should include location, altitude, quantity, type, and direction of travel of the bird activity. The controlling agency will then alert subsequent aircrews of the potential hazard, workload permitting.

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- b. Aircrew will reference AFI 11-202V3 AETC Sup I and local directives for actions to take in response to established BWCs. 80 FTW/SE stresses the importance of minimizing pattern training during BWC MODERATE.
6. COMMUNICATIONS: BWC will be disseminated by the following means:
    - a. The primary means of transmitting BWCs will be via ATIS. During periods of flight operations, BWCs other than LOW at SAFB will be included in the ATIS. When the SOF declares BWC MODERATE or SEVERE, he/she will notify tower personnel, Airfield Management, 80 FTW/SE, RSUs, and all 80 FTW operations duty desks. Details on location should be included if the situation permits. The operations desks will notify aircrew at step time. Airfield Management personnel will post the BWC in base operations for transient aircrews.
    - b. All BWC changes at Hacker will be relayed by the RSU crew to the SOF, area monitor, and the T-6 Operations Desk.
    - c. Airfield Management personnel will ensure that the BWC is posted in the flight planning room.
  7. DOWNGRADING: Once the SOF or Airfield Management declares a BWC, it is their responsibility to downgrade the condition commensurate with updated information. In the absence of the SOF, Control Tower personnel may downgrade a BWC in coordination with Airfield Management. At Hacker, the RSU controller will downgrade BWC commensurate with observations.

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APPENDIX 3 TO ANNEX C TO SAFB BASH PLAN  
BASH AOR AND OPERATING TIMES

1. GENERAL: This appendix outlines the use for the BASH Area Of Responsibility (AOR) Map.
2. SHEPPARD BASH AOR MAP: The shaded region on the SAFB BASH AOR Map is used to delineate the portion of SAFB in which BASH deprecation operations are normally carried out.
3. BASH OPERATING TIMES: Within the shaded region on the BASH AOR Map, deprecation operations are in effect between actual sunrise and actual sunset Monday through Friday.
  - a. 82 SFS will be notified by BASH personnel when deprecation operations outside these times or any time outside the shaded region are initiated and terminated.

TAB:

- A. SAFB BASH AOR Map

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TAB A TO APPENDIX 3 TO ANNEX C TO SAFB BASH PLAN  
SAFB BASH AOR MAP



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APPENDIX 4 TO ANNEX C TO SAFB BASH PLAN

BASH GRID

4. GENERAL: This appendix outlines the use and requirements for the BASH Grid Map.
5. SHEPPARD BASH GRID MAP: The Sheppard BASH Grid Map is used to coordinate dispersal efforts and divides the airfield into distinct BASH areas. This map is used to gather historical data on BASH activities.

TAB:

- a. BASH Grid Map

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TAB A TO APPENDIX 4 TO ANNEX C TO SAFB BASH PLAN  
SAFB BASH GRID MAP



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APPENDIX 5 TO ANNEX C TO SAFB BASH PLAN  
REPORTS AND FORMS

1. GENERAL: This appendix outlines the procedures and forms required to report wildlife strikes IAW AFI 91-202 and AFMAN 91-223. This reporting, subsequently, provides a statistical base used to enhance the BASH program at SAFB and Air Force wide.
2. WHEN A WILDLIFE STRIKE IS DISCOVERED, DO THE FOLLOWING:
  - a. Notify the 80 FTW/SE Office (676-1003/5000).
  - b. Notify Maintenance Operations Center (MOC) (676-2936).
  - c. Flight Safety or Maintenance personnel will collect and save all bird remains for identification purposes. Remains may include feet, beak, feathers, and/or flesh. Collect a variety of feathers from tail, wing, back, and breast when possible. If no remains are apparent, use an alcohol wipe to swipe any blood smear that is found. Put all remains found (including wipes) in a plastic zip bag. Any flesh remains will be stored in the deep freezer in the 80 FTW/SE office. All other remains should be placed on the 80 FTW/SE BASH officer's desk. The 80 FTW/SE BASH program manager is responsible for ensuring that the 80 FTW/SE vehicle and the 80 FTW Maintenance Operations Center have a suitable quantity of sample kits. The 80 FTW/SE office will forward the remains to the Smithsonian for identification. The address is: Feather Identification Lab//Smithsonian Institution//NHB, E600, MRC 116//10<sup>th</sup> & Constitution Ave, NW//Washington, D.C. 20560-0116.
  - d. The pilot of the struck aircraft must complete an Unusual Occurrence Worksheet with 80 FTW/SE. This worksheet takes the place of the legacy AF Form 853, *Air Force Bird/Wildlife Strike Report*. The Unusual Occurrence Worksheet is available electronically via a link on the TIMS homepage, however it is preferred that the pilot(s) fill out the form in the 80 FTW/SE Office so they can debrief directly and in a timely manner with a wing or on-call Flight Safety Officer. *IMPORTANT: While the AF Form 853, is no longer required, an Unusual Occurrence Worksheet must be completed for any bird or wildlife strike, even if there was no damage.*
  - e. Maintenance personnel are encouraged to begin completing the AF Form 853 (in lieu of the Unusual Occurrence Worksheet) with all known information if the wildlife strike was discovered after the pilot left the immediate area. The aircrew is to complete an Unusual Occurrence Worksheet with 80 FTW/SE as soon as possible.
  - f. Forward the remains to 80 FTW/SE and complete the Unusual Occurrence Worksheet as soon as possible.
3. BASH MISHAP REPORT: The 80 FTW/SE BASH program manager will generate a mishap report in the AF Safety Automated System (AFSAS) IAW AFMAN 91-223 AETC Sup I.

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- a. After a bird strike incident, whether damage was caused or not, 80 FTW/SE will send an AFSAS report of the incident along with a sample of any remains (if available) to the Smithsonian Institute.
4. BASH DATABASE: The 80 FTW/SE BASH program manager will use the Advanced Query Tool (AQT) available from the AFSAS website for tracking and trend analysis. Information from the AQT will be used to generate statistical reports concerning bird strikes.

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APPENDIX 6 TO ANNEX C TO SAFB BASH PLAN  
BIRD HAZARD WORKING GROUP LIST

1. GENERAL: This annex lists the agencies which are responsible for providing a representative to the BHWG.

2. The list is as follows:

82 TRW/CV	82 TRW Vice Wing Commander
80 FTW/CV	80 FTW Vice Wing Commander
82 TRW/SEG	82 TRW Occupational Safety
82 TRW/PA	82 TRW Public Affairs
82 MSG/CC	82 MSG Commander
82 SFS/CC	82 SFS Commander
82 CONS/CC	82 CONS Commander
82 TRW/JA	82 TRW Legal
USDA/WS	US Department of Agriculture Wildlife Svc
80 FTW/SE	80 FTW Safety Office
80 FTW/LGM	LSI Maintenance Mgmt (FOD)
80 OG/CC	80 OG Commander
80 OG/OGV	80 OG Stan/Eval Division (SOF)
80 OSS/CC	80 OSS Commander
80 OSS/OSA	80 OSS Airfield Operations Flight
80 OSS/OSAA	80 OSS Airfield Management
80 OSS/OSAT	80 OSS Tower
82 CES/CC	82 CES Commander
82 CES/CEO	82 CES Operations Flight
82 CES/CEOHE	82 CES Entomology
82 CES/CEIV	82 CES Natural Resource Manager
82 CES/CEY	82 CES Grounds QAE
82 CES/CEF	82 CES Fire Department
Grounds Maintenance	Civilian Grounds Mx Contractor Rep
Wichita Falls Airport Manager	

\*\*NOTE: Courtesy copy to each office symbol secretary/executive officer.

3. The BHWG will conduct semi-annual meetings. Additional meetings may be conducted if deemed necessary by the BHWG chairperson or 80 FTW/SE.

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APPENDIX 7 TO ANNEX C TO SAFB BASH PLAN  
WILDLIFE ABATEMENT

1. GENERAL:

- a. Purpose. This appendix explains the role of USDA-Wildlife Services (WS).
- b. Mission. SAFB has entered an interagency agreement with USDA-WS to mitigate wildlife hazards to aviation safety. USDA-WS will mitigate wildlife hazards directly and through technical assistance. Direct control will consist of various lethal and non-lethal techniques. Lethal techniques include shooting as well as the use of various traps. Non-lethal techniques include pyrotechnics and propane cannons, as well as various trapping and relocation programs. Technical assistance consists of identifying hazardous wildlife habitats and offering corrective advice to leadership, as well as assisting with plans and field work to alter such habitats. Agency personnel will also train local agencies/personnel in BASH or other wildlife management techniques.

2. CONCEPT OF OPERATION:

- a. Safety. USDA-WS and 80 FTW/SE will ensure the safe operation of lethal techniques used to control wildlife hazards on SAFB to include all actions required in this annex. USDA-WS is the primary organization authorized by 82 TRW/CC to shoot birds/wildlife on SAFB. Agency personnel are highly experienced and fully trained on weapon safety, shoot/no-shoot decisions, protected species, and fields of fire.
- b. Agency personnel will run an operational wildlife hazard abatement program at SAFB, as well as within the surrounding community to mitigate wildlife hazards to flight operations at SAFB. USDA-WS will aid 80 FTW/SE by providing direct assistance and technical recommendations to improve this plan. Direct assistance will include wildlife monitoring and the use of all legal methods to either disperse or suppress hazardous wildlife populations. The biologist will maintain data logs of USDA wildlife control activities conducted on the airfield. Technical recommendations may include guidance in the corrective modification of cultural practices, objects, or environments located on or off military lands, causal in creating wildlife hazards to SAFB aircraft.

(1) USDA-WS will assist the SAFB BASH program manager in bird strike reporting and aid in briefing the SAFB BHWG on the status of the BASH program.

(2) The mitigation of wildlife hazards to aircraft will remain the agency's primary objective; however, USDA-WS is also responsible in aiding 82 CES/CEIE (previously CES/CEIV) in reducing damage to SAFB property and natural resources caused by wildlife. Apart from supervisory personnel of USDA-WS, personnel will be self-tasked in scheduling and carrying out direct assistance projects.

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(3) Agency personnel are authorized by 82 TRW/CC to transport, store, and fire weapons as identified in the cooperative agreement and as necessary to execute his duties.

TAB:

A: SAFB FEDERAL FISH AND WILDLIFE PERMIT

B: FIREARMS AUTHORIZATIONS FOR USDA WILDLIFE BIOLOGIST

C: MOU BETWEEN 82 TRW, 80 FTW, AND CITY OF WICHITA FALLS

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TAB A TO APPENDIX 7 TO ANNEX C TO SAFB BASH PLAN  
SAFB FEDERAL FISH AND WILDLIFE PERMIT

1. The current Federal Depredation Permit is kept on file in 80 FTW/SE, 82 CES/CEIV (NRM), and AFCEC/CZOW (AF Environmental Management Directorate).
2. Permit renewals are required annually. Renewal applications will be initiated by USDA personnel and coordinated through the BASH program manager to the US Fish and Wildlife Department. 82 CES/CEIV and AFCEC/CZOW will be provided with a copy of the renewed permit.
3. 80 FTW/SE and USDA personnel will maintain a Wildlife Depredation Log to record, as a minimum, species, location, and quantity affected. This will help ensure depredation quantities remain within the permit allowances. Tracking will also facilitate routine reporting and required adjustments for subsequent permits.

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TAB B TO APPENDIX 7 TO ANNEX C TO SAFB BASH PLAN  
FIREARMS AUTHORIZATIONS FOR USDA WILDLIFE BIOLOGIST

1. Mr. Theodore S. Pepps, wildlife biologist with the United States Department of Agriculture-Wildlife Services (USDA-WS), or other assigned USDA-WS personnel in support of Interagency Agreement #19-7348-5754-IA are hereby authorized to transport, possess, and discharge firearms and pyrotechnics while on official duty at SAFB. When not in use, firearms will be stored in a Class 5, GSA approved gun safe at Building 2320, Room D138. Firearms authorized under this letter include, but are not limited to:

- 12 Gauge Shotguns
- 410 Gauge Shotguns
- 22 Caliber Pellet Rifles
- 22 Caliber Rimfire Rifles
- 22 Caliber Rimfire Handguns
- 17 Caliber Rimfire Rifles
- 22-250 Centerfire Rifles

Pyrotechnics will include bird whistlers, bird bangers, CAPA rounds, and 12-Gauge cracker shells.

2. Firearms permanently stored IAW this Tab include:

<u>Firearm Type</u>	<u>Quantity</u>
12 Gauge Shotguns	4
410 Gauge Shotguns	2
17 Caliber Rimfire Rifle	1
22 Caliber Rimfire Rifle	1
22 Caliber Rimfire Handgun	1
Pellet Rifles	2

3. Any change to firearm inventory, temporary or permanent, will be submitting in writing to 82 SFS.

4. IAW IA #19-7348-5754-IA, USDA-WS personnel will remain under the direct supervision of USDA-WS when operating under the IA and are therefore not considered DoD contractors. All USDA-WS equipment will be stored IAW applicable USDA-WS policies and procedures. In addition, room D138 will be either manned or locked at all times to ensure additional security of equipment.

5. Mr. Pepps and any USDA-WS personnel assigned to operate on SAFB under the IA will exercise extreme caution while conducting wildlife control operations and will not be required to notify 82 SFS personnel prior to, during, or after discharging such devices on the flight line. However, time permitting, notification prior to activity that would lead to the discharge of such

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devices on the flight line is highly encouraged. 82 SFS personnel must be notified prior to discharging devices within inhabited areas of the base.

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TAB C TO APPENDIX 7 TO ANNEX C TO SAFB BASH PLAN

MOU between 82 TRW, 80 FTW, and City of Wichita Falls

**Memorandum of Understanding (MOU) between  
82 TRW, 80 FTW and City of Wichita Falls  
Pertaining to Wildlife Strike Mitigation in Wichita Falls, TX  
as of: 12 Jun 2012**

**INTRODUCTION**

Birds and other wildlife are significant threats to aviation safety at Sheppard Air Force Base (SAFB). Collisions between aircraft and wildlife, as well as near collisions that result in pilot error, can result in significant damages and/or complete destruction of aircraft, not to mention the injury or death of aircrew or personnel on the ground. Since FY2002, SAFB has experienced 504 bird strikes resulting in \$2.94M dollars of damage.

The real-time hazard of wildlife strikes is ever-changing, requiring a proactive, flexible, and integrated strategy to mitigate effectively. Many threats occurring on/over SAFB originate from off-base sources. Under such circumstances, on-base management efforts often prove futile, requiring off-base efforts to successfully mitigate bird strikes.

**PURPOSE**

The purpose of this MOU is to develop and formalize an action-based partnership between SAFB and the City of Wichita Falls (WF), as well as private parties when necessary, in order to communicate, plan, and execute wildlife hazard mitigation projects to resolve strike threats originating from within Wichita Falls, TX.

**SCOPE**

This arrangement will only be exercised when deemed necessary by the 80 FTW Flight Safety Office (80 FTW/SE) and will only be used for the purpose of mitigating wildlife hazards to aviation. Although actions of this partnership may indirectly benefit the City of Wichita Falls and/or private parties, it will not serve to merely resolve nuisance wildlife issues or other human-wildlife conflicts.

**ORGANIZATIONAL ROLES/RESPONSIBILITIES**

**80th Flying Training Wing Safety Office (80 FTW/SE):** Responsible for managing SAFB's Bird/Wildlife Aircraft Strike Hazard Program (BASH). Personnel promote flight safety by tracking wildlife strike trends, identifying wildlife strike hazards, and working closely with experts from other agencies (on-base and off-base) to develop wildlife hazard mitigation strategies; 80 FTW/SE will work similarly with WF in all stages of these efforts.

**United States Department of Agriculture-Wildlife Services (USDA-WS):** Through an interagency agreement with USDA-WS, SAFB maintains one full time wildlife biologist on staff. The biologist identifies wildlife hazards, provides technical assistance to mitigate such hazards, and serves as the base primary for direct control operations. USDA-WS will provide technical assistance to all involved parties and at the discretion of the biologist, will also conduct direct control operations at off-base locations. Through federal mandates, permits, and cooperative agreements, USDA-WS has the legal authority and capability to conduct operations at off-base locations, including those on private lands.

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**82d Mission Support Group (82 MSG):** 82 MSG is responsible for providing base expertise in Entomology and Civil Engineering. Where appropriate, will provide manpower for sustaining the SAFB BASH program and ensure SAFB compliance with the policies, regulations, metrics, and initiatives set forth by Air Education and Training Command (AETC) and the Air Force.

**82d Public Affairs Office (82 TRW/PA):** At request of 80 FTW/SE or in response to unsolicited queries from the media or general public, and in cooperation with the City of Wichita Falls Public Information Office (WF/PIO), 82 TRW/PA will inform the general public and media of BASH projects. Specific wildlife hazards will be articulated and sound media strategies will be used to justify actions; this will be critical for controversial issues.

**WF City Manager's Office:** WF City Manager's Office maintains a strong relationship with SAFB Leadership and has authority to direct/approve WF Departments to assist/aid in BASH projects. Some BASH situations will require resources of WF and consequently dilute other obligatory functions of the city; the City Manager's support/direction for BASH projects is critical to ensure the commitment of applicable WF departments.

**WF Department of Aviation:** Wildlife hazards occurring at SAFB also impact aviation safety to joint-use operations of Wichita Falls Municipal Airport. The Airport is Part 139 Certified by the Federal Aviation Administration (FAA), and IAW-Part 139 Regulation and must take action to alleviate wildlife hazards whenever they are detected. Airport personnel currently work with SAFB/USDA-WS as appropriate to mitigate wildlife hazards within, as well as outside SAFB boundaries.

**WF Animal Services Center/Animal Control:** WF Animal Services Center/Animal Control is responsible for all animal issues within WF city limits and oversight of some WF ordinances regulating the direct control of wildlife populations. WF personnel currently work with SAFB/USDA-WS to mitigate wildlife hazards and will be instrumental in planning, as well as providing necessary waivers to conduct activities.

**WF Fire & Police Departments:** WF has ordinances limiting the use of firearms, propane cannons, and pyrotechnics. Some of these ordinances may affect off-base wildlife control activities that are within the city limits. The Fire Chief and Chief of Police will be involved in securing and recommending necessary waivers to utilize prohibited control methods within off-base area within the city limits. When applicable, emergency responders will be informed of date(s), time(s), and location(s) associated with scheduled control activities within city limits; this aids in promotion of safe conditions for BASH personnel and general public.

**City of Wichita Falls Public Information Office (WF/PIO):** Same organizational responsibilities as 82 TRW/PA.

**Cooperator:** The landowner (s), lessee(s), or administrator(s) of private or non-private lands upon which the project is to occur will be involved in the planning and execution of projects. Unless the strike threat is determined to be the result of non-compliance with WF ordinance, the cooperator will not be legally forced into concurrence. This MOU is designed to enhance off-base relationships in the name of BASH; requesting compliance through the threat of legal action will impair and diminish relationships and likewise impact subsequent field operations.

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## **PLANNING**

Organizations above will be the primary entities involved with initial discussion of projects. The scope and complexity of each situation will be unique, which may or may not require subsequent involvement by additional parties.

### **Once hazards are identified by 80 FTW/SE, listed SAFB agencies will:**

1. Meet to discuss and determine mitigation options and whether or not to pursue action
2. For controversial issues, brief and receive approval from 82 TRW/CC prior to commitment
3. Notify WF Director of Aviation of the identified hazard and recommended action
4. As necessary, contact WF City Manager to request support of project

### **Upon notification of wildlife hazard, WF Director of Aviation will:**

1. Contact applicable WF Departments of proposed action
2. Organize and chair meetings between WF and SAFB for further input and consensus
3. As necessary and applicable, further serve as liaison among SAFB, WF, and private parties during the planning and execution of projects

### **Once consensus is reached among all parties, 82 TRW/PA and WF/PIO will:**

1. Work together to ensure a sound media strategy
2. If required, develop media release on behalf of SAFB and WF
3. Assist with response to inquiries by media or general public

## **PROJECT EXECUTION**

As necessary, the appropriate federal and/or state permits will be secured prior to the project implementation. Should proposed measures violate city ordinance, applicable WF Departments will review and act upon requests for waivers, giving consideration of operational benefits to flight safety. Actions to resolve strike threats will be a combination of, as applicable: technical assistance, direct control, and government-provided or assisted habitat manipulation.

- **Technical Assistance** – Will be provided to off-base cooperators (including WF field personnel as needed) by USDA-WS and will consist of personal consultations, recommendations, and on-site training to mitigate specific wildlife strike threats. In many cases, the cooperator will already be suffering conflicts with the associated target species. In such an event, the cooperator is likely to provide assistance, in-part or in-full (funding/manpower). With proper training and the provided political support structure, the capability for each cooperator to self-achieve will increase, thereby reducing the burden of government in mitigating specific wildlife strike threats.
- **Direct Control** – Direct Control is the use of direct, physical intervention against the target species posing strike threats/risks. All legal options will be considered. Should additional field support be required of WF or SAFB, written landowner agreement/approval shall be secured in advance. It is expected that USDA-WS will actively participate in most direct control operations and prior to field engagement will:



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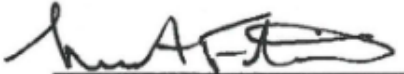
82d Training Wing/80th Flying Training Wing  
Sheppard Air Force Base, Texas

15 Sep 21

1. Secure written authorization from the cooperator (s) for the "Control of Animal Damage on Private and Non-Private Properties (USDA-WS Forms 12A/12C)."
  2. At discretion of USDA-WS, request letter of concurrence from designated WF officials when conducting direct control within the incorporated city limits.
- Government-Provided or Assisted Habitat Manipulation – Manipulation is the alteration or complete removal of specific wildlife habitats at specific locations, as necessary, to mitigate specific wildlife strike threats. Due to the legal, logistical, and fiscal complexities of such endeavors, habitat manipulation projects partaken with government resources shall be the product of extensive planning and agreement by all applicable parties.

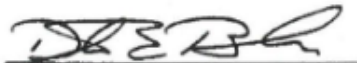
**ACTIVATION**

This Memorandum is effective immediately upon the date of final signature and will continue indefinitely. It should be reviewed annually. The 82 TRW, 80 FTW, or City of WF may request an update or out-of-cycle review any time. This MOU is set forth and agreed to by all parties in the interest of aviation safety at both SAFB and WF Municipal Airport.



MICHAEL A. FANTINI  
Brigadier General, USAF  
Commander, 82 TRW

14 Jun 12  
Date



DIETER E. BAREIHS, Colonel, USAF  
Commander, 80 FTW

14 Jun 12  
Date



DARRON LEIKER  
City Manager, Wichita Falls, Texas

8-15-12  
Date

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ANNEX L TO SAFB BASH PLAN  
OPERATIONS SECURITY

1. REFERENCES:

- a. Joint Pub 3-13.3, *Operations Security*
- b. AFI 10-701, *Operations Security (OPSEC)*

2. SITUATION: OPSEC was considered when writing this Plan. It specifically integrates the OPSEC concepts as laid out in AFI 10-701, *Operations Security*. This Plan does not warrant the inclusion of an OPSEC annex, as its implementation does not contain indicators of critical information that could be exploited by our adversaries.

//signed/jg/2 Jun 21//

JOSEPH A. GAGNER, Maj, USAF  
80 FTW Chief of Safety

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ANNEX Z TO SAFB BASH PLAN  
DISTRIBUTION

AGENCY

AFSC  
/SEFW

82 TRW  
/IGP  
/PA  
/SE  
/JA

80 FTW  
/SE  
/IG

80 OG  
/OGV (Supervisor of Flying)

80 OSS  
/OSAT  
/OSAA  
/OSAR

82 CES  
/CL  
/CEY  
/CEIV

82 CS/SCX

82 SFS/S5S USDA/WS  
Wichita Falls Municipal Airport Manager  
FBO Signature General Manager

**NOTE:** This plan will be published on the 82 TRW Plans and Programs SharePoint site located at [https://sheppard.eis.aetc.af.mil/82TRW/XP/War\\_Cont%20Plans/War%20and%20Contingency%20Plan%20Program\\_Plan](https://sheppard.eis.aetc.af.mil/82TRW/XP/War_Cont%20Plans/War%20and%20Contingency%20Plan%20Program_Plan). Plan OPRs must send electronic copies of revised/changed plans to organizations residing off base.

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**D GOLF ENVIRONMENTAL MANAGEMENT (GEM) PLAN**  
**Installation Supplement**

This section is not applicable, there is no golf course at Sheppard AFB.

**E INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN (ICRMP)**



**SHEPPARD AIR FORCE BASE  
INTEGRATED CULTURAL RESOURCE MANAGEMENT PLAN**

**SHORT TITLE: SAFB ICRMP**

30 November 2016 (Full Re-write)  
16 October 2017 (Annual Review)  
9 November 2018 (Annual Review)  
29 October 2019 (Annual Review)  
28 October 2020 (Annual Review)



**82 CES/CEIV**

**82D TRAINING WING  
SHEPPARD AIR FORCE BASE, TEXAS**

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**Coordinator Identification Page**  
**Integrated Cultural Resources Management Plan**  
**OPR: 82 CES/CEIE**

This form is completed by the plan OPR (plan owner) and placed inside the plan directly behind the front cover sheet. The form contains three parts: Part I identifies (name and/or office symbol) the individual that will conduct the administrative review (spelling/grammar). Part II identifies the Subject Matter Experts (SME) who should review and provide corrections/comments during the review process. Part III identifies the individuals who need to coordinate on the rewritten/changed plan.

**Part I. Administrative Review Identification (Name and/or Office Symbol)**

82 CES/CEIE Administrative Assistant

**Part II A. SME Identification (Name and/or Office Symbol)**

82 CES/CEIE 82CES/CEIR 82CES/CEN

**Part II B. Reviewer of Plan**

82 CES/CEY      AFCEC/CZO (every 5 yrs)      Texas Historical Commission (every 5yrs)

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**Part III. Coordination Process Identification (Name and/or Office Symbol)**


82 MSG/CC	82 TRG/CC	80 FTW/CC	982 TRG/CC
82 MDG/CC	782 TRG/CC	82 TRW/JA	82 TRW/OPSEC Manager

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**Integrated Cultural Resources Management Plan  
For  
Sheppard Air Force Base, Texas**

**Reviewer**

 For: Mark Wolfe, SHPO 11/30/16

---

**Michael Robb**  
Texas Historical Commission

**Approving Officials**

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email=THARP.DEBORAH.K.1135184680  
Date: 2016.11.27 08:21:09 -0500

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**Deborah Tharp**  
AFCEC/CZO  
Cultural Resources Specialist

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**Patrick J. Doherty**  
Brigadier General, USAF  
Commander



**DEPARTMENT OF THE AIR FORCE  
AIR EDUCATION AND TRAINING COMMAND**

MEMORANDUM FOR UNIT ENVIRONMENTAL COORDINATORS

FROM: 82 CES/CL

SUBJECT: Sheppard Air Force Base (SAFB) Integrated Cultural Resource Management Plan  
(ICRMP)

1. The attached plan is the 82d Training Wing (82 TRW) supporting plan required by AFMAN 32-7003 and DoDI 4715.3.
2. This plan is in effect for planning purposes upon receipt. Execution will be when directed by the Commander, 82 TRW or designated representative.
3. Requests for additions, deletions, and/or changes should be directed to the plan OPR, 82 CES/CEIV.
4. Supporting implementing instructions, operating instructions or checklists must be prepared by tasked organizations and forwarded to 82 CES/CEIV for review and coordination within 30 days of publication.
5. This plan supersedes prior versions of the SAFB ICRMP which should be destroyed IAW Records Disposition Schedule, Series 10, Table 10-04, Rule 04.00, (or other disposition directives depending upon plan classification).

  
MARK Mc BURNETT, GS-14, DAF  
Base Civil Engineer

Attachment:  
SAFB ICRMP

## SECURITY INSTRUCTION

1. The long title of this plan is Sheppard AFB Integrated Cultural Resource Management Plan. The short title is SAFB ICRMP.
2. Reproduction of this document in whole or in part to assist tasked organizations in development of supporting operating instructions/checklists is authorized.
3. The provisions of AFI 10-701, *Operations Security (OPSEC)*, were considered during the formation of this plan.

## RECORD OF CHANGES/RECORD OF ANNUAL REVIEW

### RECORD OF CHANGES

<u>CHANGE No.</u>	<u>DATE ENTERED</u>	<u>POSTED BY</u>
Change 1. Administrative	November 9, 2018	Lisa Black

### RECORD OF ANNUAL REVIEW

<u>DATE</u>	<u>REVIEWED BY</u>
October 16, 2017	Jennifer Nader
November 9, 2018	Lisa Black
October 29, 2019	Lisa Black
October 28, 2020	Lisa Black

## PLAN SUMMARY

1. **PURPOSE:** The Integrated Cultural Resource Management Plan (ICRMP) is the responsibility of each installation staff member and is required by AFMAN 32-7003, DoD 4715.16. The purpose is ensure that the facilities under their jurisdiction in or on which they work is maintained at a level that allows it to continue serving the function for which it was designed and used, and allows it to continue serving that function into the future. This is mandatory for all personnel on Sheppard AFB and for all areas covered by Sheppard AFB.

All installation personnel, both civilian and military, will act responsibly in the public interest in managing the land and historic resources that are an integral part of the installation plans, decisions, actions and programs.

2. **CONDITIONS FOR IMPLEMENTATION:** This plan will be implemented upon receipt. Continuous support is required.

3. **OPERATIONS TO BE CONDUCTED:** All current and planned installation activities (e.g., master planning, construction requests, site approval requests, and training exercise plans) shall be planned and conducted so as to ensure effective and timely coordination with installation historic resources management personnel.

4. **KEY ASSUMPTIONS:** None.

5. **OPERATIONAL CONSTRAINTS:** None.

6. **OPSEC:** Normal.

7. **SUMMARY OF REVISIONS:** Only minor format and administrative changes were made to the current plan

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### ACRONYMS USED

AAF	Army Air Force
ACHP	Advisory Council on Historic Preservation
AETC	Air Education Training Command
AFB	Air Force Base
AFCEC/CZO	Air Force Civil Engineering Center/environmental operations
AFI	Air Force Instruction
AFPD	Air Force Policy Directives
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEIV	Civil Engineering
CFR	Code of Federal Regulations
CRM	Cultural Resources Manager/Management
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EIS	Environmental Impact Statement
ENJJPT	Euro-NATO Joint Jet Pilot Training
EO	Executive Order
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FPO	Federal Preservation Officer
GIS	Geographic Information System
GSA	General Services Administration

<b>HABS/HAER</b>	<b>H</b> istoric American Building Survey/ <b>H</b> istoric American Engineering Record
<b>IC</b>	<b>I</b> nstallation Commander
<b>ITLO</b>	<b>I</b> nstallation Tribal <b>L</b> iaison <b>O</b> fficer
<b>MAJCOM</b>	<b>M</b> ajor Command
<b>MOA</b>	<b>M</b> emorandum of Agreement
<b>NAGPRA</b>	<b>N</b> ative American Graves Protection and Repatriation Act
<b>NARA</b>	<b>N</b> ational Archives and Records Administration (36 CFR Part 1228)
<b>NEPA</b>	<b>N</b> ational Environmental Policy Act
<b>NHPA</b>	<b>N</b> ational <b>H</b> istoric Preservation Act
<b>NPS</b>	<b>N</b> ational Park Service
<b>NRHP</b>	<b>N</b> ational Register of <b>H</b> istoric Places
<b>PA</b>	<b>P</b> rogrammatic Agreement
<b>SHPO</b>	<b>S</b> tate <b>H</b> istoric Preservation Officer
<b>SHEPPARD AFB</b>	<b>S</b> heppard Air Force <b>B</b> ase
<b>SOP</b>	<b>S</b> tandard Operating Procedures
<b>TCP</b>	<b>T</b> raditional Cultural Property
<b>USAF</b>	<b>U</b> nited States Air Force
<b>USACE</b>	<b>U.S.</b> Army Corp of Engineers
<b>U.S.C.</b>	<b>U</b> nited States Code
<b>WG</b>	<b>W</b> ing Commander



## 1. EXECUTIVE SUMMARY

This Integrated Cultural Resources Management Plan (ICRMP) prescribes procedures and guidance for the conservation, maintenance, and protection of cultural resources and facilities, compatible with the military mission and in accordance with Department of Defense (DoD) policy. Cultural resources, in the context of this plan, refer to physical remains of any prehistoric or historic district, site, building, structure or object significant in American history, architecture, archaeology, engineering or culture on Sheppard Air Force Base TX (Sheppard AFB).

Sheppard AFB comprises 5,736 acres of land in Texas and Oklahoma. 5,297 acres are on Sheppard AFB proper, 430 acres are at the Sheppard Recreational Annex which may include archaeological and historic cultural resources, and 9 acres in Oklahoma. The goal of this ICRMP is to provide the Cultural Resource Manager (CRM) with the information and tools necessary to protect the cultural resources on base. All US Air Force (USAF) personnel have a duty and are required by law to be responsible stewards of Sheppard AFB's cultural resources, preserving and protecting them from harm while achieving the base's primary mission. The cultural resources management program is not the primary mission of Sheppard AFB, although the CRM program's mission supports the primary military mission. Careful



Figure 1 SAFB Map

management dictates how CRM can take into account the interests of Sheppard AFB and outside parties while supporting the military mission. This ICRMP provides guidance for the base CRM to establish and perpetuate cost-effective methods to protect cultural resources. This ICRMP provides information on USAF and other federal regulatory requirements as well as standard operating procedures (SOP) for protecting cultural resources during routine activities at Sheppard AFB.

This ICRMP includes information detailed in USAF guidance and current issues regarding Sheppard AFB. This plan will be reviewed annually and updated by Sheppard AFB CRM staff with an external review and comprehensive update every five years.

## 2. INTRODUCTION

Air Force Instruction (AFI) 32-7065 and Department of Defense Instruction (DoDI) 4715.3 require every military installation to have an ICRMP. ICRMPs are internal USAF compliance and management plans written to help integrate an installation's cultural resources program with ongoing mission activities, identifying potential conflicts between the installation's mission and cultural resources, and identifying compliance actions necessary to maintain the availability of mission-essential properties and acreage.

The ICRMP is a guidance tool designed to be flexible and remain sensitive to unanticipated changes in the base's mission over time. The ICRMP describes an integrated cultural resources management program designed to minimize impacts to the military mission; meet compliance requirements and identify, enhance, and implement program efficiencies. Cultural resources management becomes integrated when the CRM have established processes to plan for the improvement of the program over short and long term time frames, maintain the existing program, coordinate with other base offices that have the potential to impact cultural resources, consult with outside entities who have a stake in cultural resources at Sheppard AFB and monitor the success of the program.

## 3. GENERAL INFORMATION

### 3.1. Mission Statement

Currently, Sheppard AFB is home to the 82d Training Wing and the 80th Flying Training Wing. The primary mission of Sheppard AFB is to build, strengthen & sustain global combat capability through superior technical training.

### 3.2. Physical Setting

Sheppard AFB is located in Wichita County approximately four miles north of Wichita Falls and twelve miles south of the Oklahoma state line, within the Central Rolling Red Plains of the Red beds Plains unit of the Central Lowland physiographic province (Fenneman 1938:617-618; Richardson et al. 1977). The region is characterized by smooth, rolling plains which have rounded slopes and relatively shallow broad valleys. The red landscape of the area is derived from Permian deposits. The valley of the Red River is located to the north of the base with the Wichita River located to the south of the base. Elevations on base range from 1030 feet above mean sea level (amsl) at the north end of the runways to 965 feet amsl on the east side of the base along Bear Creek, a tributary of the Wichita River.

Sheppard AFB also lies within the Comanchian Biotic Province (Darrow 1977:48-56; Dice 1943:28—29). This part of the mixed grass prairie is dominated by grasses of medium height including little bluestem, side-oats grama, buffalo grass, Arizona cotton top, vines, mesquite and hairy grama. A variety of mammal, avifauna, and reptile species inhabit the region such as: fox, cottontail rabbit, quail, dove, meadowlark, turkey, ducks, geese, heron, mink, muskrat, snakes, badger, pronghorn antelope and field sparrow (Brown 1985:45-53; Shelford 1963:356-372).

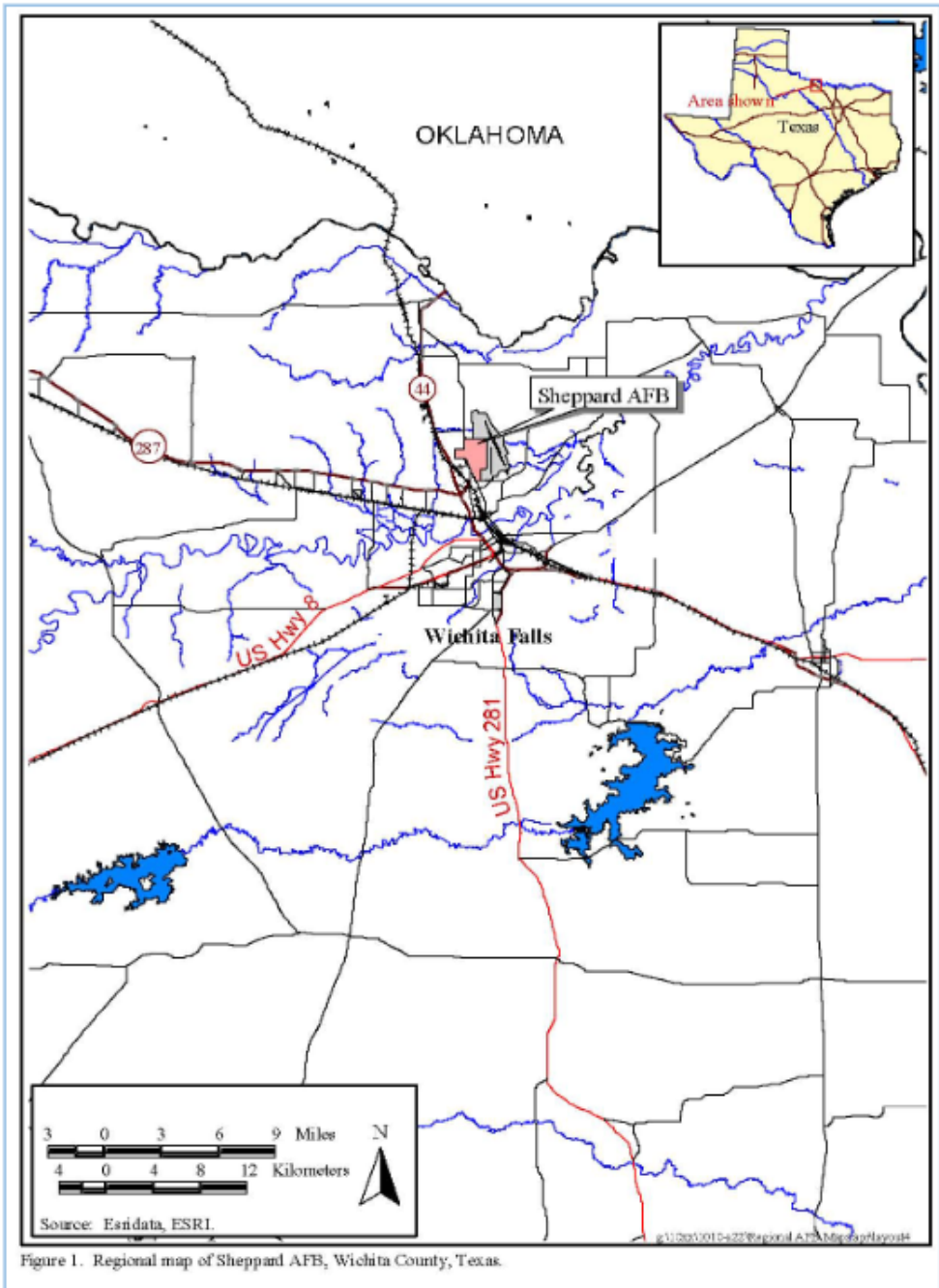


Figure 1. Regional map of Sheppard AFB, Wichita County, Texas.

### 3.3. Historical Perspective

Sheppard AFB has a long history beginning in 1941 when it was established as an Army Air Corps Training Center. The base was established on 300 acres just south of Kell Field. The history of the base is linked to national trends as the Air Force emerged from the Department of the Army to become the United States Air Force.

In May 1941, the first contingent of men arrived at Sheppard Field to design and supervise construction of administrative, technical, hospital and housing facilities. Initially, the War Department had planned to use the training facilities solely for an aviation mechanics school. However, on 19 June 1941, the War Department approved a revised training plan that provided Sheppard Field with a dual mission. Along with its Aviation Mechanics School, Sheppard also would serve as a basic training center. In addition to the 16,122 soldiers originally projected for the aviation mechanics program, basic training supplied another 10,000 students.

The United States' entry into World War II saw a rapid increase in personnel and training at Sheppard AFB. By April 1942, training officials had to start a class every six days to meet training requirements. Basic training also experienced rapid growth. During the first three weeks of January 1942, the number of new recruits jumped from 5,500 to 19,000. To keep pace with the large increase in training requirements, the War Department, in March 1942, authorized an additional \$1.6 million for the construction of more than thirty new buildings at Sheppard Field.

In the first six months after Pearl Harbor, training officials confined themselves to producing aircraft mechanics. In September 1942, Col Henry R. Clagett announced the establishment of a Glider Mechanic School at Sheppard Field, creating a change in use for Sheppard Field. The Army's interest in locating glider mechanic training at Sheppard coincided with a growing interest in using gliders to deliver troops to war zones. About 90 instructors, mostly aircraft mechanic graduates, taught an average of 1,440 glider mechanic students per day, with a new class starting every 10 days. Sheppard also briefly accommodated Free French soldiers during World War II. In March 1946, instructors at Sheppard Field learned that their installation would be de-activated. For the local community the news was not welcomed. During the waning days of the Great Depression, Sheppard Field had helped buoy the area's depressed agriculture and oil-based economy. In its 57 months of operation, the field had pumped more than \$100 million into the local economy. The base reopened two years later, on August 15, 1948, in response to the Cold War. The National Guard used the base for the next two years. Over the next three decades, the base was used for a variety of training exercises, including aircraft maintenance, transportation and civil engineering. Two Undergraduate Pilot Training programs were conducted on the base between 1961 and 1971 for West German and South Vietnamese helicopter pilots.

As a result of the increase in specialized training and the number of graduates Sheppard began to take on a quality of permanency. On 18 January 1950, Secretary of the Air Force Stuart Symington, to the delight of local community leaders, announced that he had selected the installation to be a permanent Air Force base, a designation that seemed appropriate when once again the base saw the number of its students and instructors rapidly increase in response to the outbreak of war in the Far East. On 3 October 1955, the Air Force made Sheppard the primary

training center for the Atlas ballistic missile system. During the next two years the base also became the prime center for the Jupiter and Thor intermediate range ballistic missiles, as well as the Titan intercontinental ballistic missile. By 1965 Sheppard had graduated more than 47,000 missile specialists. The missile training program at Sheppard ended in the mid-1980s.

The base was also used as a Strategic Air Command Center between 1960 and 1965. The center conducted aerospace rescue schools and weather instruction. The Air Force School of Health Care Sciences offered training in dentistry, medicine, nursing and health service administration. The disbanding of the Soviet Union in 1991 brought an end to the Cold War. As part of the Base Realignment and Closure Program announced by DoD in 2005, Sheppard AFB underwent a realignment due to the relocation of the medical training mission. To date the base continues to be used as a training installation.

### **3.4. Organizational Listing and Roles**

#### **3.4.1 Wing Commander (WG)/Installation Commander (IC) and Installation Tribal Liaison Officer (ITLO)**

Responsibilities for compliance with historic preservation laws, regulations and directives are established in AFI 32-7065, *Cultural Resources Management*. The office with responsibility for historic preservation at Sheppard AFB is the Cultural Resources Manager. The WG/IC is required to establish and maintain government-to-government relationships with the federally recognized tribes that have ancestral ties to the land. (AFI 90-2002). The WG/IC is also required to assign an Installation Tribal Liaison Officer (ITLO).

The ITLO at Sheppard AFB is the Base Civil Engineer. This is to ensure CRM matters are directly disseminated to the WG/IC and signature processes, such as the Track and Management Tool (TMT), do not slow the CRM process.

The WG/IC will designate the Base Civil Engineer (BCE) the authority to issue Archaeological Resources Protection Act (ARPA) permits to qualified applicants and provide a copy of the signed permit to AFCEC/ANG/AFRC. The BCE will also be the Federal agency official with management and curation agreement signature authority over archaeological artifact collections and associated records, per 36 CFR (AFI 32-7065, para 2.9.3/2.9.5)

The Sheppard AFB ITLO is required to initiate government-to-government consultation with regionally and culturally affiliated tribes. Consultation serves many purposes. For purposes of cultural resources management on Sheppard AFB consultation is the door to establishing protocols for inadvertent discovery of archaeological artifacts and/or sites; or Native American human remains or funerary objects.

Please reference AFI 90-2002 for further information that pertains to the ITLO.

### 3.4.2. Cultural Resources Manager (CRM)

The CRM manages the base cultural resources management program according to the procedures set forth in Section 6 of this Plan. The CRM fulfills this role at Sheppard AFB, by appointment from the WG/IC. Duties of the CRM are as follows:

- Obtain training that is applicable to the CRM Program.
- Develop ICRMP and review it on a yearly cycle.
- Maintain an inventory of cultural resources (Attachment C) and through discussions with the Headquarters Air Education and Training Command (HQ AETC) and the Texas State Historic Preservation Office (SHPO), evaluate those resources for possible inclusion on the National Register of Historic Places (NRHP).
  - In order to determine what is eligible for the NRHP, the Area of Potential Effects (APE) must meet the National Parks Service five categories of districts, sites, buildings, structures, and objects designated by the Secretary of the Interior as possessing national significance in American history, architecture, archeology, engineering, and culture. They then have to fall under four Criterion. Criterion A - association with historic events; Criterion B-association with important persons; Criterion C (distinctive design or distinguishing characteristics as a whole Criterion D-potential to yield information about history or prehistory. Often, more than one criterion will apply to historic resources.
- Instruct excavation personnel for any large-scale construction activities to be watchful for the inadvertent discovery of human remains, funerary objects and/or archaeological artifacts and to immediately report any finding to the CRM or the Security Forces Commander.
- Participate in project and program planning at the earliest possible stage of development. This includes reviewing Forms 1391c designated by the Civil Engineering as potentially affecting historic properties and forward findings of such reviews to the Civil Engineering for action.
- Assist Civil Engineering in developing maintenance plans for historic properties to ensure such plans enhance preservation of such properties.
- Prepare requests for determination of eligibility, findings of effect, and nominations to the NRHP.
- In the event human remains are discovered on Sheppard AFB lands, implement, in conjunction with the Security Forces Commander, the procedures for the treatment of human remains (See SOP-7) and Native American Graves Protection and Repatriation Act (NAGRPA) compliance.

- Through discussions with individuals designated by the tribal councils of the Comanche Nation, Kickapoo Traditional Tribe of Texas, Wichita and Affiliated tribes, Kiowa Indian Tribe of Oklahoma, the Fort Sill Apache Tribe of Oklahoma, and Tonkawa Tribe of Indians of Oklahoma, establish mutually acceptable procedures for consultations called for under NHPA, Archaeological Resources Protection Act (ARPA) and NAGPRA.

#### **3.4.3. The ICRMP Goals and Objectives**

The management goals of this ICRMP include standard goals established by the USAF and specific goals established by Sheppard AFB. These goals are designed to assist Sheppard AFB to proactively protect historic properties while meeting mission objectives.

These goals are:

- To comply with USAF standards, which are derived from federal legislation pertaining to cultural resources management;
- Protect real estate investments;
- Repair, restore and reuse historic resources;
- To maintain a cultural resources management program that meets the needs of the Air Force mission.
- Follow the NHPA(Attachment D) and Section 106 procedures (SOP-1); and
- Survey and make eligibility determinations of selected properties to the NRHP as mandated by the NHPA.

#### **3.5. CRM/Sheppard AFB Responsibilities**

This plan is for the protection, use and development of cultural resources at Sheppard AFB and will be implemented according to the following DoD policies:

- All installation personnel, both civilian and military, will act responsibly in the public interest in managing the land and historic resources that are an integral part of the installation plans, decisions, actions and programs.
- Historic resources under control of Sheppard AFB will be managed to support the military mission, while practicing the principles of multi-use and sustained yield, using scientific methods and an inter-disciplinary approach. The conservation of historic resources and the military mission need not and shall not be mutually exclusive.

- All current and planned installation activities (e.g., master planning, construction requests, site approval requests and training exercise plans) shall be planned and conducted so as to ensure effective and timely coordination with installation historic resources management personnel.

### 3.6 Coordination

The Sheppard AFB CRM will coordinate with appropriate federal, state, and local government officials, other public groups with interest or jurisdiction in accordance with AFMAN 32-7003, and with planners of installation activities that affect cultural resources.

- The Proponents of actions that would affect installation cultural resources will coordinate with the Sheppard AFB CRM throughout planning and implementation. The Sheppard AFB CRM will routinely review work requests and job orders that affect historic resources and will ensure that they are compatible with this plan. The installation CRM will coordinate this plan, and management activity under it, with all affected installation officers.
- All parts of this ICRMP are in concurrence with the following federal laws:
  - **Historic Sites Act of 1935,**
  - **National Historic Preservation Act of 1966, as amended,**
  - **Section 8 of the General Authorities Act Amendments of 1976,**
  - **American Indian Religious Freedom Act of 1978,**
  - **Native American Graves Protection and Repatriation Act of 1990,**
  - **Antiquities Act of 1906,**
  - **Archeological and Historic Preservation Act of 1960,**
  - **Archeological Protection Act of 1979,**
  - **Transportation Act of 1966,**
  - **National Environmental Policy Act of 1969,**
  - **Archeological Resources Protection Act, and**
  - **Public Building Cooperative Use Act of 1976**  
(A description of each law can be found in Attachment D.)



## **4. CULTURAL RESOURCE INVENTORY**

### **4.1. Affiliated Indian Tribes**

Six tribal groups identified as having occupied the Sheppard AFB vicinity were contacted to determine if the Tribe had any concerns or issues regarding cultural resources within the bounds of the base. These groups include the Apache, Comanche, Kickapoo, Kiowa, Tonkawa, and Wichita and Affiliated, tribes. Based on tribal discussions, survey and evaluation of the cultural resources on base, it was determined that there are no traditional cultural properties or sacred places within the installation's boundaries.

### **4.1.2. Cultural Resources Inventory**

Sheppard AFB has completed four cultural resource surveys and includes data for the base proper and Texoma annex. These surveys were conducted in 1993, 1994 2002 and 2012. Following are summaries of the surveys and the results of their findings. The CRM office has the original survey reports.

The first survey was the "Cultural Resource Assessment of Sheppard Air Force Base" conducted in 1993 by the National Park Service. The second was "Cultural Resource Survey of the Sheppard Air Force Base Recreation Area at Lake Texoma" conducted in 1994 by U.S. Army Corps of Engineers contractor Geo-Marine, Inc. The third was an inventory and assessment of the Cold War-era (1945–1991) built environment at Sheppard done in 2002 by U.S. Army Corps of Engineers contractor Geo-Marine, Inc.

### **4.1.3. Archaeological Surveys**

The 1993 cultural resources assessment included an archeological reconnaissance survey of the base. There were 5,056 acres inspected during the reconnaissance level survey for Sheppard AFB. The survey was guided by standard field procedures as part of a cultural resources archaeological baseline survey requested by Headquarters Air Education and Training Command (AETC). The reconnaissance was conducted by one individual walking non-regular transects in open areas, rather than inspecting the area through regularly spaced transects by several people due to the irregular shaped project area, areas of construction and placement of runways, taxiways and aprons. Special attention was focused on erosional exposures, fence lines and drainages.

This survey included the northwestern part of the base, open areas, including the parasail training area, the physical training area, the civil engineering training area and the pastures associated with the saddle club, all of which were traversed during the pedestrian survey of the base. The base has been severely impacted by base construction activities. The location of administrative, recreational and training facilities; base housing units and the runway network affected the potential for finding cultural resources. Other construction, including the golf course, field and readiness training area and the Wichita Falls Municipal Airport on the southern area of the base, have led to significant ground disturbance. During the reconnaissance survey of the base several construction areas were also observed. In the location of Facility 609, the area surrounding

the new buildings had been removed to a depth of 60 to 70 cm, and construction crews were in the process of refilling the excavated site. Demolition of World War II era buildings on base included the removal of the upper portion of the soil in the areas surrounding the building and included the street curbs.

No archaeological resources were identified and it was recommended no further archaeological investigations were needed. SHPO had concurred with these findings and recommendations.

Based on the aforementioned observations there is an extremely low probability of any intact cultural deposits within the base proper.

In 1994 a second archaeological survey was also conducted. This survey focused on the Sheppard AFB Recreational Area (Sheppard AFBRA). An initial literature and archival search was conducted to establish the presence of any previously recorded sites on the Sheppard AFBRA property in November 1993. The site files of the Texas Archaeology Research Laboratory (TARL) were consulted. Information was found regarding two previously recorded sites within the project area. These sites (41GS11S and 41GS26), are currently completely submerged in Lake Texoma; consequently they were not investigated.

During the 1994 survey, the shoreline, within the vicinity of these sites, was thoroughly examined via field examination. The examination consisted of a 100 percent pedestrian survey of the 430-acre Sheppard AFBRA property. The field personnel, spaced 20 m apart, traversed the property along parallel east-west transects in the eastern half of the property and along north-south transects following the ridgeline dominating the western portion of Sheppard AFBRA.

The pedestrian survey resulted in the discovery of two non-site localities. Locality 1 consisted of one tertiary chert flake recovered from the surface at the northeastern tip of the Sheppard AFBRA peninsula. Locality 2 contained a single chert flake extracted from a shovel test located at the southeastern tip of the Sheppard AFBRA property. This flake occurred at a depth of approximately 10 cm beneath the surface. In each case, four additional shovel tests, spaced 20 inches from the finds in each of the four cardinal directions, revealed no additional cultural materials. No cultural resource sites were located during this survey. This places the tertiary flake 150 m from the southeast edge of site 41GS11S, from which it may have originated. Shovel tests in and around the shoreline, near the submerged sites, revealed no additional cultural materials.

No archaeological resource sites were located during the 1994 survey. The two observed localities are not considered to be eligible for nomination to the NRHP. Shovel tests and the examination of the shore line and erosional cuts revealed massive clay deposits which are likely Pleistocene in age; thus, the potential for deeply buried cultural deposits is considered to be low. Since the two previously recorded sites (41GS26 and 41GS11S) are currently submerged, further consideration of these sites is not possible at this time. As a result of the survey and literature searches and the lack of significant archaeological resources, it was determined with SHPO concurring, Sheppard AFB may use and develop the existing recreational area as necessary with no further consideration of cultural resources.

**Table-1 Summary of Archaeological Survey Results**

Site Number	Description	NRHP Eligibility
41GS115	Submerged in Lake Texoma; unable to investigate	Not eligible
41GS26	Submerged in Lake Texoma; unable to investigate	Not eligible
Locality 1	Tertiary flake	Not eligible
Locality 2	Single chert flake	Not eligible

Sheppard AFB is believed to have communicated with the SHPO, in letters dated December 14, 1993 and February 7, 1994, though those letters could not be located. If there are any inadvertent discoveries, impacts to any historic resources will be evaluated to determine if they are eligible for inclusion in the NRHP.

Based on the results of the survey no mitigation measures were needed for Sheppard AFB.

#### 4.1.4. Historic Resources

There have been three surveys and evaluations of historic buildings, structures and landscapes at Sheppard AFB. Surveys were conducted in 1993, 2002 and 2012. The findings of those surveys/evaluations are discussed below.

During the archaeological assessment of the base in 1993, the base's Real Property Inventory listing was reviewed to identify any buildings or structures that might meet the eligibility requirements for listing on the NRHP. This review covered the period from 1928 to 1950. A total of seventy-three buildings or structures were identified as being constructed during this period. Eighteen auxiliary facilities were also reviewed during this period (roads, runways, underground utilities, etc.).

The following structures/facilities were reviewed: facilities 2120, 2121, 2124, 2130, 2135 and 2140, are associated with first municipal airport, Kell Field, for the City of Wichita Falls. Facility 2130, constructed in 1928, is the air terminal building. Bridwell Road was originally the runway associated with Kell Field. Known as the "Little Adobe" or the Kell Field Air Terminal Building, the terminal building is located on Sheppard AFB, approximately five miles north of Wichita Falls, Texas, on State Highway 240 which runs through the west section of the base. Fifteen permanent and 48 semi-permanent facilities, including the child care centers, gas meter facilities, maintenance shops and storage facilities, were constructed during World War II. Four permanent facilities were constructed between 1948 and 1949. Thirteen additional facilities constructed between 1942 and 1947, such as runways, roads, parking lot boundary fences, and underground utilities lines were also constructed. Seventy-three buildings and structures, and 18 auxiliary facilities were identified as dating between 1928 and 1950.

During the 1993 survey, the Kell Field Air Terminal Building was the only building determined eligible for both the NRHP and State register. The Kell Field Air Terminal was listed as a Recorded Texas Historic Landmark by the Texas Historical Commission in 1981 (Hunter 1992).

A Cold War inventory was conducted in 2002. The Cold War-era buildings and structures at Sheppard AFB are not automatically categorized as significant Cold War resources merely because of their construction dates. Several categories of property types at Sheppard were judged to have no direct association with USAF and AETC Cold War missions and therefore were not subjected to intensive evaluation. These categories included housing, base support facilities, hangars, static displays of aircrafts, and training facilities.

The real property listing of buildings and structures at Sheppard AFB provided by AETC lists 256 cultural resources constructed during the Cold War era. Many of the buildings on the list, however, were removed from consideration because they were part of the base infrastructure and had no apparent Cold War mission.

The guidelines, suggestions and chronology noted in the previous paragraphs provide a means for assessing Cold War properties at Sheppard AFB. Twelve resources were identified as having a direct association with Cold War missions at Sheppard and were assessed for NRHP eligibility. The remaining 244 Cold War-era resources were support facilities and had no direct association with the base's Cold War missions.

Of the 256 buildings and structures at Sheppard that were constructed during the Cold War period, only two are recommended eligible for NRHP listing as Cold War resources. Building 2560 and the Alert Apron are recommended for eligibility for listing on the NRHP as an example of a SAC alert facility for dispersal bases. The wing hangars associated with the B-52s and later used in training were determined to lack Cold War significance. Although the training facilities that were examined were related to a specific Cold War mission, ICBM and IRBM training, they were altered and lacked the architectural integrity for listing in the NRHP. The ENJJPT area was determined to lack architectural and engineering features capable of conveying the Cold War mission of training NATO pilots.

The Inventory and Assessment of Select buildings and Structures (Dating Through 1976) was conducted in 2012. The 133 resources evaluated at Sheppard Main Base, Sheppard Recreation Annex, and Fredrick Municipal Airport were not associated with important WWII or Cold War military events. In addition, none are related to a significant military mission or event that fell outside the realm of WWII or the Cold War (e.g., medical, aircraft, or communications technology that impacted the military), and none hold architectural significance. None of the 133 resources at Sheppard AFB is recommended eligible for listing in the NRHP.

**Table -2 Summary of Historic Resources Survey**

<b>Site</b>	<b>Description</b>	<b>NRHP Eligibility</b>
Kell Field Air Terminal Building	Eligible under Criterion B as a unique building in the Wichita Falls area.	Eligible for National and State Register of Historic Places, listed as a Texas Historical Landmark.
Building 2560	Eligible for listing under Criterion G.	Eligible for NRHP
Alert Apron (1960)	Eligible for listing under Criterion G	Eligible for NRHP

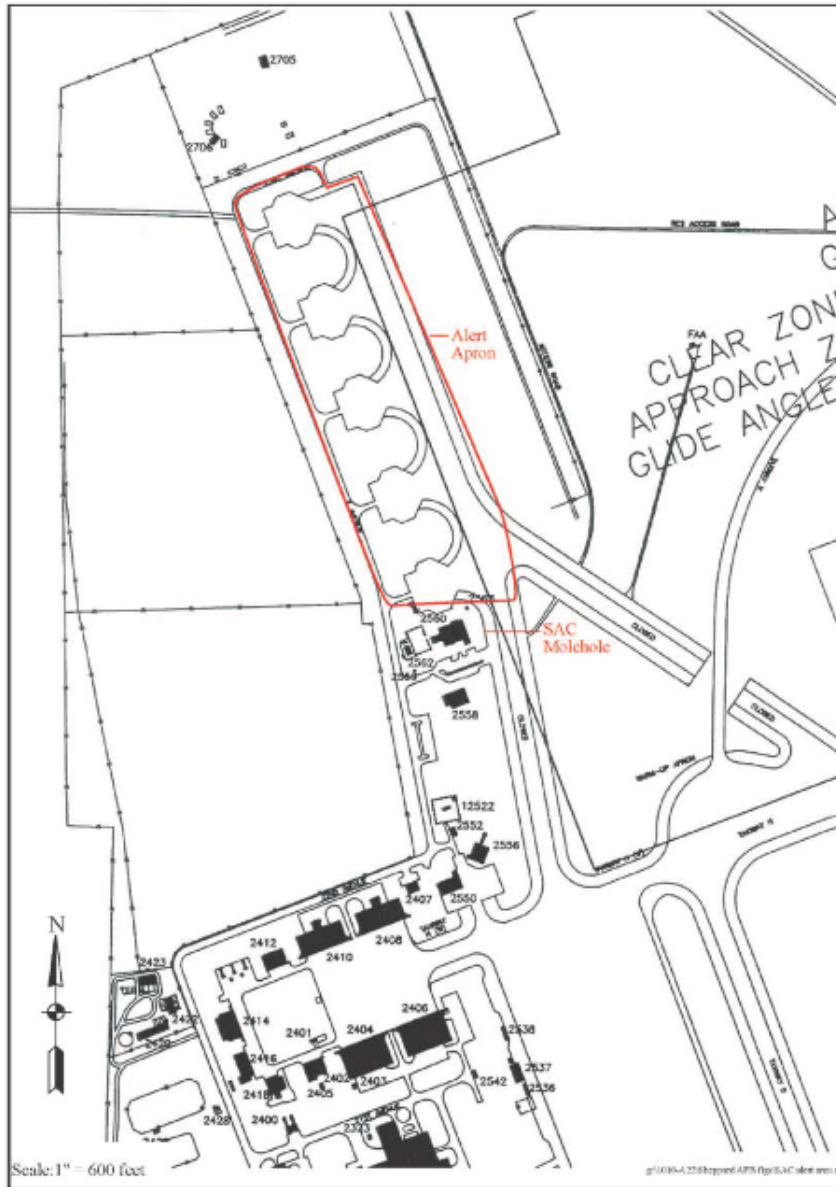


Figure 3- Map of SAC ramp and Molehole

#### 4.1.6. Areas of Concern

If during the course of future construction or other ground disturbing activities archaeological resources are identified, the CRM and other appropriate offices shall be notified and action shall be taken in accordance with the procedures outlined in 36 CFR 800.11, AFR 126-7 and this ICRMP. Any data recovery programs shall be reviewed by the SHPO prior to its implementation.

There are three structures which have been determined eligible for listing on the NRHP. If future plans for the base include renovating or changing these three buildings in any way, Section 106 should be initiated to protect these historic resources. In addition, the Secretary of Interior's *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* will be followed to ensure that maintenance activities will not alter the character-defining features or the integrity of the property.

## 5. COMPLIANCE PROCEDURES

### 5.1. Preservation and Mitigation Strategies

The CRM conducts an annual review of base properties with Real Property personnel to determine which structures or sites could potentially qualify as historic resources.

Whenever a potentially historic resource could be affected by an undertaking, the CRM will review proposed modifications and notify the BCE. The findings and proposals are submitted to the SHPO with the following for review and concurrence:

- A letter of request for Section 106 Consultation.
- SHPO Consultation" Section 106 of the National Historic Preservation Act and/or the Antiquities Code of Texas packet (found on the Texas Historical commission website) will be submitted.

Sheppard will work with the SHPO with regard to any adverse effects determinations. Should these attempts not be successful, **AFCEC/CZO** will be notified and the Advisory Council on Historic Preservation will be invited to participate in negotiations with Sheppard AFB and the Texas SHPO.

In the event sites are discovered during the course of construction, work in the area will cease until notification of possible significant finding is made to SHPO and evaluation by designated, qualified personnel knowledgeable in natural resources, history, architecture or archeology is made.

#### 5.1.1. Mitigation Plans for Threatened Cultural Resources

Currently there are three buildings/structures that have been determined eligible for listing in the NRHP. If work is proposed for these buildings, it will be performed in accordance with the Secretary of Interior's *Standards for Rehabilitation and Guidelines for Rehabilitating Historic*

*Buildings*, to ensure that maintenance activities will not alter the character-defining features or the integrity of the property.

## 5.2. Consultation Procedures

Section 106 of the NHPA requires Federal agencies to take into account the effects of their projects on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on those actions if there is a non-concurrence. Properties potentially eligible for nomination to the National Register receive the same protection and consideration as nominated historic properties under subsection 106. This policy also applies to archeological sites, even if they have not yet been discovered. Section 106 Step-by-Step, written by the ACHP, provides clear and concise guidance on the steps to be taken.

Prior to accomplishing any work on base, the CRM will review work orders/AF IMTs 813, *Request for Environmental Impact Analysis*, for the proposed action and determine if the project could result in a change of character on the property in question. In the event of potential effects, the CRM will assess what information is needed and forward the information to SHPO. SHPO has 30-day review period in each step of the consultation process. After the initial SHPO review, the consultation process follows the basic steps of Section 106 Review (see SOP 1). Below is a brief discussion of the parties involved in the consultation process.

- **State Historic Preservation Office (SHPO)**

The SHPO, according to the NHPA of 1966 as amended, must review all undertakings and actions that effect cultural resources at Sheppard AFB. This means “could” or “may” become historical in the future. The SHPO for the state of Texas is located in Austin TX (see Appendix D for contact information). The CRM is the point of contact between the SHPO and Sheppard AFB. Cultural resource responsibilities in this relationship include: review work, prepare documentation necessary for Section 106. In both cases where adverse effect or no adverse effects are found; present mitigation proposals, keep data current with regard to master planning staff, and negotiate MOAs and PAs to preserve, protect and manage cultural resources.

- **Advisory Council on Historic Preservation (ACHP)**

The ACHP is an independent federal agency created by the NHPA and is the major policy advisor to the government in the field of historic preservation (see Appendix G for contact information). Federal agencies also consult with project proponents, members of the general public, state and local officials and the ACHP to address adverse impacts on historic properties.

- **National Park Service (NPS)**

The NPS can assist Sheppard AFB in assessing the eligibility of properties for the NRHP (see Appendix D for contact information). If there are questions about the eligibility of an historic property, the Federal agency overseeing the undertaking can seek a formal Determination of Eligibility (DOE) from the NPS or Keeper of the National Register (see *36 CFR 63*). The Keeper



will then determine if the property is eligible for listing in the National Register of Historic Places. The NPS can also serve as a resource for appropriate methods of renovation, rehabilitation and preservation.

- **Interested Public (including Native American Groups)/Other Interested Parties**

Individuals doing university research in addition to people and organizations interested in cultural resource management issues can be considered other interested parties. Relationships and responses to such parties are facilitated by the Command Architect and CRM. As of 2004, no Native American resources have been identified as being associated with Sheppard AFB area lands.

## **6. STANDARD OPERATING PROCEDURES (SOP)**

### **6.1. Establishing Standard Operating Procedures**

Although protection of cultural resources is not the primary mission of the Air Force, it is an important secondary mission. Failure to fulfill mandated federal and state responsibilities could leave the Air Force open to charges of poor stewardship of cultural resources which could jeopardize the bases continued use.

This ICRMP reflects a decision by the Air Force in general and Sheppard AFB in particular to proactively integrate consideration of cultural resources into day-to-day development, operation and maintenance of Sheppard AFB. The procedures presented in this plan and described in the SOPs are designed to facilitate that decision.

#### **6.1.1. Standard Operating Procedures**

While not anticipated, it is possible significant archaeological sites may be discovered via subsurface activities at any of the facilities covered by this ICRMP. Continued consideration of Cold War era buildings and structures will be necessary. It should be noted that a facility can become historical within years of being built. It all depends on the circumstances/determination and if that site/facility falls under one of the following five National Register of Historic Properties (NRHP) eligibility: buildings, structures, sites, objects, and districts (districts can be a combination of two or more of the categories). In order to become historical, the areas must fall under Criterion A-D of the NRHP. (See 3.4.2 for more information).

A very real benefit to conserving cultural resources is avoiding the cost of delays and litigation that may result from failure to fully comply with cultural resource laws and regulations. Preservation law requires federal agencies, including the U.S. Air Force, to consider and protect cultural resources in planning and undertaking actions. If project planners fail to comply with these requirements, installations face increased project costs and delays with negative impacts to mission training and operations.

The SOPs are intended to be short, simple discussions that outlines “who-does-what and when” to consider cultural resources under specific circumstances that are expected to occur, or could potentially occur, in conjunction with maintaining operations at Sheppard AFB unless otherwise noted.

**SOP-1: Section 106 Compliance**

- **UNDERTAKING** - is any project/work that involves federal involvement, funding, license. (Example of undertaking: clearing land, flying new routes, construction or adding to existing facilities, installing new doors, windows, or even light bulbs to a facility). The key point is “federal involvement, funding, and license.”
  - See Chart below. Section 106 has 4 potential steps.
    - **Step 1.** Determine what the undertaking is. You must ask this question: *Is this the type of project that could potentially affect historic property if it were present?* It doesn't matter if the historic property is there or not. It could be there, hence, section 106 must be implemented.
      - If a Section 106 letter exists for the property where the project is to take place, Section 106 requirements are met.
    - **Step 2.** If an existing Section 106 letter does not exist, a letter demonstrating the finding of no adverse effect must be sent to SHPO, and the Tribes. Additionally, an allowance for public involvement must be demonstrated. If all are in agreement and there are no findings, then Section 106 is complete

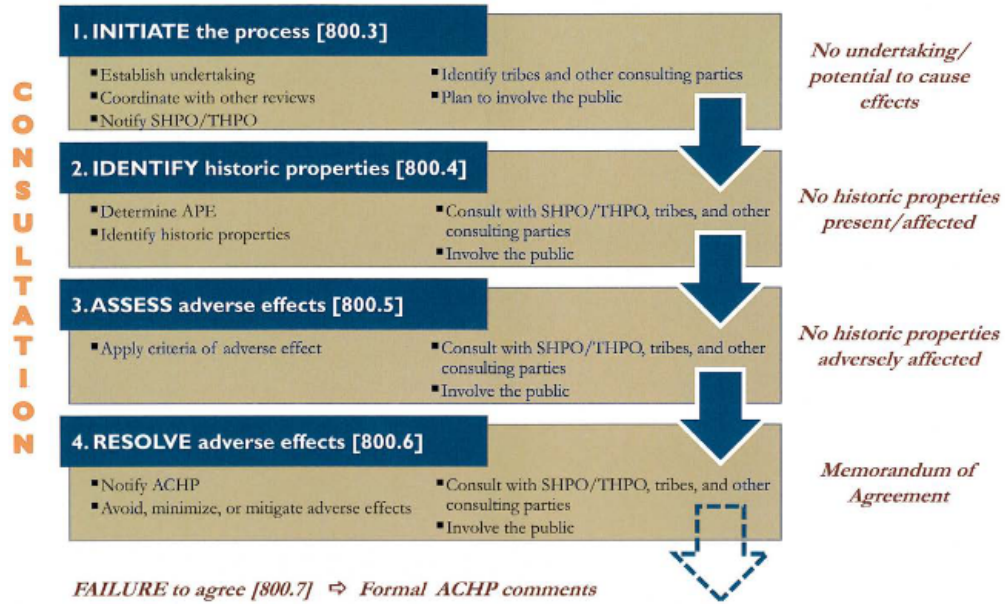
In the event that there is a historic aspect to the APE, the following steps must be completed:

- **Step 3.** Assessing the effects is required.
    - A letter to SHPO/THPO and public involvement is required.
      - If there are no adverse effects Section 106 requirements are met.
      - If there are adverse effects Step4 is required.
  - **Step 4.** Resolve the adverse effects
    - Sheppard AFB must be able to avoid, minimize or mitigate adverse effects.
    - Notify Advisory Council on Historic preservation (ACHP)/consult with SHPO and Tribes. Involve the Public and create a Memorandum of Agreement (MOA) or Programmatic Agreement (PA).
- MOA's are legally binding - 3 signatures are required for a MOA: Federal, SHPO/THPO and ACHP.
  - Environmental Assessments (EA's) and Environmental Impact Statements (EISs) for actions producing adverse effects to historic properties require an MOA or PA be signed

into effect before a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) may be signed.

- The Section 106 process is the method by which federal agencies guard against potentially affecting a historic property (even if not yet identified), when doing an "undertaking" - disturbing land, buildings, other structures that could damage or change the character of a property that "might" be historic.

# THE SECTION 106 PROCESS



***SOP-2: Eligible for NRHP Facility Maintenance-Repetitive Maintenance and Repair Operations***

When undertaking repair of failed materials or systems, all work should follow *the Secretary of the Interior's Standards for Treatment of Historic Properties*, and its accompanying Guidelines. Because this work will usually be done on an emergency basis, great care must be taken to avoid adverse effects to cultural resources. Prior to making repairs, the following issues should be considered:

- Repair the root cause of the failure before repairing the results. An example of this would be the repair of a soffit where failure resulted from water leaks. The cause may be a backed up gutter or rain water leader. The solution then becomes obvious - establish a clear schedule for leaf removal from roofs and cleaning of gutters, thus avoiding the condition that allowed water to build up and damage the soffit;
- Make all repairs with appropriate materials and workmanship. Avoid makeshift solutions;
- Do not replace historic fabric with substitute materials or systems. For example, retain and repair historic stucco rather than replacing stucco walls with wallboard and a thin plaster coat or replacing mortar with caulk; and
- Maintain repaired systems in accordance with the principles set forth under Pro-Active Facility Maintenance.

**Pro-Active Facility Maintenance**

It is part of the responsibility of each installation staff member to ensure that the facilities under their jurisdiction, or in/on which they work, is maintained at a level that allows it to continue serving the function for which it was designed and used, and allows it to continue serving that function into the future. It is not someone else's responsibility; it is everyone's responsibility. By doing this, the facility and its systems are unlikely to fail, which would result in delays, inconvenience, and expense. Cyclical maintenance can prevent failure. It has been proven that developing a plan for preventive maintenance on NRHP site can save an installation substantial funds over continuing to operate in a reactive maintenance mode, can keep buildings and systems on-line, and can improve working conditions because there will be fewer emergencies for the staff to address.

**Renovating Space within a Cultural Resource for a Different Use**

The WG/IC must ensure that real property facilities are used efficiently. The BCE, Facility User and Base Real Property personnel, along with other flights of Civil Engineering, must work together to accomplish this goal. There are two ways to determine if a facility is being used effectively.

1. Perform a building inventory inspection on the facility in question; and
2. Have Base Development prepare a set of requirements for the organization occupying the facility. Compare these requirements to the assets being used.

If a facility is found to be underutilized, a plan should be developed for more efficient use of that facility and this information should be presented to the Facility Board for approval. If it is determined that a change in use is required, then an AF Form 123, *Request for Changed Use of Real Property*, may be required. The WG/IC can approve all changes in use except for the following:

1. Munitions and Maintenance Facilities;
2. Family Housing;
3. Religious Facilities; and
4. Morale, Welfare and Recreation (MWR) facilities, if that change in use does not directly support an MWR purpose.

In addition, the facility use cannot be changed from what was justified on DoD Form 1391, *Military Construction Project Data*, until 2 years after project completion and beneficial occupancy. However, if a change in use is necessary because of base mission or overriding needs, an AF Form 123 needs to be sent through the proper approval authority. For further guidance on these items please see paragraph 2.6.3 of AFI 32-9002, *Use of Real Property Facilities*.

After completion of AF Form 123, this document should be forwarded to the proper approval authority. Once all signatures have been obtained, the AF Form 123 should be attached to the Journal which was created showing the change in use of the facility. The approved AF Form 123 and back-up documentation should be placed in the facility folder.

### ***SOP-3: Section 110 Compliance***

Comprehensive cultural resource inventories (including Native American consultation) should be conducted if surveys are older than 10 years. Currently, Sheppard AFB maintains three National Register eligible Cold War properties: Kell Field Air Terminal Building, Building 2560, and the Alert Hangar. Kell Field Air Terminal Building is eligible for its architectural significance, Building 2560 and the Alert Hangar are eligible for their significance as Cold War properties.

***SOP-4: Consulting with Interested Parties and Native Americans***

It should be the objective of the Air Force to seek the input of, and to consult with, parties who have an interest in the management of cultural resources at Sheppard AFB. It is the responsibility of the ITLO to oversee this consultation: (see previous paragraph 3.4.1).

Given current understanding of cultural resources at Sheppard AFB, groups and individuals with an interest in the Cold War and, to a lesser extent, World War II and Native American Consultation, should be included.

***SOP-5: Archaeological Resource Protection Act Compliance (ARPA)***

This SOP implements provisions of the ARPA. Because the potential for discovery cannot be entirely ruled out for future discoveries, this SOP is included. If additional lands are added to the boundaries of Sheppard AFB, compliance with ARPA and any known archaeological resources would be protected. ARPA makes it a federal felony for persons to excavate, remove, damage or otherwise deface any archaeological resource located on *federal* land. The sale, purchase or transfer of artifacts obtained in violation of the law also is a felony. ARPA contains definitions and guidelines for the enforcement of the act and sets forth procedures and standards for the issuance of permits that are held to be exceptions to the act. Permits are not required of contractors employed directly by the Air Force. It is the responsibility of Environmental Programs staff (with assistance from Sheppard CRM) to advise personnel about ARPA and its criminal penalties.

Should important archaeological resources be discovered and subsequently investigated at the base or the recreation area covered by this ICRMP, the Air Force also would be required to provide 30-days' notice to Native American communities that might consider the sites to be of cultural or religious importance. Groups requiring notification would be identified as an aspect of SOP-4. If concerns were to be expressed, the Air Force would need to take those concerns into consideration as the archaeological investigation was conducted.

Additionally, the Air Force would have to comply with regulations for curation of federally owned archaeological collections (published at 36 CFR Part 79 and developed to implement the NHPA as well as ARPA). It would be the responsibility of the Air Force to determine that a repository has the capability to provide adequate long-term curatorial services as defined in this regulation.

***SOP-6: Dealing with Discoveries***

Any excavations within Sheppard AFB have the potential for discovering undetected or unknown archaeological deposits; however, the likelihood of this occurring is low. Nonetheless, the possibility cannot be ruled out entirely, hence the need to inform personnel about ARPA as discussed under SOP-5. This SOP outlines the procedures to be followed if an unexpected discovery is made.

Prior to any ground disturbing activity or excavation project, the construction crew should be briefed on what to do if apparent archaeological materials are uncovered and informed of the penalties, both state and federal, for non-compliance. Apparent archaeological materials would include accumulations of broken (or whole) pottery vessels, stone tools like arrowheads, sharp flakes that could have served as knives or scraping implements or grinding implements (manos or metates), bones, charcoal stains possibly with broken rock fragments and rock or adobe concentrations suggestive of walls.

If the work is to be done in-house, the crew chief may be supplied with a copy of this SOP by the BCE and required to make its contents known to all members of the construction crew. If the work is contracted, the language from this SOP may be included in the construction contract or delivery order. In any case, construction crews shall do the following in the event of a finding:

- Halt work immediately in the area where apparent archaeological materials are found; and
- Notify the BCE and the Environmental Program's staff of the situation.

The Environmental Program's staff will notify the Sheppard CRM who will attend to the situation. It should be stressed that if this process is followed properly; there should be limited impact to the mission in terms of down time or delays. Once the Sheppard CRM has been notified, he/she will contact the medical examiner, SHPO and/or arrange to have the materials examined by a contracted archaeologist within 48 hours if possible. The following procedures will be employed by the Sheppard CRM or the contracted archaeologist to evaluate the materials:

- If, upon examination of the recovered material, it appears to be natural stone formations, or other such materials that are often mistaken for archaeological materials, Sheppard CRM may allow the excavation to proceed without further action;
- If, upon examination, the recovered materials are clearly of human cultural origin, the field archaeologist must make a field evaluation of the primary context of the deposit and its probable age and significance, recording his or her findings in writing and documenting the material with photographs and drawings as appropriate;
- If the disturbance to the deposit has been slight and the excavation can be relocated to avoid the buried site, the Sheppard CRM is required to file an incident report and a site form with the SHPO in a routine manner, having avoided any adverse effect through relocation of the excavation;
- Where the excavation cannot be relocated or simply aborted, emergency consultation between the SHPO and Sheppard CRM will be required;
- Sheppard cultural resources staff will telephone the SHPO, reporting the discovery based on their own or the contracted archaeologist's observations and documentation. The facts that would bear on the question of the significance of the site relative to the criteria for National Register eligibility also will be reported to the SHPO. If both the SHPO representative and the



Sheppard cultural resources staff agree that the deposit encountered is not eligible, the telephone conversation will be summarized in an informal memorandum for record, to be included with the incident report and site form. Sheppard cultural resources staff may then allow the project to proceed, but must have an archaeologist monitor the excavation personally for other deposits that might be eligible;

- In the event that the recovered data are deemed insufficient to make a determination of eligibility, in the opinion of either the SHPO or Sheppard CRM, an emergency testing plan will be devised either by Sheppard CRM or the contracted archaeologist and coordinated with the SHPO. The provisions of ARPA must be met prior to implementation of testing procedures for undertakings on federal land; thus Native American contacts should be a priority in these cases because of the requisite 30-day notification period. Further excavation in the vicinity of the site will be suspended until an agreed testing procedure has been carried out and sufficient data gathered to allow a determination of eligibility to be made. Sheppard cultural resources staff may request that a representative of the SHPO visit the site to consult directly on the question of eligibility. If both the SHPO and Sheppard CRM agree after the testing plan is completed that the site is not eligible for the National Register, work on the project may resume; and
- If the site appears to be eligible, or if the SHPO and Sheppard CRM cannot reach an agreement on the question of eligibility, the Air Force may choose among three alternative actions depending on the urgency of the project being delayed by the discovery of archaeological materials. These alternatives include:

1. Reconsider relocation of the project to avoid any adverse effect.

2. Proceed with a data recovery project under a memorandum of agreement (MOA) with the SHPO that specifies the scope and extent of the data recovery required to mitigate the impact of the project on the historic property in question. The provisions of ARPA also must be met in this eventuality for undertakings on federal land. This option may be implemented as an extended test for National Register eligibility when either the SHPO or Sheppard CRM is doubtful of the eligibility of the site. The mitigation effort may be terminated when evidence specified in the MOA indicates the site is not eligible.

When the recovery of human remains is deemed to be likely, the Air Force may choose to initiate excavations in compliance with the NAGPRA or applicable state law Texas Health and Safety Code Chapter 711 within 10 days which protect unmarked burials on state or private land (refer to SOP 6). Such excavations will be coordinated with the SHPO and if human remains are encountered, coordinated with interested Native American tribal groups.

3. The Air Force will comply with 36 CFR 800.11(b)(2)(ii), developing and implementing actions that take into account the effects of the undertaking on the historic property to the extent feasible and the comments of both the SHPO and the ACHP. The comments of the ACHP will be requested. Under 36 CFR 800.11(c)(2), interim comments of the ACHP must be provided to the Air Force within 48 hours and final comments within 30 days. Nothing in section 106

requires the Air Force to stop work on an undertaking but the provisions of NAGPRA require temporary suspension of work in the immediate vicinity of a discovery situation involving human remains. If the comments of the SHPO and the ACHP both indicate that the nature of the property is significant and the undertaking's apparent effects on it are serious, then the Air Force should make reasonable efforts to minimize harm to the property until such time as the Section 106 consultation is completed.

#### ***SOP-7: Treatment of Human Remains***

The unexpected finding of human remains (including skeletal materials, associated or unassociated mortuary offerings, and items of cultural patrimony) would be treated as a type of discovery situation. If skeletal remains should be encountered inadvertently during construction activities or are found being exposed by erosion or other natural processes at Sheppard AFB and it is apparent they are human remains, or it cannot be determined whether or not they are human remains, the area should be secured and the Base Civil Engineer notified immediately. The Base Civil Engineer will notify the Environmental Program's staff and the Sheppard CRM who will attend to the situation.

Once the Sheppard CRM has been notified, they will either examine the skeletal remains themselves or arrange to have the materials examined by a contracted physical anthropologist or archaeologist within 48 hours if possible. If the remains are found to be human, formal consultation will be initiated, prior to removal of the remains, with the appropriate Native American tribes as mandated by NAGPRA (if the remains are of probable Native American ethnicity) or the amendments to the Arizona Antiquities Act (irrespective of probable ethnicity), dependent on land jurisdiction. Any arrangements for the disposition of human remains recovered from federally owned land will take into consideration the principles outlined in the ACHP's policy statement regarding the treatment of human remains and grave goods issued 27 September 1988 as well as the dictates of NAGPRA and its implementing regulations.

#### **Historic Buildings and Structures**

Following are strategies, or SOPs, that can be used to protect the integrity of historic structures and buildings at Sheppard AFB.

- Monitor, maintain and update the GIS and layer sets that include historic buildings and structures data.
- Monitor National Register eligible buildings and structures (occupied or vacant) regularly to ensure they are adequately maintained in accordance with the NHPA Section 110. Notify Civil Engineering of any noncompliance.
- Monitor vacant National Register eligible buildings and structures regularly to encourage their appropriate reuse in accordance with NHPA Section 110. Document successful reuse examples for future reference.

***SOP-8: Reporting Damage to Cultural Resources***

At Sheppard AFB, cultural resources may take the form of buildings, sites, structures, monuments, archaeological finds, or other items that possess possible historical or cultural importance. If any of these resources are damaged or destroyed, such damage or destruction must be reported to 82 CES/CEIV within 24 hours. The resource shall immediately be secured until 82 CES/CEIV personnel arrive.

82 CES/CEIV will then evaluate the impact on the subject resource and coordinate responses to SHPO, and AETC for appropriate action.

## **Appendix A**

### **Cultural Surveys**

**Link to 2012 DEC, INVENTORY AND ASSESSMENT OF SELECT BUILDINGS AND STRUCTURES (DATING THROUGH 1976) SURVEY AND UPDATE BUILDING LIST**

[\\nvm-fs-001\82ces\Enviro\CULTURAL\\_RESOURCES\OTHER\Dec 2012\\_inventory\\_and\\_Assessment.pdf](\\nvm-fs-001\82ces\Enviro\CULTURAL_RESOURCES\OTHER\Dec 2012_inventory_and_Assessment.pdf)

**LINK TO 2002 COLD WAR-ERA BUILDING AND STRUCTURES INVENTORY AND ASSESSMENT FOR SAFB, TEXAS**

[\\nvm-fs-001\82ces\Enviro\CULTURAL\\_RESOURCES\OTHER\2002 Cold War Era Bldg\\_Survey Sheppard\\_AFB](\\nvm-fs-001\82ces\Enviro\CULTURAL_RESOURCES\OTHER\2002 Cold War Era Bldg_Survey Sheppard_AFB)

**Link To 1994 JAN, A CULTURAL RESOURCES SURVEY OF THE SHEPPARD AIR FORCE BASE RECREATION AREA AT LAKE TEXOMA, GRAYSON COUNTY, TEXAS**

[\\nvm-fs-001\82ces\Enviro\CULTURAL\\_RESOURCES\OTHER\1994 Cultural Resources Survey of Lake Texoma.pdf](\\nvm-fs-001\82ces\Enviro\CULTURAL_RESOURCES\OTHER\1994 Cultural Resources Survey of Lake Texoma.pdf)

**1993 SAFB CULTURAL SURVEY**

[\\nvm-fs-001\82ces\Enviro\CULTURAL\\_RESOURCES\OTHER\1993 SAFB cultural survey.pdf](\\nvm-fs-001\82ces\Enviro\CULTURAL_RESOURCES\OTHER\1993 SAFB cultural survey.pdf)

## Appendix B

### Copies of Correspondence Documents



CS

## TEXAS HISTORICAL COMMISSION

P.O. BOX 12276

AUSTIN, TEXAS 78711

(512) 475-3092

January 28, 1985

Mr. Jimmie K. Stodghill  
Department of the Air Force  
3750th Air Base Group (ATC)  
Sheppard Air Force Base, TX 76311

Re: Sheppard Air Force Base  
Renovation of Little Adobe  
Wichita Falls County, Texas  
(USAF, A-3)

Dear Mr. Stodghill:

This office is in receipt of your letter of December 27, 1984 regarding the above referenced undertaking. Using the information provided, we offer the following comments in accordance with 36 CFR 800.

It is our opinion that the Little Adobe structure is eligible for the National Register of Historic Places. Relatively unique in the Wichita Falls area, the structure meets Criterion B for inclusion in the National Register.

In order to provide further comments upon the scope of the proposed undertaking, we find that we shall need further information. Please provide this office with clear photographs (polaroids, 135mm, or etc.) of each of the areas to be treated. Also include any construction drawings with these photographs. Upon receipt of this information we shall provide comments regarding the effect of the undertaking upon the property pursuant to 36 CFR 800.3.

Thank you for your attention to this matter. If you have procedural questions, please call Nancy Kenmotsu (512-475-3057) of my staff; please direct technical questions to Gerron Hite (512-475-3094) staff architect.

Sincerely,

Handwritten signature of LaVerne Herrington in cursive.

LaVerne Herrington, Ph.D.  
Deputy  
State Historic Preservation Officer

LH/NK/rrh

*The State Agency for Historic Preservation*

82d Training Wing  
Sheppard Air Force Base, Texas  
30 Nov 2016



TEXAS  
HISTORICAL  
COMMISSION

George W. Bush • Governor  
John L. Nor, III • Chairman  
Curtis Tunnel • Executive Director

File  
201  
FT

*The State Agency for Historic Preservation*

DEPARTMENT OF ARCHITECTURE

July 16, 1996

John Clark, Lead Architect  
Department of the Air Force  
82 CES/CECC  
231-9th Avenue  
Sheppard AFB, TX 76311-3333

Re: DOD, Repair Exterior Wall/Roof Little Adobe Bldg, 2130, Sheppard AFB, Wichita  
County, Texas

Dear Mr. Clark:

Thank you for the opportunity to review the project referenced above. The Department of Architecture reviews determinations of effect for federal projects on National Register eligible buildings, structures, objects, and districts.

Staff has determined that the proposed project will have no adverse effect on the above referenced historic resource provided that the flashing detail of exterior parapet includes caulking or a reglet to prevent water infiltration. The submitted drawn detail lacks sufficient information. Please clarify.

Thank you for your interest in the cultural heritage of Texas, and for the opportunity to comment on this federally funded project in accordance with the National Historic Preservation Act, as amended. If you have any questions or concerns about this review please contact Lisa Hart Stross in the Department of Architecture at 512/463-6167, fax 512/463-6095.

Yours truly,



Stan Graves, AIA, DSHPO  
Director  
Department of Architecture

SG/LHS

82d Training Wing  
Sheppard Air Force Base, Texas  
30 Nov 2016

For  
Keep  
Forever!



TEXAS  
HISTORICAL  
COMMISSION

*The State Agency for Historic Preservation*

RICK PERRY, GOVERNOR

JOHN E. NAU, III, CHAIRMAN

F. LAWRENCE OAKS, EXECUTIVE DIRECTOR

August 29, 2002

Timothy W. Hunter  
Cultural Resource Manager  
82ND CES/CEVX  
231 9TH Avenue  
Sheppard AFB, Texas 76311

*Re: Project review under Section 106 of the National Historic Preservation Act of 1966, Cold War Era Buildings and Structures Inventory and Assessment, Sheppard AFB, Wichita County, Texas. (USAF)*

Dear Mr. Hunter:

Thank you for providing information regarding the above referenced project. This letter serves as comment on the survey document from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Bob Brinkman, has completed its review of the survey document *Sheppard Air Force Base: Cold War-Era Buildings and Structures Inventory and Assessment* (May 2002). We concur with the findings of the survey; namely, that two properties are **eligible** for listing on the National Register of Historic Places (NRHP). These properties are:

- Building 2560, Bomber alert facility / molchole (1960)
- Alert apron (1960)

These SAC bomber dispersal facilities possess exceptional Cold War significance, and therefore are determined eligible for listing under Criterion Consideration G.

We concur that all other properties surveyed in this document represent common building types or have had sufficient loss of architectural and historic integrity, and are therefore **not eligible** for listing on the NRHP.

We look forward to further consultation with your office, and hope to maintain a partnership that will foster effective historic preservation. Thank you for your participation in this federal review process. If you have any questions concerning this review or if we can be of further assistance, please contact Bob Brinkman at 512/464-8769.

Sincerely,

Handwritten signature of F. Lawrence Oaks in black ink.

for: F. Lawrence Oaks  
Executive Director, Texas Historical Commission

cc: Joreen Ludeke, Wichita County Historical Commission, 3326 Bohner Road,  
Burkburnett TX 76354

82d Training Wing  
Sheppard Air Force Base, Texas  
30 Nov 2016

FEB-05-2003 WED 04:04 PM THC/ARCHITECTURE DIV

FAX NO. 5124636095

P. 02



TEXAS  
HISTORICAL  
COMMISSION

*The State Agency for Historic Preservation*

RICK PERRY, GOVERNOR

JOHN L. NAU, III, CHAIRMAN

F. LAWRENCE OAKS, EXECUTIVE DIRECTOR

February 5, 2003

Brigadier General Arthur J. Rooney, Jr.  
82d Training Wing Commander  
419 G Avenue Suite 1  
Sheppard AFB TX 76311-2941

Re: *Project review under Section 106 of the National Historic Preservation Act of 1966  
Rehabilitation and addition to Kell Field Air Terminal, Wichita Falls, Wichita County  
(USAF/106/RTHL)*

Dear General Rooney:

It was a pleasure meeting you and everyone else at Sheppard Air Force Base to tour the "Little Adobe" and discuss the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Chase Robertson, has completed its review of the project documentation provided and determined the project as proposed would have **no adverse effect** on this National Register eligible property.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions concerning our review or if we can be of further assistance, please contact Chase Robertson at 512/463-6183.**

Yours truly,

A handwritten signature in black ink, appearing to read "Chase R.", written over a light blue rectangular background.

for: F. Lawrence Oaks, State Historic Preservation Officer

cc: Dorothy Rencurrel, Tarrant County Historical Commission

FLO/CR

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B-4



**TEXAS HISTORICAL COMMISSION**  
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June 1, 2012

Mark McBurnett  
Base Civil Engineer  
82<sup>nd</sup> Civil Engineer Squadron  
149 Hart Street, Suite 8, Bldg. 1200  
Sheppard AFB, TX 76311-3333

*Re: Concurrence Requested on Determination of Eligibility for Buildings 17, 19, 843, 980, and 981 at Sheppard AFB, Texas*

Dear Mr. McBurnett:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC).

Our review staff, led by Mr. William McWhorter, has reviewed the above mentioned consultation from your office and the THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for Buildings 17, 19, 843, 980, and 981 at Sheppard AFB.

Thank you for your cooperation in this state and federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we may be of further assistance, please contact Mr. William McWhorter at 512/463-5833.

Sincerely,

*William McWhorter*

for  
Mark Wolfe,  
Executive Director  
State Historic Preservation Office



RICK PERRY, GOVERNOR • SHERI S. KRAUSE, CHAIRMAN • MARK WOLFE, EXECUTIVE DIRECTOR  
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**TEXAS HISTORICAL COMMISSION**  
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March 22, 2012

Mark McBurnett  
Base Civil Engineer  
149 Hart Street, Suite 8, Bldg. 1200  
Sheppard AFB, TX 76311

*Re: Concurrence on Determination of Eligibility for Building 1638 at Sheppard AFB, Texas*

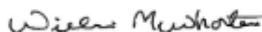
Dear Mr. McBurnett:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC).

Our review staff, led by Mr. William McWhorter, has reviewed the above mentioned consultation from your office and agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for **Building 1638** at Sheppard AFB.

Thank you for your cooperation in this state and federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we may be of further assistance, please contact Mr. William McWhorter at 512/463-5833.

Sincerely,



for  
Mark Wolfe,  
Executive Director

**TEXAS HISTORICAL COMMISSION**  
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August 27, 2012

Ms. Leslie Pena  
Defense Support Services  
231 9<sup>th</sup> Avenue  
Sheppard AFB, TX 76311-3333

*Re: Draft Report eligibility consultation for Sheppard Air Force Base Inventory and Assessment of Select Buildings and Structures (Dating Through 1976), Wichita Falls, Texas (Wichita County)*

Dear Ms. Pena:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC).

Our review staff, led by Mr. William McWhorter, has reviewed the above mentioned consultation from your office and the THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following World War II-era Facilities at Sheppard AFB:

- 5, 17, 19, 401, 843, 961, 962, 980, 981, 1020, 1040, 1060, 1080, 1089, 1090, 10024

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Medical Facilities at Sheppard AFB:

- 1200, 1209

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Administration Facilities at Sheppard AFB:

- 400, 402, 987, 1638

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Recreational Facilities at Sheppard AFB:

- 318, 430, 471, 649, 811, 840, 1125, 1552, 1552A, 4490, 4491, 4493, 55512, 55514, 55515, 55516, 55701, 55702, 55703, 55704, 55705, 55706, 55707, 55708, 55709, 55710, 55711, 55712, 55713, 55714, 55715, 55716, 55717, 55718, 55719, 55720, 55721-55722, 55724, 55725, 55726, 55727, 55728, 55729, 55739, 55740, 55741, 55742, 55743, 55744, 55745, 55746, 55747

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Security Facilities at Sheppard AFB:

- 2204

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Training and Education Facilities at Sheppard AFB:

- 249, 250, 558, 832, 920, 1081, 1919, 1928, 1929, 1932, 1950, 1959, 1960, 2330

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Maintenance and Storage Facilities at Sheppard AFB:

- 1, 21, 472, 992, 1092, 1121, 1641, 2119, 2325, 2404, 2406, 2408, 2410, 2565

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Utility Facilities at Sheppard AFB:

- 1023

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Social Support Facilities at Sheppard AFB:

- 55, 57, 195, 312, 810, 1624, 4475

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Operational Support Facilities at Sheppard AFB:

- 237, 340, 845, 986, 1015, 1700, 2017, 2115, 2206, 2208, 50100, 55501, 55510

The THC agrees with the U.S. Air Force's determination of **NOT ELIGIBLE** for listing on the National Register of Historic Places for the following Cold War-era Housing Facilities at Sheppard AFB:

- 127, 128, 129, 130, 131, 132, 133, 134, 1658

Thank you for your cooperation in this state and federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we may be of further assistance, please contact Mr. William McWhorter at 512/463-5833.

Sincerely,

*William McWhorter*

for  
Mark Wolfe,  
Executive Director  
State Historic Preservation



**TEXAS HISTORICAL COMMISSION**  
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September 25, 2014

Leslie Peña  
CRM/Environmental Tech II  
82CES/PAE/CEIV  
231 9<sup>th</sup> Ave.  
Sheppard AFB, TX 76311

*Re: Project review under Section 106 of the National Historic Preservation Act of 1966, proposed repairs to Kell Field Air Terminal (Little Adobe), Building 2130, Sheppard Air Force Base, 1133 Heritage Way, Wichita County (DOD/106, RTHL, THC Tracking #201413243)*

Dear Ms. Peña,

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Elizabeth Brummett, has completed its review of the project documentation provided, which was received by our office on August 26, 2014. Based on this information, the proposed work entails repairs to the former Kell Field Air Terminal (Little Adobe), which is eligible for listing in the National Register of Historic Places and is designated as a Recorded Texas Historic Landmark.

Work will include repair or replacement of non-original metal doors; repair or selective, in-kind replacement of deteriorated wood windows; and exterior repainting. We find that this work meets the *Secretary of the Interior's Standards for Rehabilitation* and will have **NO ADVERSE EFFECT** on this historic property. We have also reviewed this project under Recorded Texas Historic Landmark (RTHL) legislation. We hereby waive the remainder of the notification period and work may proceed. However, in the event that extensive window replacement is proposed by the contractor selected for this project, we will need additional information on the condition of the windows and proposed replacement units.

Additionally, should funds become available, the adjacent concrete patio will be replaced or topped with a concrete overlay. This work will also have no adverse effect provided that care is taken to avoid damage to the historic building if the patio is demolished. We recommend hand removal of the concrete within 8-12" of the building face. No further consultation will be needed for this work.

Other work contingent on future funding includes foundation, roof, and stucco repairs. While we are supportive of these items, we will need to review additional details regarding the project scope and materials in order to make a determination of effect.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If you have any questions or if we can be of further assistance, please contact Elizabeth Brummett at 512/463-6167.**

Sincerely,

*A. Elizabeth Brummett*

A. Elizabeth Brummett, State Coordinator for Project Review  
For: Mark Wolfe, State Historic Preservation Officer

MW/aeb



RICK PERRY, GOVERNOR • MATTHEW F. KREISLE, III, CHAIRMAN • MARK WOLFE, EXECUTIVE DIRECTOR  
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**TEXAS HISTORICAL COMMISSION**  
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March 15, 2016

Ms. Leslie Peña  
NEPA Program Manager  
82 CFS/PAE-DS2/CEIV  
231 9<sup>th</sup> Avenue  
Sheppard AFB, TX 76311

*Re: Prescribed fire for re-seeding project, Sheppard Air Force Base, Wichita Falls, Texas (Wichita County)*

Dear Ms. Peña:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC).

Our review staff, led by Mr. William McWhorter, has reviewed the above mentioned consultation from your office and has the following comments. Regarding historic or potentially historic structures at Sheppard Air Force Base, and this project's potential to impact them, the THC concurs with the U.S. Air Force's determination of **No Historic Properties Affected**.

Thank you for your cooperation in this state and federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we may be of further assistance, please contact Mr. William McWhorter at 512/463-5833.

Sincerely,

*William McWhorter*

for  
Mark Wolfe,  
Executive Director  
State Historic Preservation Office



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**TEXAS HISTORICAL COMMISSION**  
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April 22, 2016

Leslie Peña  
EIAP, NRM, CRM  
GP Program Manager  
231 9<sup>th</sup> Avenue  
Sheppard Air Force Base, TX 76311

Re: *Project review under Section 106 of the National Historic Preservation Act of 1966  
Review Interior Renovation of Building 2560 Bomber Alert Facility/Molehole, Sheppard Air Force  
Base, Wichita County, Texas (DOD/106, THC # 201606121)*

Dear Mrs. Peña:

Thank you for your correspondence describing the above referenced project. This letter serves as comment on the proposed undertaking from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission (THC).

The review staff, led by Michael Robb, has completed its review of the documentation provided for the above-referenced project. The proposed interior renovations will have no adverse effect on building 2560 or the Alert Apron. Should there be a change in scope or nature of the project activities, please contact the THC.

Building 2560 is significant not only for its role in the cold war, but also because it is the lone remaining "molehole" in the state. While the best preservation practice in this case is to keep the structure functioning and usable, it should be noted that cumulative effects can potentially lead to a determination of adverse effect. The prospect for this finding can potentially be mitigated by the retention and re-use of as much historic material as is suitable for the project.

We look forward to further consultation with your office and hope to maintain a partnership that will foster effective historic preservation. Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. If you have any questions concerning our review or if we can be of further assistance, please contact Michael Robb at 512/463-6083.

Sincerely,



Michael Robb, Military Project Reviewer, Central and West Texas Project Reviewer  
for: Mark Wolfe, State Historic Preservation Officer

cc: Robert Palmer, Chair, County of Wichita Historical Commission

MW/MR



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B-11

**Appendix C**

**List of All Cold War Era Properties at Sheppard AFB**

NOTE: Some Buildings were demolished since original survey - marked with an Asterisk (\*)

**TABLE C-1**

NRHP Eligibility of Cold War Properties at Sheppard AFB, Texas

<b>Building Number</b>	<b>Present Use</b>	<b>Year Built</b>
1	Traffic Management Facility	1953
21	Base Store Covered Facility	1953
*55	Automotive Shop	1967
*57	Automotive Shop	1974
61	Kitchen Cne Prep	1979
120	Commissary	1979
125	Base Package Store	1962
127	Transient Lodging Facility (Appropriated)	1962
128	Transient Lodging Facility (Appropriated)	1962
129	Transient Lodging Facility (Appropriated)	1962
130	Transient Lodging Facility (Appropriated)	1962
131	Transient Lodging Facility (Appropriated)	1962
132	Transient Lodging Facility (Appropriated)	1962
133	Transient Lodging Facility (Appropriated)	1962
134	Transient Lodging Facility (Appropriated)	1962
139	Water Support Building	1947
146	Water Support Building	1952
*147	Youth Center	1966
148	Water Support Building	1952
149	Water Support Building	1952
151	Electric Power Station Building	1964
160	Transient Lodging Facility (Non-appropriated)	1983
161	Transient Lodging Facility (Non-appropriated)	1983
162	Transient Lodging Facility (Non-appropriated)	1983
163	Transient Lodging Facility (Non-appropriated)	1983
164	Transient Lodging Facility (Non-appropriated)	1983
165	Transient Lodging Facility (Non-appropriated)	1983
195	Child Care Center	1973
200	Bank Branch	1962
202	Branch Exchange	1978
212	Credit Union	1981
237	DPI	1971
239	Exchange	1975



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*240	Visiting Officers' Quarters	1985
*249	Technical Training Lab	1955
*250	Technical Training Lab	1955
312	Library Recreational	1966
318	Bowling Center	1970
*331	Visiting Officers' Quarters	1968
*332	Visiting Officers' Quarters	1969
*333	Visiting Officers' Quarters	1970
340	Officer Open Mess	1976
370	Visiting Officers' Quarters	1986
400	Headquarters Wing Group	1954
402	Base Personnel Office	1974
430	Recreation Center	1969
450	Gymnasium	1968
461	Swim Pool Water Treatment	1962
471	Swimmers Bath House	1967
472	Base Storage Shed	1954
474	Sanitary Latrine	1963
*514	Supply and Equipment Shed	1981
*515	Supply and Equipment Shed	1980
*516	Airman Dormitory	1972
*524	Supply and Equipment Shed	1981
*525	Supply and Equipment Shed	1980
*526	Airman Dormitory	1969
527	Airman Dormitory	1990
528	Airman Dormitory	1990
*529	Airman Dormitory	1990
530	Housing Supply Facility	1990
531	Headquarters Wing Group	1990
551	Post Office	1990
*558	Security Police Operations	1984
596	Airman Dormitory	1975
645	Housing Supply Facility	1977
649	Recreation Center	1954
690	Misc. Recreation Building	1986
691	Airman Dormitory	1986
*692	Airman Dormitory	1986
693	Airman Dormitory	1986
699	Headquarters Wing Group	1986
*716	Airman Dormitory	1972
*726	Airman Dormitory	1968
740	Exchange	1983
776	Airman Dormitory	1975
790	Misc. Recreation Building	1987
791	Airman Dormitory	1987

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792	Airman Dormitory	1987
793	Airman Dormitory	1987
*796	Family Support Center	1987
810	Chapel, Central	1957
811	Bowling Center	1963
825	Gymnasium	1986
832	Arts and Craft Center	1966
840	Base Theater	1973
845	Communication Facility	1963
920	Technical Training Classroom	1954
985	Supply Warehouse	1988
986	Utility Vault	1953
987	Administration Office	1968
991	Aircraft Support Equipment Shop/Storage Facility	1952
992	Aircraft Support Equipment Shop/Storage Facility	1971
1010	High-Bay Technical Training	1952
1011	Electric Power Station Building	1972
1014	Pump Station	1960
1015	Sanitary Latrine	1971
1023	Compressed Air Plant Building	1960
1081	ATC Technical Training Support	1969
*1092	Aircraft Maintenance Organizational Shop	1967
1093	Fire Station	1983
1094	Sewage Pump Station	1983
*1095	Control Tower	1959
*1096	Electric Power Station Building	1970
*1100	Security Police Con Ident	1991
1121	Supply Warehouse	1953
*1122	Supply Shed	1953
1124	Swim Pool Water Treatment	1954
1125	Swimmers Bath House	1954
1127	Traffic Check House	1955
1200	Composite Med	1963
1202	Electric Power Station Building	1970
1209	Material Services	1975
1210	Sanitary Latrine	1967
1211	Patient Welfare	1969
1214	Base Hazard Storage	1974
1215	Air Condition Plant Building	1982
1216	Environmental Health	1987
1275	Traffic Check House	1978
*1301	Storage Liquid Oxygen	1969
1360	ATC Technical Training Support	1954

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1365	Base Hazard Storage	1967
*1366	Electric Power Station Building	1969
*1392	Mwr Sup/Naf C-Storage	1981
1397	Water Support Building	1986
*1400	Service Station	1961
1450	Traffic Check House	1962
*1511	Transient Lodging Facility (Appropriated)	1959
1624	Thrift Shop	1952
*1638	Headquarters Wing Group	1952
*1641	Base Maintenance Shop	1972
*1658	Family Support Center	1952
1664	Headquarters Wing Group	1952
1681	Sanitary Latrine	1956
1700	Air Passenger Terminal	1959
1710	Technical Training Classroom	1984
1711	Technical Training Classroom	1986
*1712	Technical Training Classroom	1986
*1713	Sanitary Latrine	1986
1714	Technical Training Lab	1986
*1715	ATC Technical Training Support	1989
1716	Sewage Pump Station	1990
1717	Technical Training Classroom	1986
1718	Technical Training Classroom	1990
*1810	Electric Power Station Building	1970
1813	Tacan Station, Fixed	1968
1900	Technical Training Lab	1966
1912	Sewage Pump Station	1991
1917	Technical Training Classroom	1990
1918	Technical Training Classroom	1962
*1919	Technical Training Lab	1960
1920	ATC Technical Training Support	1960
1921	Technical Training Lab	1972
1922	ATC Technical Training Support	1960
1924	Technical Training Classroom	1960
1926	Technical Training Classroom	1960
1927	Technical Training Classroom	1974
1928	Technical Training Lab	1975
1929	Technical Training Lab	1975
1930	Compressed Air Plant Building	1974
*1931	Misc. Recreation Building	1976
1932	ATC Technical Training Support	1967
1934	ATC Technical Training Support	1981
1935	Base Hazard Storage	1990
1950	Technical Training Classroom	1976
1959	Technical Training Classroom	1970

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1960	Technical Training Classroom	1966
2001	Technical Training Classroom	1956
2002	Base Maintenance Shop	1956
2004	Sanitary Latrine	1956
2005	Sanitary Latrine	1956
2006	Sanitary Latrine	1956
2007	Sanitary Latrine	1956
2008	Sewage Pump Station	1991
*2009	Waste Treatment Building	1956
2010	Technical Training Classroom	1963
2012	Technical Training Lab	1956
*2013	High-Bay Technical Training	1956
2014	Technical Training Lab	1956
*2017	Petroleum Operations Building	1965
*2018	Base Hazard Storage	1967
*2021	Technical Training Lab	1975
2027	Technical Training Lab	1990
2028	Technical Training Lab	1990
*2030	ATC Technical Training Support	1975
*2031	ATC Technical Training Support	1975
2110	Vehicle Operations Admin	1984
2111	Vehicle Maintenance Shop	1984
2112	Vehicle Maintenance Shop	1984
2115	Vehicle Fuel Station	1975
2119	Base Maintenance Shop	1969
2122	Wash Rack	1969
2125	Cat Maintenance Building	1979
*2128	Kennel Stray Animals	1991
2130	Misc. Recreation Building	1960
2135	Supply Warehouse	1960
2140	Base Storage Covered Facility	1960
2142	Base Hazard Storage	1987
2160	Supply Shed	1963
2161	Liquid Oxygen Storage	1968
*2201	Administration Office	1959
2204	Security Police Control Building	1959
2206	Space Inert Storage	1959
2208	Shop, SRVLL Insp.	1965
2216	Mu-Cub Magazine Storage	1960
2218	Mu-Cub Magazine Storage	1959
2220	Segregated Magazine Storage	1959
2320	Flying Training Classroom	1960
2323	Compressed Air Plant Building	1970
2325	Jet Engine Maintenance Shop	1962
2330	Flight Simulator Training	1961

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2333	Physiological Training	1968
2334	Base Hazard Storage	1986
2382	Rod and Gun Club	1988
2401	Base Hazard Storage	1990
2402	Aircraft Corrosion Control	1973
2403	Corrosion Control Utility Storage	1990
2404	Maintenance Dock	1960
2406	Maintenance Dock	1960
2408	Maintenance Dock	1960
2410	Maintenance Dock	1960
2412	Non-Destruction Inspection Shop	1973
2414	Maintenance Dock	1991
2530	Aircraft Maintenance Organizational Shop	1959
2532	Aircraft Maintenance Organizational Shop	1969
2533	Aircraft General Purpose Shop	1990
2534	Aircraft Maintenance Organizational Shop	1969
*2535	Aircraft Maintenance Organizational Shop	1990
2536	Aircraft Maintenance Organizational Shop	1969
2538	Aircraft Maintenance Organizational Shop	1969
*2542	Base Hazard Storage	1961
2550	Aircraft Corrosion Control	1991
2558	Rapcon Center	1982
2559	Electric Power Station Building	1970
2560	Headquarters Group	1960
2562	Sewage Pump Station	1991
2565	Supply Warehouse	1967
4475	Chapel	1959
4477	Sanitary Latrine	1965
4489	Golf Clubhouse	1984
4490	Golf Clubhouse	1961
4491	Golf Clubhouse	1965
4493	Mwr Sup/Naf C_Stor	1962
*4494	Golf Clubhouse	1970
4495	Sanitary Latrine	1961
*5000	Traffic Check House	1981
5991	Swimmers Bath House	1969
5592	Swim Pool Water Treatment	1969
10022	Electric Power Station Building	1984
11537	RSU	1990
11538	RSU	1990
11539	RSU	1990
11540	RSU	1990
*12522	Electric Power Station Building	1983
*12560	Security Police Tower	1986
*12561	Security Police Tower	1986

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## Appendix D

### Contact List/References

#### State Historic Preservation Office

Mr. Mark Wolfe  
State Historic Preservation Office  
Texas Historical Commission  
Post Office Box 12276  
Austin, Texas 78711-227  
Phone: (512) 463-6100  
FAX: (512) 475-4872

#### Texas Archeological Sites

Texas Archeological Research Laboratory  
University of Texas at Austin  
Pickle Research Campus, Building 5  
Austin, Texas 78712-1100  
Phone: (512) 471-5960  
FAX: (512) 471-5973  
<http://www.utexas.edu/research/tarl/>

#### Advisory Council on Historic Preservation

401 F Street NW, Suite 308  
Washington, DC 20001-2637  
Phone: (202) 517-0200  
[www.achp.gov](http://www.achp.gov)<http://www.achp.gov>

#### National Trust for Historic Preservation

Houston Field Office  
700 Milam Street, Suite 1300  
Houston, Texas 77002  
Phone: (832) 871-5259  
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## Appendix E

### Relevant Legislation and Regulations

#### APPLICABLE FEDERAL LAWS

##### *Laws and Regulations*

#### FEDERAL LAWS, REGULATIONS, ORDERS, AND PROCEDURES

Authority	Name
54 USC 320301 et seq.	Antiquities Act of 1906
Antiquities Act Regulations: 43 CFR Part 3	Preservation of American Antiquities
54 USC 300101 et seq.	National Historic Preservation Act (NHPA) of 1966, amended through 2000
P.L. 89-665 80 Stat. 913 Amended by P.L. 91-243, 93-54, 94-422, 94-458, 96-199, 96-244, 96-515, 98-483, 99-514, 100- 127, and 102-575 NHPA Regulations and Guidelines:	
36 CFR Part 60	National Register of Historic Places
36 CFR Part 61	Procedures for State, Tribal, and Local Government Historic Preservation Programs
36 CFR Part 63	Determinations of Eligibility
36 CFR Part 67	Historic Preservation Certifications Pursuant to the Internal Revenue Code of 1986, including the Secretary of the Interior's Standards for Rehabilitation
36 CFR Part 68	Secretary of the Interior's Standards for the Treatment of Historic Properties
48 FR 44716-44740	Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (9/29/1983)
44716-44720	Standards for Preservation Planning
44720-44723	Standards for Identification
44723-44726	Standards for Evaluation
44726-44728	Standards and Guidelines for Registration
44728-44730	Standards for Historic Documentation
44730-44734	Standards and Guidelines for Architectural and Engineering Documentation

<b>FEDERAL LAWS, REGULATIONS, ORDERS, AND PROCEDURES</b>	
<b>Authority</b>	<b>Name</b>
44734-44737	Standards and Guidelines for Archaeological Documentation
44737-44740	Standards and Guidelines for Historic Preservation Projects, including Professional Qualification Standards
36 CFR Part 78	Waiver of Federal Agency Responsibilities, under Section 110 of the National Historic Preservation Act
36 CFR Part 79	Curation of Federally Owned and Administered Archaeological Collections
36 CFR Part 800	Protection of Historic Properties
<b>42 U.S.C. § 4321 et seq.</b>	<b>National Environmental Policy Act (NEPA) of 1969</b>
P.L. 91-190	
83 Stat. 852 et seq.	
NEPA Regulations:	
40 CFR Part 1500-1508	Conducting Environmental Reviews
<b>44 U.S.C. chapters 21-33</b>	<b>Federal Records Act</b>
36 CFR 1222, 1228, 1230, 1232, 1234, 1236, 1238	
<b>25 U.S.C. § 3001 et seq.</b>	<b>Native American Graves Protection and Repatriation Act (NAGPRA) of 1990</b>
P.L. 101-601	
104 Stat. 3048	
NAGPRA Regulations:	
43 CFR Part 10	Regulation Final Rule
16 U.S.C. § 469 et seq.	Archaeological and Historic Preservation Act (AHPA) of 1974
P.L. 93-291	
88 Stat. 174	
<b>42 U.S.C. § 1996</b>	<b>American Indian Religious Freedom Act (AIRFA) of 1978</b>
P.L. 95-341	
92 Stat. 469	
<b>54 USC 320101 et seq.</b>	<b>Historic Sites and Buildings Act of 1935</b>
P.L. 74-292	
49 Stat. 666	
Historic Sites Act Regulations:	
36 CFR Part 65	National Historic Landmarks
<b>16 U.S.C. § 460 et seq.</b>	<b>Land and Water Conservation Act of 1976</b>
P.L. 94-422	
<b>20 U.S.C. § 2101 et seq.</b>	<b>American Folklife Preservation Act of 1976</b>
P.L. 94-201	



<b>FEDERAL LAWS, REGULATIONS, ORDERS, AND PROCEDURES</b>	
<b>Authority</b>	<b>Name</b>
89 Stat. 1129	
42 U.S.C. § 12101 et seq. P.L. 101-336 104 Stat. 327	<b>Americans with Disabilities Act (ADA) of 1990</b>
<b>Executive Order 11593</b>	<b>Protection and Enhancement of Cultural Environment, 13 May 1971</b>
<b>Executive Order 13007</b>	<b>Indian Sacred Sites, 24 May 1996</b>
<b>Presidential Memorandum</b>	<b>Distribution of Eagle Feathers for Native American Religious Purposes, 29 April 1994</b>
<b>Presidential Memorandum</b>	<b>Government-to-Government Relations with Native American Tribal Governments, 29 April 1994</b>

**Antiquities Act of 1906 (54 USC 320301 et seq.)**

The Antiquities Act was the first federal law to provide protection of historic and prehistoric ruins and monuments, and objects of antiquity on federal lands. It authorized the President to establish national monuments to protect historic and prehistoric structures, and objects of historic or scientific interest. It also established a system to permit examination and excavation by qualified researchers to increase knowledge and collect antiquities for permanent preservation in public museums. Penalties were established for unauthorized excavation and collection. Implementing regulations are codified at 43 CFR Part 3.

**National Historic Preservation Act of 1966 (54 USC 300101 et seq)**

The NHPA, as amended on several occasions, is the cornerstone of the current federal cultural resource preservation program. The NHPA expanded the Historic Sites Act policy of protecting resources of national significance to encompass resources of state and local significance as well, thus providing the basis for an expanded National Register. The NHPA also established the Advisory Council on Historic Preservation (ACHP), the network of State Historic Preservation Officers (SHPOs), and a preservation grants program to assist the SHPOs.

Section 110 of the Act directs federal agencies to inventory cultural resources, nominate significant properties to the National Register, and work to protect and preserve important cultural resources. Section 106 directs federal agencies to take into account effects of their undertakings on National Register listed or eligible properties. Implementing regulations issued by the Advisory Council on Historic Preservation, *Protection of Historic Properties*, are codified at 36 CFR Part 800. These regulations define the key procedures for the federal historic preservation program. The steps in the Section 106 consultation process include:

- Deciding whether a proposed action has the potential to effect historic properties (properties listed on or determined eligible for National Register listing). If it does not, it is not an undertaking, and no further compliance is required;

- Identifying a proposed undertaking's area of potential effect and evaluating cultural resources (with regard to their eligibility for National Register listing) that may be affected by the undertaking;
- Assessing the potential effects of the undertaking on historic properties;
- Consulting with the SHPO, ACHP, and other appropriate concerned parties to determine ways to avoid or reduce any adverse impacts if such are identified;
- If necessary, providing the ACHP a reasonable opportunity to comment on the proposed undertaking and effects on historic properties; and
- Proceeding with the undertaking under the terms of a memorandum of agreement or a programmatic agreement, or in consideration of ACHP comments if required.

The NHPA was amended most recently in 2000. Among the provisions of these amendments are Sections 101(d)(6) and 101(d)(6)(B), specifying that "properties of traditional religious and cultural importance to an Indian tribe may be determined to be eligible for inclusion on the National Register," and directing federal agencies in carrying out their responsibilities under Section 106 of the Act to "consult with any Indian tribe that attaches religious and cultural significance to properties" that may be affected by federal undertakings.

*Section 106 – 16 U.S. Code [U.S.C.]. 470f/54 USC 300101 et seq — Advisory Council on Historic Preservation, comment on Federal Undertakings.* The chief management implication for Section 106 compliance pertains to providing the ACHP a reasonable opportunity to comment on an undertaking.

*Section 110 – 16 U.S.C. 470h-2(a) — Federal agencies' responsibility to preserve and use historic properties.* The ICRMP satisfies the applicable portions of this subparagraph by assuming responsibility for preservation activities, even for facilities that have not reached the 50-year threshold specified in the NHPA. Facilities less than 50 years old that potentially have exceptional historic significance are systematically identified and evaluated for NRHP eligibility. The ICRMP has no negative impact on Sheppard AFB's ability to use historic properties "to the maximum extent feasible."

In cases where mission requirements allow for an NRHP-eligible facility to retain its original use, or to be reused in a new, compatible way, Sheppard AFB will make every effort to preserve the architectural integrity of the property in accordance with the Secretary of Interior's Standards for Rehabilitation.

#### **National Environmental Policy Act of 1969 (83 Stat 852; 42 USC 4321)**

NEPA establishes national policy for protection and enhancement of the environment. In addition to natural resources, NEPA specifically stipulates that federal agencies should work to

preserve historic and cultural aspects of our national heritage. Implementing regulations issued by the Council on Environmental Quality are codified at 40 CFR 1500-1508, and the Air Force has published counterpart regulations at 32 CFR Part 989. These regulations encourage combining NEPA compliance with other regulatory requirements such as those of the NHPA.

#### **Federal Records Act (44 USC Chapters 21-33)**

Historical documents are important cultural resources and as such, are protected under the NHPA. In addition, however, there is a considerable body of law and regulation dealing with the management of Federal records to maintain their historical value, and some specific provisions dealing with particular kinds of records. The Federal Records Act (FRA) specifically addresses the maintenance and disposal of documents under the management of the Federal government that might have historical value. Records that pertain both to World War II and the Cold War that are housed at Sheppard AFB may be subject to the FRA. Violations of the FRA can result in criminal penalties, including fines and imprisonment. The extensive regulations dealing with management of Federal records are found at 36 CFR 1222, 1228, 1230, 1232, 1234, 1236, and 1238, issued by the National Archives and Records Administration (NARA).

#### **Archaeological Resources Protection Act of 1979 (93 Stat 721; 16 USC 470aa)**

The Archaeological Resources Protection Act (ARPA) strengthened protection of archaeological resources by increasing the penalties for unauthorized excavation, collection, or damage from misdemeanors defined by the Antiquities Act, to felonies with fines up to \$10,000 and one year of imprisonment for first offenses. Trafficking in archaeological resources derived from public and tribal lands also is prohibited by ARPA. ARPA also specifically requires notification of affected Indian tribes if archaeological investigations proposed in a permit application would result in harm to or destruction of any location considered by tribes to have religious or cultural importance. When archaeological investigations are performed under contract to the installation or facility where they are located, a permit is not required. Implementing regulations are codified by the DoD at 32 CFR Part 229. No ARPA concerns have been identified at Sheppard AFB.

#### **Archaeological and Historic Preservation Act of 1974 (74 Stat 220, 221, 88 Stat 174; 6 USC 469)**

The Archaeological and Historic Preservation Act (AHPA), promulgated as an amendment of the Reservoir Salvage Act of 1960, provides for the preservation of archaeological and historical information that might otherwise be lost as a result of federal construction projects and other federally licensed activities and programs. This Act stipulates that up to one percent of the funding appropriated by Congress for federal undertakings can be spent to recover, preserve, and protect archaeological and historical data. A subsequent amendment authorized the one percent limit to be administratively exceeded under certain circumstances.

#### **Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001)**

The Native American Graves Protection and Repatriation Act (NAGPRA) protects human remains of indigenous peoples and associated funerary objects, sacred objects, and items of cultural patrimony on federal lands, and provides for repatriation of such remains and items previously collected from federal lands to culturally affiliated groups. There are advantages to negotiating NAGPRA agreements with tribes or groups prior to initiation of projects that are likely to encounter NAGPRA remains and objects; however, no NAGPRA items have been identified as having been previously removed from Sheppard AFB and it does not seem likely that such items are present at any of these facilities. Implementing regulations are codified at 43 CFR Part 10.

#### **American Indian Religious Freedom Act of 1978 (92 Stat 469; 424 USC 1996)**

The American Indian Religious Freedom Act (AIRFA) reiterates First Amendment guarantees of religious freedom with specific reference to the inherent right of indigenous peoples to believe, express, and exercise their traditional religions, including but not limited to access to religious sites, use and possession of sacred objects, and freedom to worship through ceremonial and traditional rites. Federal agencies are directed to evaluate their policies and procedures to determine if changes are needed to ensure that such rights and freedoms are not disrupted by agency practices. The Act is not implemented by regulations, but a U.S. Court of Appeals determined that there is a compliance element in the Act, requiring that views of Indian leaders be obtained and considered when a proposed land use might conflict with traditional Indian religious beliefs or practices. (For additional consideration of Native American issues, refer to discussions below concerning ARPA, NAGPRA, Executive Memorandum of 1994, and Executive Orders 13007 and 13084.)

#### **Historic Sites Act of 1935 (49 Stat 666; 16 USC 461)**

The Historic Sites Act declared a national policy to identify and preserve historic sites, buildings, objects and antiquities of national significance. The law authorized the Secretary of the Interior to conduct surveys, collect and preserve data, and acquire historic and archaeological sites. Historic American Building Survey/Historic American Engineering Record (HABS/HAER) stem from this Act, as well as the National Park Service (NPS) program of designating National Historic Landmarks. Implementing regulations are codified at 36 CFR Part 65.

#### **Public Buildings Cooperative Use Act of 1976**

This Act encourages federal agencies to reuse, while maintaining their historic integrity, historic buildings for commercial, cultural, educational, and recreational activities.

#### **CURATION OF FEDERALLY OWNED AND ADMINISTERED ARCHAEOLOGICAL COLLECTIONS**

The preservation and maintenance guidelines for collections of prehistoric and historic material remains and records recovered from federal or federally assisted programs that are in the care of

the federal government are set forth in *Curation of Federally Owned and Administered Archaeological Collections* (36 CFR Part 79). The NPS has established definitions, standards, procedures, and guidelines to be followed by federal agencies in preserving prehistoric and historic remains.

## **EXECUTIVE ORDERS AND PRESIDENTIAL MEMORANDA**

### **Executive Order 11593 (1971)**

Executive Order 11593 directs federal agencies to conduct inventories in order to locate properties under their control that meet the criteria for listing on the National Register, and to nominate those properties for inclusion. The executive order further directs federal agencies to ensure that cultural resources are not inadvertently damaged, destroyed, or transferred prior to the completion of inventories and evaluation for National Register eligibility.

### **Executive Order 13007 (1996)**

On 24 May 1996 President Clinton signed Executive Order 13007 concerning Indian sacred sites. In order to protect and preserve Indian religious practices, the executive order states that federal land managers must accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and avoid adversely affecting the physical integrity of sacred sites. "Sacred site" is defined in the executive order to mean "any specific, discrete, narrowly defined delineated location on federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

### **Executive Order 13084 (1998)**

This Executive Order deals largely with monetary policies regarding non-funded mandates that may affect tribal governments and the issuance of waivers to offset such unintended burdens. However, the order also supplements the Executive Order 13007 29 April 1994 described above in requiring federal agencies to establish procedures for regular and meaningful consultation with federally recognized tribal governments in the development of regulatory practices that might affect their communities.

### **Presidential Memorandum, 29 April 1994: Distribution of Eagle Feathers for Native American Religious Purposes**

The Presidential Memorandum of 29 April 1994 stipulates that salvageable eagle carcasses and eagle feathers located on federal lands may be collected for those Native American entities that are engaged in religious activities and are federally recognized tribes eligible to receive services from the Bureau of Indian Affairs listed under 25 U.S.C. § 479a-1. Collected salvageable carcasses

and feathers for Native American religious purposes should be shipped to the U.S. Fish and Wildlife Service, Forensic Laboratory.

Regulation 50 CFR § 22.22 allows permits to be issued for the possession, taking, and transportation of lawfully acquired golden eagles or bald eagles or their parts, nests, or eggs for religious use by federally recognized Native American tribal entities. The Secretary may grant or deny the permit based on several criteria, among which are the effect that taking live eagles would have on the wild populations of the birds and whether the applicant is authorized to participate in bona fide tribal religious ceremonies.

**Presidential Memorandum, 29 April 1994: Government-to-Government Relations with Native American Tribal Governments**

This executive memorandum addressed government-to-government relations with Native American tribal governments. To ensure that the rights of sovereign tribal governments are fully respected, the memorandum set forth guidelines requiring federal agencies to:

- Operate within a government-to-government relationship with federally recognized tribal governments;
- Consult with tribal governments prior to taking actions that affect those governments;
- Assess the impact of federal plans, projects, and activities on tribal trust resources and assure tribal government rights and concerns are considered during the development of such plans, programs, and activities;
- Take appropriate steps to remove procedural impediments to working directly and effectively with tribal governments on activities that affect trust properties or tribal governmental rights;
- Work cooperatively with other federal departments and agencies to enlist their interest and support in cooperative efforts, where appropriate, to accomplish the goals of the memorandum;
- Design solutions and tailor federal programs, in appropriate circumstances, to address specific or unique needs of tribal communities.

As with other federal mandates and guidelines that address Native American issues, this executive memorandum would pertain to management of Sheppard AFB only if Native American concerns relative to properties or areas within the base were to be expressed.

***DEPARTMENT OF DEFENSE DIRECTIVES AND POLICIES***

Programmatic Memorandum of Agreement Among the United States Department of Defense, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, as amended (1986)

The U.S. Senate Armed Services Committee Report 97-440 to the Military Construction Authorization Bill for 1983 instructed this Programmatic Memorandum of Agreement (PMOA) be established to define procedures to follow before demolishing temporary World War II buildings. According to the Programmatic Agreement (PA) between the DoD and the ACHP, documentation exists regarding the World War II temporary buildings to allow the demolition of said buildings without Section 106 review. The Air Force, therefore, has the authority to demolish any World War II temporary building as long as they are not listed individually on the NRHP or as contributing elements to a historic district. However, the PA pertains only to the demolition of the buildings, not any other undertaking. Thus, the base must still consult with the SHPO for any actions other than demolition that may affect the integrity of the World War II temporary buildings.

#### **Department of Defense Directive 4710.1: Archaeological and Historic Resources Management (1984)**

This directive provides policy, prescribes procedures, and assigns responsibilities for the management of archaeological and historic resources located in and on waters and lands under DoD control. It is the policy of the DoD to integrate historic preservation requirements with the planning and management of activities under DoD control. It also is DoD policy to minimize expenditures through judicious application of options available in complying with applicable laws, and to encourage practical and economical rehabilitation and adaptive use of significant historic resources (that is, buildings and structures). The directive established Federal Preservation Officers (FPOs) in each military department and also directed each DoD component to establish a historic preservation program.

#### **DoDI 4715.3 (1996)**

This DoDI covers a wide range of topics pertinent to the integrated management of natural and cultural resources on property under DoD control. The DoDI describes means by which policies are to be implemented, assigns responsibilities for carrying out that implementation, and prescribes appropriate procedures.

#### **The DoD Legacy Resource Management Program**

The Legacy program was created by Congress in 1991 under Public Law 101-511 to provide for the responsible stewardship of the over 25 million acres under DoD control as well as specified physical and paper historical records. The Legacy Program sponsors training programs, develops tools for cultural resource managers, and funds demonstration and educational projects.

#### **DoD American Indian and Alaska Native Policy (October 1998)**

This policy document establishes the framework for DoD agencies to contact federally recognized Native American tribes on a government-to-government basis. The policy also ensures that tribes receive the opportunity to participate in the planning process when tribal interests or lands might be affected by an undertaking.

## **AIR FORCE POLICY DIRECTIVE (AFPD), AIR FORCE INSTRUCTION (AFI), AND OTHER POLICIES**

### **AFPD 32-70: Environmental Quality (20 July 1994)**

AFPD 32-70, *Environmental Quality*, establishes Air Force policies for achieving and maintaining environmental quality and compliance with federal environmental laws and standards. The provisions of the Policy Directive include the cleanup of damage from past activities, complying with environmental standards, and planning future activities to conserve resources and eliminate pollution. To comply with this policy directive, Air Force Historic Preservation Officers and CRM are to be included in environmental planning to ensure that archaeological and historic resources are considered.

### **AFMAN 32-7003: Cultural Resources Management (20 April 2020)**

This AFI provides guidance for protecting and managing cultural resources was developed to implement DoD Directive 4701.1. It outlines the requirements for cultural resource management plans (formerly historic preservation plans) such as this document, and also addresses appropriate training of Air Force personnel with regard to cultural resource management, and describes the steps to follow in evaluating and nominating eligible properties to the National Register. The AFI defines compliance requirements for protecting cultural resources as follows:

- Installations must coordinate with the SHPO and the ACHP, as stipulated at 36 CFR 800, to reduce conflicts and delays due to unforeseen requirements; and
- If Air Force property is to be disposed of, the Air Force Base Conversion Agency acts for the General Service Agency on base closure action. In this capacity, the Air Force Base Conversion Agency ensures that properties eligible for National Register listing are not inadvertently transferred, sold, altered, or demolished; and that the new owners of National Register eligible properties follow the Secretary of the Interior's standards and guidelines at 36 CFR 68.

The AFI also lays out guidelines for determining the eligibility of properties for National Register listing and for nominating those properties that qualify; provides guidance in consulting with experts and preparing MOAs; provides guidance for preparing statements of work and, when necessary, granting permits; and provides the general guidelines and regulations associated with data recovery, budgeting, and cultural resource management training. AFMAN 32-7003 is comprehensive and covers the full range of cultural resource management issues pertinent to the Air Force's operation.

### **Secretary of Air Force/Civil Engineering Guidelines for Consultation with Native Americans in the Context of Program Planning and Impact Assessment (16 May 1991)**



These guidelines mandate consultation requirements for discovery of burials of Native American remains and for the management of traditional cultural properties (TCPs) on Air Force lands.

**Guidelines for Consultation with Native Americans (May 1991)**

The Guidelines for Consultation with Native Americans was issued in consideration of AIRFA. The guidance indicates it is Air Force policy to attempt to identify sites and areas of concern to Native American during early planning in order to avoid unnecessary impacts to these places and to the traditional practices that may take place at them. The guidelines address contacts with tribes, assessing impacts of proposed projects, reburial of human remains, and the disposition of confidential information.

**Air Force Guidelines of Archaeological and Historical Data (13 May 1992)**

The Air Force Policy Letter, "Air Force Guidelines of Archaeological and Historical Data," instruct Air Force personnel of the provisions of Title 36 CFR Part 79, "Curation of Federally-Owned and Administered Archaeological Collections." The letter explains the process Air Force installations should follow to comply with the provisions contained within the regulations as promulgated; however, it is not intended to affect collections housed as part of the U.S. Air Force Museum Program that do not meet the inclusive definition found in Title 36 CFR 79.4.

**Interim Guidance: Treatment of Cold War Historic Properties for U.S. Air Force Installations (1993)**

These guidelines were established by the Air Force to help major commands (MAJCOMs) and installations to comply with Section 106 and 110 of the NHPA in regard to Cold War-era resources, since most of those resources would be less than 50 years of age and have to meet the criterion of "exceptional significance" for listing in the NRHP.

**Preserving Scientific and Technical Facilities (Policy Letter Issued by the Air Force Office of Civil Engineering and Environment, 1 June 2004)**

This guidance was issued to address the problem of finding a "balance between the requirements of changing technologies and the need to maintain and protect the physical evidence of America's scientific heritage." It specifically encourages the development of programmatic agreements to accommodate preservation concerns and operational requirements.

## Appendix F

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## Appendix G

### GLOSSARY

#### ADAPTATION

The process of change to better conform to environmental conditions or other external stimuli.

#### ADVERSE EFFECT

An adverse effect occurs when an undertaking diminishes the integrity of a historic property's location, design setting, materials, workmanship, feeling, or association. Characteristics of the property that may qualify it for inclusion on the NRHP have been negatively impacted. Installation commanders make the assessment in consultation with the State Historic Preservation Office.

#### ADVISORY COUNCIL ON HISTORIC PRESERVATION (ACHP)

The independent agency set up under the National Historic Preservation Act (Title II) to advise the President and the Congress on cultural resources preservation; to advise on the dissemination of information on such activities; and to encourage public interest in cultural resources preservation. Under Section 106 of the NHPA, the ACHP will be afforded an opportunity to comment on Federal, federally assisted, or federally licensed undertakings that may have an effect on cultural resources properties.

#### ARCHEOLOGICAL PERMIT

"A legal authorization from the Archeological Resources Protection Act to conduct an archeological survey or investigation including surface collecting or subsurface testing on Federal land. The Air Force issues such permits for archeological activities that take place on Air Force controlled land. Federal employees or contractors do not need this permit because the statement of work provides the same information as the archeological permit."

#### ARCHAEOLOGICAL RESOURCE

"[A]ny material remains of past human life or activities which are of archaeological interest, as determined under uniform regulations promulgated pursuant to ARPA. Such regulations shall include but not be limited to: pottery, basketry, bottles, weapons, weapon projectiles, tools, structures, pit houses, rock paintings, rock carving, intaglios, graves, human skeletal materials, or any portion or piece of any of the foregoing items. No item shall be treated as an archaeological resource under ARPA regulations unless such item is at least 100 years of age" [ARPA 16 U.S.C. § 470bb].

#### AREA OF POTENTIAL EFFECT (APE)

"[T]he geographic area or areas within which an undertaking may cause changes in the character of or use of historic properties, if any such properties exist" [36 CFR § 800.2(c)]. The determination is based not on knowledge of specific properties, but on what effects might be created if historic properties do exist in the undertaking's APE. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

#### ASSEMBLAGE

A group of artifacts related to each other based upon their recovery from a common archaeological context. Assemblage examples are artifacts from a single site or feature.

#### BURIAL

“Any natural or prepared physical location, below, on, or above the ground surface, into which human remains are placed as part of a death rite or ceremony. Includes non-articulated reinterments “(AFMAN 32-7003).

**CLASS**

Cultural resources that have similar, distinct, historic, chronological, scientific, or cultural characteristics.

**CONSULTATION**

The act of seeking and considering the opinions and recommendations of those parties that have consultative roles in the Section 106 process. These parties include the SHPO, the ACHP, Native American Indian, traditional tribal leaders, representatives of local governments, applicants for Federal assistance, other agencies (Federal or State), institutions, foundations, professional organizations, preservation groups, and specific individuals from the public with a demonstrable interest in the outcome of the process.

**CONTEXT (including ARCHAEOLOGICAL and HISTORIC)**

The physical setting, location, and cultural association from which archaeological or historic materials are discovered. Usually the meaning of such materials cannot be discerned without information about their setting. One example is determining how old an object is, given that the age of objects excavated from a site varies with their depth in the ground. Unless the depth of an object is carefully recorded against a fixed point of reference, it may be impossible to relate objects to the dimension of time.

**CONTINGENCIES**

Changed orders and new mission requirements that may have an effect on cultural resources in a way that was not anticipated in the Cultural Resources Management Plan or MOA. This may also include treatment of cultural resources that have been damaged by fire or natural disasters, as per 36 CFR § 800.12.

**CULTURAL PATRIMONY**

Ongoing historical, traditional, or cultural importance of an object or place central to a Native American group or the culture itself.

**CULTURAL RESOURCE MANAGER (CRM)**

Under AFMAN 32-7003, an individual may be selected by the commander to be responsible for the coordination of the installation’s management of its cultural resources.

**CULTURAL RESOURCES**

A broad term applied to places, sites, buildings, structures, objects, cultural practices, or collections of these physical and nonphysical manifestations that have significance to humans.

**CULTURAL RESOURCES MANAGEMENT PROJECT**

Activities to carry out a cultural resources management plan. Projects include the following:

- a. Field surveys, archival documentation, and inventory projects.
- b. Investigations, evaluations, and rehabilitation.
- c. Adaptive use, data recovery, preservation, and maintenance.
- d. Any other field or analytical activity needed to locate, inventory, evaluate, or manage cultural resources.

**CULTURE**

A system of behaviors, values, ideologies, and social arrangements. These features, in addition to tools and elements such as graphic arts, help in the interpretation of the human universe as well as dealing with features of the natural and social environments. Culture is learned, transmitted in a social context, and modifiable. Synonyms for culture include "lifeways," "customs," "traditions," "social practices," and "folkways."

#### DATA RECOVERY

"Systematically collecting and preserving the scientific, prehistoric, historic, or archeological information or artifacts that give research or information value to an historic property, including:

- \* Archeological research producing descriptive and theoretical articles.
- \* Study collections of artifacts and other materials.
- \* Architectural or engineering studies resulting in measured drawings or photography.
- \* Historical or anthropological studies for understanding historic properties.
- \* Relocation of properties to preserve their data value "(AFMAN 32-7003).

#### DETERMINATION OF ELIGIBILITY (DOE)

"A process to determine if a property is eligible for the National Register of Historic Places. National Register of Historic Places allows 10- or 45-day determinations. An eligible property receives the same treatment as a registered property pending completion of the nominating process" (AFMAN 32-7003).

#### DISCOVERY

To find cultural resources in an unexpected location or circumstance, or of a class not covered by previous review under the National Historic Preservation Act, as amended through 1992, Section 106.

#### DOCUMENTATION

A documentary, photographic, and graphic record of a historic property. Buildings and structures are documented according to the guidelines of the National Park Service (HABS/HAER) for deposit in the Library of Congress.

#### EFFECT

The word "effect" is broadly defined. Effects can be direct or indirect and the word covers any foreseeable change when "the undertaking may alter characteristics of the property for inclusion in the National Register." For the purpose of determining effect, alterations to features of the property's location, setting, or use may be relevant depending on a property's significant characteristics and should be considered [36 CFR § 800.9(a)].

#### ETHNOGRAPHY

"The descriptive and analytical study of the culture of living groups or communities. An ethnographer seeks to understand a community by interviewing its members or living within it as a participant observer" (AFMAN 32-7003).

#### ETHNOHISTORY

"An ethnographic study of historical data, including documentary and oral history" (AFMAN 32-7003).

#### FEATURE or ARCHAEOLOGICAL FEATURE

Many archaeological elements are portable, such as fragments of bone, pottery, and stone tools. Archaeological sites, however, frequently contain features: manmade constructions that are not portable and are part of the earth itself. Examples of such features are hearths, bedrock mortars, fire places, foundations of buildings, storage pits, grave pits, and canals.



**FEDERAL HISTORIC PRESERVATION OFFICER (FPO)**

“The person who coordinates the agency’s activities under the National Historic Preservation Act and Executive Order 11593, including nominating agency properties for the National Register. SAF/MIQ is the Air Force FPO” (AFMAN 32-7003).

**GEOGRAPHIC INFORMATION SYSTEM (GIS)**

A geographic information system is a data base system that is designed to manage data referenced by spatial or geographic coordinates. Using GIS spatial data can be viewed, queried, and analyzed for greater understanding of the spatially significant relationships. Common GIS data features include transportation, water resources, utility resources, geopolitical boundaries, aerial photography/imagery, and the attributes for all of the above.

**HISTORIC LANDSCAPE** (see Rural Historic Landscape)

**HISTORIC PROPERTY**

“Any prehistoric or historic building, district, site, structure, or object included in or eligible for inclusion in the National Register. The term includes artifacts, records, and remains that are related to and located within such properties” [36 CFR § 800.2(e)].

- a. **DISTRICT.** A geographically definable area, urban or rural, with a concentration, linkage, or continuity of cultural resources properties that are united by past events, or aesthetically by plan or physical development. A district may also be composed of areas that are separated by space but are linked by history or style.
- b. **SITE.** The location of a prehistoric or historic
  1. Event, occupation, or activity; or
  2. Structure, whether represented by standing ruins or by other surface or subsurface evidence, when the location, regardless of the value of existing structures, contains the historical or archaeological value.
- c. **BUILDING.** A structure created to shelter any form of activity, such as a house, stable, church, barracks, hospital, or similar structure. Buildings may refer to a functionally related complex, such as a courthouse and jail, a house and barn, or a barracks, a mess hall, and a chapel.
- d. **STRUCTURE.** An edifice, often an engineering project, designed to aid human activities, such as bridges, canals, or aqueducts.
- e. **OBJECT.** An artifact of functional, aesthetic, cultural, historical, or scientific value that may be, by nature or design, movable yet related to a specific historical activity, event, district, site, setting, or environment.

**INDIAN TRIBE**

The governing body of any Indian tribe, band, nation, or other group that is recognized as an Indian tribe by the Secretary of the Interior and for which the United States holds land in trust or restricted status for that entity or its members. Such term also includes any native village corporation, regional corporation, and native group established pursuant to the Alaska Native Claims Settlement Act [43 U.S.C. § 1701 et seq.].

**INSTALLATION COMMANDER**

The senior commanding officer or designee at an installation.

**INTERESTED PERSONS**

Those organizations and individuals that are concerned with the effects of an undertaking on historic properties. Certain interested parties—e.g., local governments, Federal applicants, Indian tribes, and the public—may be invited to participate in preservation planning as consulting parties by the SHPO, ACHP, and the agency official. Participation

of other interested persons—e.g., academic institutions, local preservation organizations, historical or archaeological commissions, and others who promote historic preservation, and the public—is defined under Section 110 guidelines [53 *FR* 4727-46].

#### INVENTORY

The product and the process of locating cultural resources and identifying or documenting them well enough to judge whether they meet the criteria for inclusion in the National Register of Historic Places as per 36 CFR Part 60. The inventory process usually includes problem-oriented literature review, field surveys, archival documentation, and other data recovery and analysis efforts needed to acquire enough information to determine the presence or absence of National Register of Historic Places values.

#### INTEGRATED CULTURAL RESOURCES MANAGEMENT PLAN (ICRMP)

The installation's cultural resources protection and compliance document, formerly known as a Historic Preservation Plan (HPP).

#### KEEPER OF THE REGISTER

An individual designated by the National Park Service, on behalf of the Secretary of the Interior, who is authorized to list properties and determine their NRHP eligibility.

#### MATERIAL REMAINS/ARTIFACTS

Material remains (or artifacts) consist of "physical evidence of human habitation, occupation, use, or activity" [43 CFR § 7.3 (a) (2)]. These remains consist of any object or site that shows evidence of manufacture, use, or modification by humans. Examples of artifacts/material remains may include but are not limited to tools, implements, weapons, ornaments, clothing, and containers created variously from bone, ivory, shell, wood, metal, hide, feathers, pigments, chipped/pecked/ground stone, pottery/ceramics, and cordage/basketry/weaving; as well as organic debris or by-products/waste products such as burned animal bones or vegetal remains resulting from food preparation activities; works of artistic or symbolic representation such as rock paintings and carvings; and human remains.

#### MEMORANDUM OF AGREEMENT

- a. A document signed by the State Historic Preservation Officer, Advisory Council on Historic Preservation, and the Air Force listing what the installation will do to meet the requirements of the National Historic Preservation Act, as amended through 1992, Section 106.
- b. It is prepared
  1. In coordination with the preparation of an installation ICRMP.
  2. When a specific undertaking will have an adverse effect on a historic property listed on or eligible for listing in the National Register of Historic Places.
- c. It contains
  1. Items or stipulations to be addressed in an ICRMP.
  2. Ways to avoid or reduce adverse effects.
  3. Calendar for meeting the stipulations.

#### NATIONAL HISTORIC LANDMARK

Properties named by the Secretary of the Interior, per the Historic Sites Act of 1935, as having exceptional significance in the Nation's history [36 CFR Part 65]. National Historic Landmarks are listed in the National Register of Historic Places. They are reviewed per the National Historic Preservation Act, as amended through 1992, Section 110(f). The

National Historic Preservation Act, as amended through 1992 [16 U.S.C. § 470 et seq.], sets national historic preservation policy and requires each Federal agency to develop a program to locate, inventory, and nominate to the Secretary of the Interior all cultural resources under the agency's control that may meet the criteria of the National Register of Historic Places. In addition, every Federal agency having any undertaking that may have an effect on a historic property (i.e., meeting the criteria of the National Register of Historic Places) will afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. Federal agencies are directed to assume responsibility for preservation of historic properties they own or control.

#### NATIONAL REGISTER OF HISTORIC PLACES (NRHP)

A listing of districts, sites, buildings, structures, and objects significant on the national, regional, or local level in U.S. history, architecture, archaeology, engineering, and culture. It is maintained by the Secretary of the Interior per the Historic Sites Act and the National Historic Preservation Act, as amended through 1992. The term "eligible for inclusion on the National Register" includes both properties formally determined as such and all other properties that meet the National Register of Historic Places criteria as defined by 36 CFR § 60.4.

#### OUTBUILDINGS

A term used to refer to all nonresidential structures at a historic site. These include outhouses, barns, garages, smokehouses, granaries, cribs, and other structures for storage or protection of animals or property.

#### OVERVIEW

A report based on the collection and analysis of existing information that summarizes known information regarding the cultural resources on an installation, suggests the likelihood of additional cultural resources, and provides recommendations for meeting the compliance requirements of AFMAN 32-7003.

#### PRESERVATION or HISTORIC PRESERVATION

The "identification, evaluation, recordation, documentation, curation, acquisition, protection, management, rehabilitation, restoration, stabilization, maintenance and reconstruction, or any combination of the foregoing activities" [16 U.S.C. § 470w(8)].

#### PRESERVATION MAINTENANCE

Protection through preventive maintenance of existing historic fabric and building elements.

#### PROGRAMMATIC AGREEMENT

A document executed between a facility and advisory agencies which may take the place of multiple Memoranda of Agreement when actions are programmed, are repetitive, or are perceived to have similar impacts on cultural resources.

#### PROJECTILE POINT

A hand-crafted, chipped, pointed artifact generally made of stone, but also may be of shell, bone, wood, or metal, hafted to the tip of an arrow, atlatl dart, spear, or lance shaft to facilitate penetration. Projectile points are generally divided into "dart" (early) and "arrow" (late) points on the basis of size and morphology. Various stylistic characteristics of projectile points are used as diagnostic temporal markers.

#### REBURIAL

Reintering human remains exhumed by erosion, construction disturbance, vandalism, or scientific excavations.

**REHABILITATION**

The alteration or repair of a building to permit an efficient and continued use while maintaining or restoring elements that define the character of the building or are associated with its historic significance.

**REPATRIATION**

The expeditious return of Native American human remains and associated funerary objects upon the request of a tribe that has met the requirements of Section 7 of NAGPRA.

**RESPONSIBLE OFFICIAL**

“The Air Force official with command authority who authorizes a project or action and makes sure that it complies with applicable laws and directives” (AFMAN 32-7003).

**RESTORATION**

Actions taken to return a building, elements of a building, or a site to an earlier appearance.

**RURAL HISTORIC LANDSCAPE**

A geographical area that historically has been used by people, or shaped and modified by human activity, occupancy, or intervention, and that possesses a significant concentration, linkage, or continuity of areas of land use, vegetation, buildings and structures, roads and waterways, and natural features. *Landscape characteristics* are the tangible evidence of the activities and habits of the people who occupied, developed, used, and shaped the land to serve human needs; they may reflect the beliefs, attitudes, traditions, and values of these people.

**SENSITIVE SITE**

A location associated with the traditional beliefs of a Native American group, including current and historical ceremonial sites (AFMAN 32-7003).

**STATE HISTORIC PRESERVATION OFFICER (SHPO)**

The official within each state who has been designated and appointed by the state governor to administer the state historic preservation program, pursuant to Section 101(b)(1) of the NHPA.

**SUBSISTENCE ECONOMY**

The means by which a group obtains the food and shelter necessary to support life.

**TRADITIONAL CULTURAL PROPERTY**

A property “that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community” (*Guidelines for Evaluating and Documenting Traditional Cultural Properties* [NPS 1992:1]). Examples include:

- “a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world;
- a rural community whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents;
- an urban neighborhood that is the traditional home of a particular cultural group, and that reflects its beliefs and practices;
- a location where Native American religious practitioners have historically gone, and are known or thought to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice; and

- a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historical identity” (*Guidelines for Evaluating and Documenting Traditional Cultural Properties* [NPS 1992:1]).

**TRADITIONAL LEADER**

Recognized leader of a Native American group whose leadership status derives from knowledge of traditional cultural beliefs and practices. A traditional leader is someone who fits the definition of “other designated official” per AFPD 32-70.

**TREATMENT**

The way an installation maintains, repairs, uses, protects, excavates, documents, or alters cultural resources.

**UNDERTAKING**

“Any project, activity, or program that can result in changes in the character or use of historic properties, if any such historic properties are located in the area of potential effect. The project, activity, or program must be under the direct or indirect jurisdiction of a federal agency or licensed or assisted by a federal agency. Undertakings include new and continuing projects, activities, or programs and any of their elements not previously considered under Section 106” [36 CFR § 800.2(o)].

In a separate volume, or preferably on an electronic medium such as a CD-ROM, compile copies of all archaeological and historic site and inventory forms. Archeological site locations are sensitive information. Do not release them to the general public.

82d Training Wing  
Sheppard Air Force Base, Texas  
(28 Apr 14)

Appendix I

Integrated Natural Resource Management Plan

Integrated Pest Management Plan

82d Training Wing  
Sheppard Air Force Base, Texas  
(28 APR 14)

SIGNATURE PAGE

The Sheppard Air Force Base (AFB) Integrated Pest Management Plan (IPMP) provides specific administrative and operational guidelines for managing pest management at Sheppard AFB, and it fulfills the requirements defined in AFI 32-1053, Integrated Pest Management Program.

This plan is effective upon receipt and supersedes all previous versions of the Sheppard AFB IPMP.

This plan will be reviewed annually by the installation pest management coordinator, and formally staffed every five years.

The Office of Primary Responsibility for this document is 82 Civil Engineer Squadron Environmental Flight Service Provider (SP) (82 CES/SP/CEIV).

Execution of this plan will be directed by the 82 Civil Engineer Squadron Operations Department (CES/SP/CHOHE).

The effective date of the IPMP begins on the date the last required signature is obtained.

  
\_\_\_\_\_  
INSTALLATION COMMANDER

28 APR 14  
DATE

  
\_\_\_\_\_  
MISSION SUPPORT GROUP COMMANDER

22 Apr 14  
DATE

  
\_\_\_\_\_  
INSTALLATION CIVIL ENGINEER


26 Mar 14  
DATE

  
\_\_\_\_\_  
ENVIRONMENTAL ENGINEER OFFICER

7 Mar 14  
DATE

  
\_\_\_\_\_  
PUBLIC HEALTH OFFICER

10 Mar 14  
DATE

  
\_\_\_\_\_  
INSTALLATION PEST MANAGEMENT COORDINATOR

3-05-2014  
DATE

  
\_\_\_\_\_  
COMMAND ENTOMOLOGIST AETC/A7CAN

14 May 2014  
DATE

RECORD OF CHANGES

<u>Change Number</u>	<u>Date</u>	<u>Date Posted</u>	<u>Posted By:</u>
1. Added information Tech Guide			
47 para.6.1-6.1.5.2	7/08/16		
2. Remove referances			
DS-2-PAE from plan	7/08/16		

RECORD OF REVIEWS

<u>Reviewed By:</u>	<u>Date</u>	<u>Remarks</u>
Michael Gregory IPM Coordinatord	30 Oct 15	Date on IPM changed to reflect date of last signature.
		Date of annual review will be in October to coincide with the Measure of Merit report.
Michael Gregory IPMC	06 Nov 16	Date of annual review to coincide with MoM
Michael Gregory IPMC	27 June 18	Date of annual review complete after partial MoM report performed Feb 2018



1. Summary: The Sheppard AFB Pest Management Plan provides detailed information on how to prevent and manage pests on Sheppard AFB, Fredrick Municipal Airport, and at the Sheppard Recreation Annex (Lake Texoma). Effective and environmentally sound land stewardship is a fundamental component of the base's maintenance and environmental policy. Working to control invasive pests and promoting the healthy growth of desirable species simultaneously helps to fulfill this responsibility. Reducing health dangers caused by insect or disease infestations, maintaining native vegetation and supporting citizens' activities (i.e., sports, aesthetic enjoyment, and maintaining wildlife habitat) is a final aspect in this role.

The Sheppard AFB Pest Management Plan is designed to promote healthy vegetation and guide pest control activities on land and within facilities. Sheppard AFB will promote Integrated Pest Management (IPM) principles through public education and work to encourage the incorporation of IPM principles. The Sheppard AFB Pest Management Plan promotes the use of IPM tactics (cultural, biological, mechanical and chemical) to improve plant health and to prevent and manage pest infestations. The Sheppard AFB Pest Management Plan will apply to all base personnel and contractors who directly or indirectly manage vegetation or pests, or plan, design, renovate, or construct landscapes and facilities. One of the goals of the IPM policy is to keep pests at acceptable levels through effective, economical and environmentally sound methods. Pesticide use can be reduced by increasing cultural practices to improve long-term vegetation health. Healthy vegetation successfully competes with weeds and disease. For the purposes of this plan, "pests" are any injurious insects, plants, diseases, and animals.

2. Installation Implementation Authority: The 82 CES/SP operation contract implements DoDI 4150.07 and AFI 32-1053.

3. Purpose: This plan is designed to assure proper pest management, personnel training and certification, environmental protection and compliance with applicable regulations. Emphasis is placed on inspections and IPM techniques. This plan is in accordance with federal, state and Air Force requirements.

#### 4. Installation Description and Mission:

4.1. Sheppard AFB: The mission of the 80th Flying Training Wing serves as the only Euro-NATO Joint Jet Pilot Training (ENJJPT) program created to produce top quality fighter pilots for NATO. The 82d Training Wing's mission is as follows: Build, Strengthen & Sustain Global Combat Capability through Superior Technical Training. Most pest management activities take place at Sheppard AFB proper. Areas of concern include the community center, administrative areas, temporary and permanent party dormitories, and temporary living facilities, child care and dining facilities, which total 378 industrial buildings and 5,297 acres. These areas are treated for all categories of pests, from general household and nuisance pests, to pests of ornamental plants and turf. No aerial spraying is conducted on Sheppard AFB. IPM procedures are in place at Sheppard AFB to minimize pesticide use, thus producing the least amount of impact upon the environment. IPM is achieved through fertilization techniques, aeration, sanitation, the use of traps and least toxic pesticides.

4.2. Frederick Municipal Airport: This airfield is an auxiliary flight line mainly as a "touch and go" destination for flight training missions to and from Sheppard AFB. This airfield consists of three facilities, a fire station and two Runway Supervisory Units (RSUs). There is also a separate hangar on lease by Sheppard AFB. All of this sits on a nine acre area. These areas are treated for all categories of pests, from general household and nuisance pests to pests of ornamental plants and turf. No aerial spraying is conducted on Frederick Municipal Airport. IPM procedures are in place at Frederick Municipal Airport to minimize pesticide use, thus producing the least amount of impact upon the environment. IPM is achieved through fertilization techniques, aeration, sanitation, the use of traps and least toxic pesticides.

4.3. Sheppard Recreational Annex (Lake Texoma): This recreational facility contains 50 facilities on over 430 acres of land. Areas of concern include the recreational, administrative, maintenance, residential and temporary living (cabin) facilities. These areas are treated for all categories of pests from general household and nuisance pests to pests of ornamental plants and turf. No aerial spraying is conducted on the Sheppard Recreation Annex. IPM procedures are in place at the Sheppard Recreation Annex to minimize pesticide use, thus producing the least amount of impact upon the environment. All treatments are conducted away from any water ways to avoid contamination of the water source. IPM is achieved through fertilization techniques, aeration, sanitation, the use of traps and least toxic pesticides.

## 5. Responsibilities:

5.1. 82d Mission Support Group (82 MSG) Commander: The 82 MSG Commander and the Pest Management Coordinator from within the 82 CES/SP Operation Department coordinate the Pest Management Plan, with ultimate approval by the 82 TRW/CC.

5.2. 82 AMDS/SGPB - Bioenvironmental Engineering: Reviews all requests for new pesticides and assigns a supply exception code based on the potential for health hazard of the chemicals involved.

5.3. 82 AMDS/SGPM - Public Health: Monitors the base community for any situation that could affect the health of personnel. Public Health investigates complaints, requests control actions from the Entomology Shop and reviews the proposed corrective actions. Once the actions have been completed Public Health ensures that the actions taken have been effective in eliminating the problem.

5.4. 82 CES/SP - Safety Specialist: Performs annual Occupational Safety and Health Administration (OSHA) inspections of the Entomology Shop, administers the respiratory protection program, and coordinates any personnel monitoring as required.

5.5. 82 CES/SP - Environmental Branch: Provides guidance, supervision, and environmental oversight of the Pest Management Program to include pesticide storage procedures, SDS corresponding with pesticides on hand, correct recording and reporting of pesticide applications, current medical records, and current state certified applicator's

licenses.

5.6. 82 CES/SP – Lead, Entomology Shop: Provides supervision as needed to grounds personnel and monitors training, along with providing consulting services to Air Force personnel. The Shop Lead schedules required periodic physical examinations for Entomology and Grounds personnel, reviews medical records annually and will maintain a State of Texas and Oklahoma Certified Applicator’s license in all required categories.

6. Pest Management Requirements and Strategies for applicable pest/disease vector categories.

6.1. Disease Vector Problem Pest: Mosquitoes.

6.1.1. Species:

6.1.1.1. *Aedes aegypti*, “Yellow Fever Mosquito”

6.1.1.1.1. Vector of Zika, Dengue, West Nile Virus and Chikungunya. Dark mosquito with guitar- or lyre- shaped markings on the thorax and white-banded legs. Bites during daytime; bites often unnoticed; bites and rests indoors.

6.1.1.1.2. Occupies urban areas with or without vegetation. Breeds inside human-made containers in or near homes; lays eggs indoors and outdoors.

6.1.1.2. *Aedes albopictus*, “Asian Tiger Mosquito”

6.1.1.2.1. Vector of Zika, Dengue, West Nile Virus and Chikungunya. Dark mosquito with a single silver stripe on the top of the thorax and white-banded legs. Aggressive daytime biter.

6.1.1.2.2. Mostly associated with thickets and dense vegetation. Mostly found outdoors. Breeds in tree holes, bamboo internodes, but will also use human-made containers.

6.1.2. Target life stage or stages: Larval and adult.

6.1.3. Ongoing Monitoring Plan.

6.1.3.1. Responsible organization or official: In accordance with AFI 32-1053, the Public Health Office determines the type, source and prevalence of biting mosquitoes at SAFB, recommends preventative/control measures and monitors the effectiveness of pest management efforts. Reference, Armed Forces Management Board Technical Guide No. 47, *Aedes* Mosquito Vector Control, for surveillance and control measures.

6.1.3.2. Techniques and procedures: Use of light traps and BG Sentinel traps to monitor adult mosquito populations. Vector spraying will be IAW AFI 32-1053 and

AFI 48-102. Reduction in population will be monitored by SAFB Public Health Office.

6.1.3.3. Locations: Installation wide, Storm water outfall # 1 located on the airfield, artificial containers, food service facilities. See Attachment

6.1.3.4. Schedule: Spring through fall, and as requested by SAFB Public Health Office.

6.1.3.5. Threshold for management and/or control: One complaint, demands investigation/inspection of areas for breeding.

#### 6.1.4. IPM Strategy and Methods.

6.1.4.1. Responsible organization or official: SAFB Public Health Office , Pest Management (82 CES/SP).

6.1.4.2. Non-chemical controls and techniques: Pest Management will educate on a case by case basis the base populous on areas where extensive breeding occurs in containers and on the importance of disposing of those containers with stagnant, standing water. The elimination of all breeding sites can be accomplished by altering the habitat in such a way as to reduce the numbers of larvae that can be supported.

6.1.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

#### 6.1.5. Chemical Control Methods:

6.1.5.1. Larval control is necessary for any chemical control program. Summit BTI briquettes, *Bacillus thuringiensis* are placed in known areas of pooling before and after a rainstorm. Reference, Armed Forces Management Board Technical Guide No. 47, *Aedes* Mosquito Vector Control for additional control methods.

6.1.5.2. Adult control is least effective and done only as a last resort. For adult control ULV applications of Permethrin, and Piperonyl Butoxide Technical maybe used. Reference, Armed Forces Management Board Technical Guide No. 47, *Aedes* Mosquito Vector Control for additional control methods.

6.1.6. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

#### 6.1.7. Sensitive areas:

6.1.7.1. Areas to be avoided or treated with caution by either non-chemical or chemical controls: SAFB Wetland Area, see Attachment 4. , Refer to section 6.1.5.1

6.1.7.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.1.8. Special health and safety measures required: Per pesticide label directions, See Attachment 5.

6.1.9. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

## 6.2. Disease Vector Problem Pest: Flies.

### 6.2.1. Species:

6.2.1.1. The housefly: The housefly is closely associated with people and their food and is considered to be a greater threat to human welfare than any other species of fly because of their habit of breeding in human excrement and other filth, their abundance, and their ability to transmit germs.

6.2.1.2. Bottle fly: Is associated with decaying animal and vegetable material and garbage cans.

6.2.1.3. Stable fly: Attacks domestic animals and humans with an irritating bite. It is commonly found around horse stables.

6.2.2. Target life stage(s): Larval and adult.

### 6.2.3. Ongoing Monitoring Plan.

6.2.3.1. Responsible organization or official: Public Health Office, Pest Control Applicator (82 CES/SP).

6.2.3.2. Techniques and procedures: Evaluation procedures and standards used for verification: Survey and identify the fly species that are found. Look for their breeding sites. Document potential unsanitary conditions that would encourage the breeding of flies, and provide a follow-up survey at a later date. Identify all building defects that allow the flies to infiltrate the building.

6.2.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

### 6.2.4. IPM Strategy and Methods.

6.2.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.2.4.2. Controls and techniques: Good sanitation is the basic step in all fly management, Pest Management will educate the public to reduce fly infestations.

Food and materials used by flies as a breeding medium must be removed, destroyed, or isolated from the egg-laying adult. Keep all garbage cans empty and clean daily. The best control method for adult flies is a fly swatter.

6.2.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center, Teen Center food preparation area.

6.2.4.4. Chemical Control Methods: Temporary control of flies can be obtained indoors by the use of contact sprays such as pyrethrins (Piperonyl Butoxide), or synthetic pyrethroids and should be dispensed as a very fine mist or aerosol. Space sprays, residual sprays or ULV fogging may be used outdoors.

6.2.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.2.6. Sensitive areas:

6.2.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.2.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center, Teen Center food preparation area.

6.2.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.2.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.3. Disease Vector Problem Pest: Bedbugs.

6.3.1 Species: No specific species. These pests have been found to carry the causative agents for several diseases such as anthrax, plague, tularemia, yellow fever, relapsing fever and typhus.

6.3.2. Target life stage(s): Egg and Adult.

6.3.3. Ongoing Monitoring Plan.

6.3.3.1. Responsible organization or official: Public Health Office, Pest Control Applicator (82 CES/SP).

6.3.3.2. Techniques and procedures: Make a thorough inspection to determine the extent of the infestation. Carefully inspect all rooms immediately adjoining any rooms where the infestation is found. The bugs can be found almost any place because they are a wander bug. Places to look include, but are not limited to, cracks in the floor, under carpeting, behind electrical switch plates, in folds of draperies, in

unused ovens or broilers and in motor compartments of electric refrigerators. Even if the bugs cannot be found, their hiding places can be located by looking for spots of fecal matter (bug droppings) that they often leave in easily visible places. Fecal spots and the bloody spots left on sheets and pillowcases when engorged bugs are crushed also serve as signs of infestation.

6.3.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

#### 6.3.4. IPM Strategy and Methods.

6.3.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.3.4.2. Controls and techniques: Sanitation is the preferred control method, e.g., washing all linen in hot water and thoroughly cleaning the house. Pest Management will educate individuals who have these infestations on controls.

6.3.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center, Teen Center food preparation area.

6.3.4.5. Chemical Control Methods: Bedbugs are usually controlled using insecticide spray or dust applications. Insecticides labeled for use on or near beds and furniture include imidacloprid and cyfluthrin, and some combination sprays or dust. The key to an adequate treatment is a thorough application, which is essential to achieve adequate control. However bed linens, as well as the top of the mattress where a person sleeps should never be sprayed.

6.3.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

#### 6.3.6. Sensitive areas.

6.3.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.3.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center, Teen Center food preparation area.

6.3.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.3.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

#### 6.4. Disease Vector Problem Pest: Fleas.

6.4.1. Species: No specific species. These pests can carry the organisms of bubonic plague, flea borne typhus, and tapeworm. A good indication of fleas is small, dark, jumping spots. Another indication is the bite. Under close inspection the bite reveals a

small reddish bump with a pale, flesh-colored center and a single puncture point caused by the fleas mouth parts.

6.4.2. Target life stage(s): Egg and Adult.

6.4.3. Ongoing Monitoring Plan.

6.4.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.4.3.2. Techniques and procedures: Besides the signs of fleas, an inspection is needed for marking the spots of origin. Wear white athletic socks while walking through the inside area and look for sites where high numbers of fleas are concentrated. Use a diagram of the premises and indicate where the hot spots are, especially where animals rest. Next, inspect outdoor areas where pets spend time. Also inspect porch areas, crawl spaces, garages and the underside of wooden frame steps.

6.4.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.4.4. IPM Strategy and Methods.

6.4.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.4.4.2. Techniques: The first step in any control is to educate the person about the life cycle of the flea and the steps of a thorough, safe and effective flea management program, and Pest Management will educate individuals with infestations on the following control methods. The person needs to place an old flea collar in a clean vacuum bag and vacuum all areas and upholstery. Place the vacuum bag in a plastic bag and put in trash receptacle outside. This should be done at least every three days for three weeks. Have a veterinarian treat the animal(s) and wash or discard all pet linen. All vegetation should be maintained in accordance with the Sheppard Land Management Plan, component plan of the Integrated Natural Resources Management Plan (INRMP).

6.4.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.4.4.4. Chemical Control Methods: Make sure all pets are treated the same day as the structure and yard, it is the pet owners responsibility to treat the pets. Keep all pets and people off the treated area until insecticide dries. Apply a growth hormone to break the life cycle of the flea. Next, apply a residual insecticide. Various insecticide formulations are available for spraying indoors. Use of these insecticides is often followed by the use of ULV or aerosol applications of non-residual synergized pyrethrins or synthetic pyrethroids.



6.4.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.4.6. Sensitive areas.

6.4.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.4.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.4.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.4.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.5. Disease Vector Problem Pest: Ticks.

6.5.1 Species: The American, brown dog and the lone star ticks are found on base. The American dog tick is a vector for the causal organism of Rocky Mountain spotted fever and is one of the species commonly involved with tick paralysis. The Brown dog tick is a vector for canine piroplasmosis transovarially and tropical pancytopenis interstadially. The Lone star tick is a transmitter of spotted fever, Q fever, tularemia and is a factor in tick paralysis.

6.5.2. Target life stage or stages: Egg and Adult.

6.5.3. Ongoing Monitoring Plan.

6.5.3.1. Responsible organization or official: Public Health, Pest Control Applicator (82 CES/SP).

6.5.3.2. Techniques and procedures: To survey vegetative areas, drag a cloth 50 feet, pick the ticks off, and put them in a 80 percent alcohol solution.

6.5.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.5.4. IPM Strategy and Methods.

6.5.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.5.4.2. Techniques: The following non-chemical techniques will reduce the tick population and Pest Management will educate the individuals with an infestation on techniques. Keep grass and weeds cut short. Remove clutter and debris around property. Remove bird nests in and around the structures and nesting material left by

rodents. Keep pets inside fences or on leashes. Screen and seal entry points to all facilities. Seal cracks and crevices where ticks can hide. Regularly examine and groom pets, and frequently clean their bedding.

6.5.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.5.4.4. Chemical Control Methods: Use residual sprays of propoxur, carbaryl, and fenvalerate for indoor and residential lawn control. Spray all cracks and crevices found around and inside buildings. Some dust formulations of these residual materials or silica aerogel and drione can be used. Non-residual insecticides are used for space spraying only. The preferred chemical is a direct contact spray of synthetic pyrethroids. It is the pet owner's responsibility to have the pet treated. Animals must be treated the same day of the chemical treatment, and the pet owner must treat the pet bedding.

6.5.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification

6.5.6. Sensitive areas.

6.5.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.5.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.5.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.5.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.6. Health Related Problem Pest: Scorpions.

6.6.1 Species: No specific species. Scorpions inject allergy reaction venom comparable to the bee sting.

6.6.2. Target life stage or stages: Adult.

6.6.3. Ongoing Monitoring Plan.

6.6.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.6.3.2. Techniques and procedures: Inspect areas for certain types of debris such as boards, rocks, stacked wood, or any other materials under which scorpions can hide. Since spiders are the main food source of scorpions, inspect areas such as attics for

spiders.

6.6.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

#### 6.6.4. IPM Strategy and Methods.

6.6.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.6.4.2. Techniques: Pest Management will educate individuals with complaints on the following techniques. Removing all debris from the area and keeping buildings free of small spiders are two main ways to prevent scorpion infestations.

6.6.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.6.4.4. Chemical Control Methods: Indoor hiding places for scorpions, such as crevices in woodwork, closets, plumbing fixtures, doorways or windows, should be carefully treated with an appropriate spray or dust. Non-residual or contact applications (ULV or aerosol) of synergized pyrethrins or synthetic pyrethroids are useful for rapid control in areas such as attics, crawl spaces and buildings.

6.6.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

#### 6.6.6. Sensitive areas.

6.6.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.6.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.6.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.6.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

#### 6.7. Health Related Problem Pest: Black Widow Spider.

6.7.1. Species: Not applicable. This spider's venom contains neurotoxins (acts on the nervous system), and the severity of a person's reaction to the bite depends on the area bitten, the person's size and general sensitivity, the amount of venom injected, depth of the bite, seasonal changes, and temperature. The globular, shiny black abdomen with two reddish or yellowish triangles forms the identifiable hourglass marking of the black widow. The web is an irregular mass of fibers, with a small central area where the spider retreats to wait for its prey to become ensnared.

6.7.2. Target life stage or stages: Adult.

6.7.3. Ongoing Monitoring Plan.

6.7.3.1. Responsible organization or official: Public Health, Pest Control Applicator (82 CES/SP).

6.7.3.2. Techniques and procedures: Inspection for spiders should begin underneath boards, stones, or seats of outdoor privies; along foundation slabs, behind shrubs; and especially where brick or wood siding extends close to ground level.

6.7.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.7.4. IPM Strategy and Methods.

6.7.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.7.4.2. Techniques: Sanitation is the key to control and Pest Management will educate individuals with complaints on these techniques. Frequently clean to remove spiders and their webs from buildings and outdoor living areas. Routinely hose-wash potential spider habitats, such as under steps and around windows and doors.

6.7.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.7.4.4. Chemical Control Methods: Residual insecticide applications of cypermethrin, cyfluthrin, fenvalerate, propetamphos or carbaryl can be used. Microencapsulated formulations if diazinon will generally give better and longer residual action on most surfaces.

6.7.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.7.6. Sensitive areas.

6.7.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.7.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center, Teen Center food preparation area.

6.7.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.7.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.8. Health Related Problem Pest: Brown Recluse Spider.

6.8.1. Species: Not applicable. This spider's venom contains a hemolytic toxin (chemical causing excessive destruction of red blood cells) that destroys the cells in the vicinity of the wound until large areas of skin tissue are sloughed off, exposing underlying muscle and organs. A yellow to dark brown body, 1/3 to 1/2 inches in length with a rather distinctive darker brown violin shaped mark on top of the cephalothorax (head/upper body area) are identifiable traits of the brown recluse spider.

6.8.2. Target life stage or stages: Adult.

6.8.3. Ongoing Monitoring Plan.

6.8.3.1. Responsible organization or official: Public Health, Pest Control Applicator (82 CES/SP).

6.8.3.2. Techniques and procedures: Populations are found in bathrooms, bedrooms, closets, garages, basements, cellars, or inside buildings where it is generally dry, littered, and undisturbed. In buildings with forced hot-air heating and air conditioning and above-ceiling duct work, the brown recluse can be found in or around the duct work or registers. They also can be found outside in protected areas, such as underneath rocks and loose bark. Building residents should shake out clothing and bedding before use, and eliminate collections of papers and unused boxes to prevent contact with the brown recluse spider.

6.8.3.3. Schedule: On complaint.

6.8.3.4. Threshold for management and/or control: One complaint, demand driven inspection.

6.8.4. IPM Strategy and Methods.

6.8.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.8.4.2. Techniques: Pest Management will educate individuals with complaints on the following control methods. Thoroughly clean beneath and behind furniture; remove or vacuum spiders, webs and egg cases from living and storage areas; remove clutter, and use other sanitation steps directed at conditions favorable to spiders.

6.8.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.8.4.4. Chemical Control Methods: Space treatments of synergized pyrethrins or especially synthetic pyrethroids are useful for clean-outs and the elimination of

indoor species. Refer to Section 6.7, black widow spiders, for residual treatment.

6.8.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.8.6. Sensitive areas.

6.8.6.1. Areas to be avoided by either non-chemical or chemical controls: None.

6.8.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.8.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.8.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.9. Health Related Problem Pest: Fire Ants.

6.9.1 Species: Not applicable. Fire ants inject venom through their stinger, causing intense irritation and severe reactions in especially sensitive people. These ants are very active and aggressive and may kill some species of wildlife and in extreme cases humans.

6.9.2. Target life stage or stages: Adult.

6.9.3. Ongoing Monitoring Plan.

6.9.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.9.3.2. Techniques and procedures: The tell-tale signs of this ant are the mounds they develop. The mounds look like someone poured coffee grinds on the area. If this mound is disturbed, workers appear to boil or swarm out of the ground in a very aggressive, defensive behavior. Since these ants are both predators and scavengers, their food source can consist of insects, honeydew, and other plant secretions.

6.9.3.3. Schedule: On complaint.

6.9.3.4. Threshold for management and/or control: One complaint, demand driven inspection.

6.9.4. IPM Strategy and Methods.

6.9.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.9.4.2. Techniques: Mechanical ways of removing the mounds are boiling hot water

or excavating the soil, but these are not considered practical for Sheppard. If the ants are located indoors, glue traps baited with peanut, bits of fresh meat, dead insects, or bacon grease can be used.

6.9.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.9.4.4. Chemical Control Methods: The best method of destroying this type of ant is ant bait. The use of a growth regulator should be applied early in the spring, along with a second application of a baited insecticide like "Amdro". These types of baits have a slow release insecticide in bait form that gets into the food chain. Logic is a growth hormone that makes the queens sterile. It takes 30-60 days for this product to reach the queen. Amdro is an insecticide designed to kill all that feed on the product. Sometimes the workers die too fast and the queen(s) simply move the rest of the colony without consuming the bait. If there is movement around her mound, the queen(s) will move downward and leave through escape tunnels before anything can be applied to the mound. With the aforementioned factors, using a residual or contact insecticide will not destroy the queen. It only kills some of the workers, and the queens will move a short distance and establish different colonies. Use of residual or contact insecticides should only be applied as a follow-on treatment to eradicate remaining workers from the area or in accordance with emergency and/or medical situations.

6.9.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.9.6. Sensitive areas.

6.9.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.9.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.9.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.9.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.10. Health Related Problem Pest: Harvester Ants.

6.10.1. Species: Not applicable. Harvester ants are considered a beneficial species to conservationists as they serve as the primary source of food for the Texas horned lizard (state threatened species). Harvester ants are not as aggressive as fire ants, but will swarm in a defensive behavior if one agitates the nest. These ants cannot sting but can bite. They should not be considered a medical pest but a nuisance. Persons allergic to

ant venom could experience irritation and severe reactions.

6.10.2. Target life stage or stages: Adult.

6.10.3. Ongoing Monitoring Plan.

6.10.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.10.3.2. Techniques and procedures: Easily found by locating the large, bare, often raised dirt the ants have removed during tunneling activity. The mounds will have trails extending in several directions. Harvester ants are relatively large, and the local species has a reddish color. They are active outside the nest during daylight hours.

6.10.3.3. Threshold for management and/or control: One complaint.

6.10.4. IPM Strategy and Methods.

6.10.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.10.4.2. Techniques: Pest Management will educate individuals with complaints on the following control methods. A healthy, well maintained lawn is the best deterrent. Other means of any control are the removal of the food source, sanitation and exclusion practices.

6.10.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.10.4.4. Chemical Control Methods: Baiting is the only good way to eradicate the entire colony, such as hydramethylon, and boric acid. Use of residual or contact insecticides should only be applied as a follow-on treatment to eradicate remaining workers from the area or in accordance with emergency and/or medical situations. For a temporary fix, the use of a residual insecticide labeled for ants may be used, but is discouraged because of the ability of the queen(s) to produce, move, or bud their colonies. Chemical applications should be limited to high use areas on the base.

6.10.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.10.6. Sensitive Areas.

6.10.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.10.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.



6.10.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.10.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

#### 6.11. Health Related Problem Pest: Bees.

6.11.1. Species: The Africanized and European honeybee may be various shades of yellow, black, brown or orange. The body is covered with light colored hairs and is usually about 2/3 inches long. Bees sting and inject hemolytic venom (chemical causing excessive destruction of red blood cells) that causes local pain, usually followed by swelling and reddening of the sting area. Although the Africanized bee has less venom, they attack more aggressively and sting five times more than the European bee. The Africanized bee is considered an invasive species, and the goal is to eradicate them.

6.11.2. Target life stage or stages: Adult.

#### 6.11.3. Ongoing Monitoring Plan.

6.11.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.11.3.2. Techniques and procedures: Prior to your bee inspection, always wear your safety gear. Always inspect a possible hive or swarm late in the afternoon or early in the evening. While inspecting, find all building faults where the bees are coming from, and once the swarm or hive has been eliminated seal the entry areas found.

6.11.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

#### 6.11.4. IPM Strategy and Methods.

6.11.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.11.4.2. Techniques: At SAFB, the preferred control method is to eradicate colonies in accordance with Technical Information Memorandum (TIM) No. 34, Bee Resource Manual with Emphasis on the Africanized Honey Bee.

6.11.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.11.4.4. Chemical Control Methods: Preferred action for eliminating hives is to use pheromone traps to attract honey bees to selected locations on SAFB. Once European and Africanized honey bees establish themselves in a trap, they will be eliminated using a liquid dishwashing solution diluted with water to a five percent concentration. Emergency response actions will involve responding to bee swarms or discovered hives and eliminating the bees using the aforementioned liquid dishwashing solution.

Once the swarm or hive is destroyed, the combs and honey should be removed and cleaned up. If the remains of the colony are left other bees may move in. In addition, other insects may be attracted to the decaying matter, fungus may develop or the area around the mass (where the hive is attached to a building or structure) may be damaged, requiring replacement. Additional guidance for Africanized Honey Bees can be obtained from the PMC or as currently recommended in TIM No. 34 which is incorporated into this plan in its entirety as a recognized standard.

6.11.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.11.6. Sensitive areas.

6.11.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.11.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.11.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.11.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.12. Health Related Problem Pest: Wasps.

6.12.1 Species: At SAFB, wasps consist of cicada killers, hornets, mud daubers, paper wasps, and yellow jackets.

6.12.2. Target life stage or stages: All stages.

6.12.3. Ongoing Monitoring Plan.

6.12.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.12.3.2. Techniques and procedures: You must be able to identify and understand the biology and behavior of the above wasps to inspect for them. Surveillance is performed on an on-call basis. Notify Civil Engineering (CE) for assistance.

6.12.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.12.4. IPM Strategy and Methods.

6.12.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.12.4.2. Techniques: The number one IPM control method is education of the base populace on safety procedures to follow when these wasps are discovered. All safety equipment must be worn before any type of inspection and/or treatment is made. Use mechanical methods to eradicate the nest. Use of wasp/hornet traps containing food attractants can also help reduce unnecessary pesticide use.

6.12.4.3. Locations to receive non-chemical control: Food Services, medical facilities, Child Development Center and Teen Center food preparation area.

6.12.4.4. Chemical Control Methods: Use of propoxur, pyrethrins, and any of the carbanates (synthetic organic insecticide, i.e. naturally man-made insecticides) for a knockdown and residual control. Treat the nest either early in the morning or late in the evening.

6.12.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification and Oklahoma State Department of Agriculture Pesticide Applicator Certification.

6.12.6. Sensitive areas.

6.12.6.1. Areas to be avoided by either non-chemical or chemical controls:

6.12.6.2. Areas to be treated with caution: Food Services, Medical Facilities, Child Development Center and Teen Center food preparation area.

6.12.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.12.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.13. General Household and Nuisance Pest: Cockroaches.

6.13.1. Species: The cockroaches found on this base are the German, American, Oriental, and the Brown Banded.

6.13.2. Target life stage or stages: All stages.

6.13.3. Ongoing Monitoring Plan.

6.13.3.1. Responsible organization or official: Public Health, Bioenvironmental, Pest Control Applicator (82 CES/SP).

6.13.3.2. Techniques and procedures: All pest management personnel must know the general biology and behavior of the specific roach. The use of roach glue traps and the inspection of the harboring areas with a flashlight are mandatory before any control is attempted. Interview building occupants for sightings of the roaches.

Inspect all areas for clutter of paper products, cardboard boxes, food and moisture problems.

6.13.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

#### 6.13.4. IPM Strategy and Methods.

6.13.4.1. Responsible organization or official: Pest Management Applicator (82 CES/SP).

6.13.4.2. Techniques: Use exclusion techniques such as caulking and sealing all cracks and crevices to eliminate harborage to prevent a roach population inside buildings.

6.13.4.3. Chemical Control Methods: Regardless of the type of insecticide used, insecticides placed directly into or near cockroach harborage will produce far better control than those placed where roaches will only walk over them occasionally. Search, locate and treat. Typical insecticide application techniques used with residual insecticide formulations are crack and crevice, and spot in general. In all facilities the first step in cockroach control is the use of roach motels. There will be problems associated with roach motel treatment if not enough traps are placed out. If the roach motels are not working properly or if the roach population is too high for roach motels to work, crack and crevice treatment along with space spraying is needed. Ready-to-use aerosols that contain a residual spray are acceptable. After the crack and crevice is done, the use of a space spray containing pyrethrins for quick knockdown maybe used. A follow-up is needed in three weeks with a different mode-of-action pesticide. Inspections must be done after each step is completed to ensure treatment programs are working.

6.13.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.

#### 6.13.6. Sensitive areas.

6.13.6.1. Avoided by either non-chemical or chemical controls: None.

6.13.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.

6.13.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.13.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

#### 6.14. General Household and Nuisance Pest: Ants, General.

6.14.1. Species: These pests are grouped into species that nest indoors, outdoors, and under slabs or sidewalks. Indoor nesting ants are the pharaoh ants. Outdoor nesting ants are the harvester ant, little black ant, and the pyramid ant. Refer to Section 6.10 for specific control of harvester ants.

6.14.2. Target life stage or stages: Adult.

6.14.3. Ongoing Monitoring Plan.

6.14.3.1. Responsible organization or official: Public Health, Bioenvironmental, Pest Control Applicator (82 CES/SP).

6.14.3.2. Techniques and procedures: The first step in ant control in or around the home is to conduct a thorough inspection of the premises to determine which species are present and, if possible, all nesting locations. Proper identification of the ant species is needed before any type of control program is established. The use of non-toxic baits is necessary to determine the nesting sites.

6.14.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.14.4. IPM Strategy and Methods.

6.14.4.1. Responsible organization or official: Pest Management Applicator (82 CES/SP).

6.14.4.2. Techniques: The only means of any control is the removal of the food source, sanitation and exclusion practices, Pest Management will educate individuals with complaints on these techniques.

6.14.4.3. Chemical Control Methods: Baiting is a good way to eradicate the entire colony. The base uses hydramethylon, boric acid, and Fipronil. Use of residual or contact insecticides should only be applied as a follow-on treatment to eradicate remaining workers from the area or in accordance with emergency and/or medical situations. For a temporary fix, the use of a residual insecticide labeled for ants may be used, but is discouraged because of the ability of the queen(s) to produce, move, or bud their colonies.

6.14.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.

6.14.6. Sensitive areas.

6.14.6.1. Avoided by either non-chemical or chemical controls: None.

- 6.14.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.
- 6.14.7. Special health and safety measures required: Per pesticide label directions. See Appendix 5.
- 6.14.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.
- 6.15. General Household and Nuisance Pest: Non-venomous Spiders.
  - 6.15.1. Species: Not applicable. Non-venomous spiders create an unsightly situation but cause no real harm.
  - 6.15.2. Target life stage or stages: Adult.
  - 6.15.3. Ongoing Monitoring Plan.
    - 6.15.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).
    - 6.15.3.2. Techniques and procedures: Everywhere there is a "cobweb", there is a spider that made it. The places to look for spiders are areas where there is little or no air movement.
    - 6.15.3.3. Threshold for management and/or control: One complaint, demand driven inspection.
  - 6.15.4. IPM Strategy and Methods.
    - 6.15.4.1. Responsible organization or official: Pest Management Applicator (82 CES/SP).
    - 6.15.4.2. Techniques: Sanitation is the key in spider control and Pest Management will educate the public on these control methods. Remove the cobweb daily until it is gone. Then on a weekly basis clean all corners, closets, and other areas that have very little air movement.
    - 6.15.4.3. Chemical Control Methods: Spray residual insecticides to all areas where the webs are found. The use of a ULV or aerosol space spray may be used for a quick knockdown if needed.
  - 6.15.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.
  - 6.15.6. Sensitive areas.
    - 6.15.6.1. Avoided by either non-chemical or chemical controls: None.

- 6.15.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.
- 6.15.7. Special health and safety measures required – Per pesticide label directions. See Attachment 5.
- 6.15.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.
- 6.16. Structural Pest: Termites.
  - 6.16.1. Species: Subterranean termites are the main wood infested pests here at SAFB.
  - 6.16.2. Target life stage or stages: Adult.
  - 6.16.3. Ongoing Monitoring Plan.
    - 6.16.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).
    - 6.16.3.2. Techniques and procedures: The inspector must know and understand building terms and be able to identify structural members from a blueprint. During the inspection the inspector must have a floor plan of the building, probe, light source, listening device, safety gear, and tape measurer. The termite inspector must know the species habits, recognize signs of infestation such as mud tubes, hollow wood, sounds of the termites, and plasterboard peeling, and be able to evaluate the extent of the infestation. Areas to inspect are the following, but not limited to: Wood-to-ground contact, leaks in, around or on top of the building, vegetation around the facility and crawl spaces or basements of the facility. All facilities will be inspected every two years.
    - 6.16.3.3. Threshold for management and/or control: One complaint, inspection driven detection.
  - 6.16.4. IPM Strategy and Methods.
    - 6.16.4.1. Responsible organization or official: Pest Management (82 CES/SP).
    - 6.16.4.2. Techniques: Mechanical alteration involves modifying the structure, providing a barrier that can't be penetrated by termites, or eliminating conditions conducive to termite invasion. Use of concrete or metal barriers, removal of cellulose debris, elimination of moisture near or in the structure, establishment of sufficient ventilation of the infested area, elimination of wood-to-soil contact, and replacement of the infested wood with pressure treated lumber are examples of mechanical alteration. Pest Management will educate individuals with infestations on these control methods.

6.16.4.3. Chemical Control Methods: Termite stakes should not be used unless installed and monitored by base Entomology personnel or as a supplement to a termite contract. There are three basic methods of termite control treatment:

6.16.4.3.1. Soil treatment is the application of an approved insecticide (permethrin) to the soil under and adjacent to a building, creating an impervious chemical barrier.

6.16.4.3.2. Foundation treatment is the application of an approved insecticide to a foundation, making it impervious to termites. This consists of treating hollow concrete blocks, all cracks at the footings, etc.

6.16.4.3.3. Wood treatment is the application of an approved insecticide to cracks and crevices of wood, and can be applied as a solution, foam or dust.

6.16.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.

6.16.6. Sensitive areas.

6.16.6.1. Avoided by either non-chemical or chemical controls: None.

6.16.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.

6.16.7. Special health and safety measures required: Per pesticide label directions. See Appendix

6.16.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.17. Structural Pest: Borers.

6.17.1. Species: These can usually be identified by the characteristics of the damage done to the wood. The main borer problems at SAFB are the powder post beetles, long-horned beetles, and metallic wood borers.

6.17.2. Target life stage or stages: Adult.

6.17.3. Ongoing Monitoring Plan.

6.17.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.17.3.2. Techniques and procedures: Inspector must be able to identify the characteristics of each borer, their behavioral patterns and life cycle before any control program can be initiated. Periodic inspections are needed to determine the condition of wood and to locate any evidence of attack. Inspect attics, crawl spaces,



basements and storage areas. Sound amplification devices, probes, a magnification device and a good light must be used while inspecting for borers. Beetles can be identified by the wood shavings they leave behind and the type of holes they make in the wood.

6.17.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.17.4. IPM Strategy and Methods.

6.17.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.17.4.2. Techniques: Alternate the environmental conditions through the use of vapor barriers, ventilation and central heat keeps wood dry and discourages infestation. Infested wood should be removed and replaced. Individuals with infestations will be educated on these techniques by Pest Management.

6.17.4.3. Chemical Control Methods: Residual insecticides approved for use against wood-boring beetles are effective when applied properly, using a water-based insecticide and covering the infected wood.

6.17.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.

6.17.6. Sensitive areas.

6.17.6.1. Avoided by either non-chemical or chemical controls: None.

6.17.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.

6.17.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.17.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.18. Structural Pest: Carpenter Ants.

6.18.1. Species: The excavated galleries in wood by carpenter ants resembles the work of termites, but these excavated galleries can be distinguished by their entirely clean and almost sandpaper appearance.

6.18.2. Target life stage or stages: Adult.

6.18.3. Ongoing Monitoring Plan.

6.18.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.18.3.2. Techniques and procedures: The building, including the outside, must be inspected prior to any treatment. The use of sound equipment is useful in finding an active colony. The ants' biology and behavior must be known prior to any treatment. Inspect outdoor sites, such as stumps, hollow logs, telephone posts, fence posts or other similar large pieces of wood. Wood that is moist or partially decayed is preferred by carpenter ants. However, cracks, crevices, and other cavities may be used to start a nest in sound wood. When inspecting structures for these ants, look for shredded wood fragments, bits of soil and sand, portions of insects, dead ants, and other debris around windows, cracks and crevices.

6.18.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

#### 6.18.4. IPM Strategy and Methods.

6.18.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.18.4.2. Techniques: The non-chemical control methods are listed below and Pest Management will educate the FM's as needed on these control methods.

6.18.4.2.1. Destruction or environmental modification of habitat to ensure pests can no longer survive. An example of modification of habitat is to seal entry points.

6.18.4.2.2. Prevention or exclusion of pests through the use of glue traps, screens, barriers, and other mechanical devices or construction practices.

6.18.4.2.3. Introduction of nematodes, viruses or in some cases their by-products to control pests.

6.18.4.2.4. Elimination of inadequate ventilation in attics and crawl spaces.

6.18.4.2.5. Elimination of earth-to-wood contact along porches, decks or fence lines.

6.18.4.2.6. Repair structural defects to eaves waterlogged by leaky, clogged or overflowing gutters.

6.18.4.2.7. Inspect and correct defects in spaces around washing machines or sinks with leaky pipes.

6.18.4.3. Chemical Control Methods: Baits that contain boric acid or hydramethylnon are used mainly for ant control. Use residual sprays of Imidacloprid,

cyfluthrin, chlorfenapyr and fipronil, one of the carbamates (synthetic organix insecticide i.e. naturally man-made insecticide), or one of the microencapsulated insecticides. All cracks and crevices on the inside must be treated, and all galleries must be located and treated. Outside spray should consist of a barrier treatment six feet up the building and 15 feet away from the building.

- 6.18.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.
- 6.18.6. Sensitive areas.
  - 6.18.6.1. Avoided by either non-chemical or chemical controls: None.
  - 6.18.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.
- 6.18.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.
- 6.18.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.
- 6.19. Stored Products Pests: Various Moths, Beetles and Others.
  - 6.19.1. Species: SAFB has many different stored product pests. Seven are a consistent problem and they are the Angoumois grain moth, cadelle, confused flour beetle, drugstore beetle, Indian meal moth, rice weevil, and the saw-toothed grain beetle. Pest control of stored product pests shall include Commissary and BX warehouses.
  - 6.19.2. Target life stage or stages: Adult.
  - 6.19.3. Ongoing Monitoring Plan.
    - 6.19.3.1. Responsible organization or official: Public Health Office, Pest Control Applicator (82 CES/SP).
    - 6.19.3.2. Techniques and procedures: Survey all areas in and around the contaminated area to include the contaminated source. Identify pests present and conditions that are conducive to future infestations.
    - 6.19.3.3. Threshold for management and/or control: One complaint, inspection driven detection.
  - 6.19.4. IPM Strategy and Methods.
    - 6.19.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.19.4.2. Techniques: Good housekeeping is the key to control and Pest Management will educate the FM's as needed on these control techniques. The facility must be constantly monitored so that defects, such as holes and cracks on walls, are sealed to prevent pest entry or pest harborage. Doors and windows must be checked to ensure they remain pest-proof. Any conditions favoring pest infestations must be brought to the attention of the facility management for correction. Other pest management measures include physical exclusion devices, irradiation, controlled temperatures, modified atmospheres and pheromones. Finally, locate the source of contamination and remove the source.

6.19.4.3. Sites/locations to receive non-chemical control: Commissary, Base Exchange.

6.19.4.4. Chemical Control Methods: The use of pesticides in and around food-serving establishments is restricted as a result of the 1972 amendment of Federal Insecticide, Fungicide, Rodenticide Act (FIFRA). Use an approved crack and crevice treatment to include sprays, dust or baits. The use of any airborne insecticide for interior application is not recommended for use at this base.

6.19.5. Education necessary to support IPM Strategy: Texas Department of Agriculture Structural Pest Control Applicator Certification.

6.19.6. Sensitive areas.

6.19.6.1. Avoided by either non-chemical or chemical controls: None.

6.19.6.2. Treated with caution: Food services, medical facilities, child development center and teen center food preparation area.

6.19.7. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.19.8. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.20. Vertebrate Pests: General, Urban Wildlife.

6.20.1. Species: At SAFB urban wildlife typically consists of 50 (+-) species of reptiles and amphibians, over 80 species of birds and over 30 species of mammals. The most common pests are the gopher, fox squirrel, skunks, field mice and rats, snakes, coyotes, raccoons, foxes and bobcats. Sighting an animal does not constitute a problem. In order for wildlife to be determined a problem they must be causing actual discomfort, property damage or a threat to safety. Wildlife surveillance and control methods are managed through the Integrated Natural Resource Management Plan (INRMP). The following are general guidelines from the INRMP.

6.20.2. Target life stage or stages: Adult.

### 6.20.3. Ongoing Monitoring Plan.

6.20.3.1. Responsible organization or official: Pest Control (82 CES/SP), Natural Resources Program Manager (82 CES/SP).

6.20.3.2. Techniques and procedures: The Natural Resource Manager will determine the location and degree of problems caused by wildlife, and will coordinate surveillance methods with pest management staff. Signs of wildlife presence include trails, damage to vegetation (bark and leaves), tracks and occasionally damage to property.

6.20.3.3. Threshold for management and/or control: One complaint, inspection driven detection.

### 6.20.4. IPM Strategy and Methods.

6.20.4.1. Responsible organization or official: Pest Management (82 CES/SP), Natural Resources Program Manager (82 CES/SP).

6.20.4.2. Techniques: General cleanliness is vital and Pest Management will educate the FM's as needed on these techniques. Sanitation can involve the removal of potential sheltered areas, food and water supply. Use of live traps for capturing and relocating is highly encouraged. In the event of diseases such as rabies, the individual animals showing disease characteristics will be destroyed.

6.20.4.3. Chemical Control Methods: There are presently no approved chemical controls for wildlife on base, except as specifically noted below. Contact the PMC for chemical controls under emergency conditions, and contact the Environmental Engineering Flight for completion of environmental analysis documentation, except for control methods specifically noted in this plan.

6.20.5. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

### 6.21. Vertebrate Pests: Bats.

6.21.1. Species: Mexican free-tailed, red, big, brown, silver-haired and hoary bats have been identified on this installation. Bats are generally a beneficial species and should be protected if at all possible. Health issues related to bats include rabies and histoplasmosis (tissue changes that are characteristic of a disease).

6.21.2. Target life stage or stages: Adult.

#### 6.21.3. Ongoing Monitoring Plan.

6.21.3.1. Responsible organization or official: Pest Control (82 CES/SP), Natural

Resources Program Manager (82 CES/SP).

6.21.3.2. Techniques and procedures: Conduct two inspections; one inspection at dusk when the bats emerge from the building, and the second during the day. While conducting the survey, the following factors need to be determined: All possible points of entry, structural deficiencies of the building which contribute to the infestation, bat roosting site inside the structure and size of the infestation colony.

6.21.3.3. Threshold for management and/or control: One complaint, inspection driven detection.

6.21.4. IPM Strategy and Methods.

6.21.4.1. Responsible organization or official: Pest Management (82 CES/SP), Natural Resources Program Manager (82 CES/SP).

6.21.4.2. Techniques: The best method to control a colony of bats is exclusion. All openings 3/8 inch and larger must be sealed.

6.21.5. Chemical Control Methods: None.

6.21.6. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.22. Vertebrate Pests: Bird Pests.

6.22.1. Refer to the SAFB Bird Aircraft Strike Hazard (BASH) Plan.

6.23. Vertebrate Pests: Mice.

6.23.1. Species: These rodents have been known to carry rickettsial pox (rickets), Salmonellosis (acute food poisoning), rat-bite fever, lymphocytic choriomeningitis (an acute viral disease characterized by fever, nausea, vomiting, headache, stiff neck and slow pulse), hantavirus disease and several other diseases. Prior to inspection you should be able to identify this rodent. Mice have large ears, a semi-naked tale as long as the head and body together, small eyes and usually dark gray fur on the back and light gray fur on the belly. Know the general biology, reproduction and behavior of the mouse.

6.23.2. Target life stage or stages: Adult.

6.23.3. Ongoing Monitoring Plan.

6.23.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.23.3.2. Techniques and procedures: An effective rodent control begins with good inspections. Look for feces, tracks, gnawing damage, burrows, runways, grease marks, urine stains, live or dead rodents, rodent sounds and rodent odors.

6.23.3.3. Threshold for management and/or control: One complaint, inspection driven detection.

6.23.4. IPM Strategy and Methods.

6.23.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.23.4.2. Techniques: The removal or reduction of food, shelter, and water by sanitation practices will have tremendous impact in reducing the house mice population, and Pest Management will educate individuals with infestations on these control methods. Control mice by making it impossible for them to find any entrances into structures by sealing openings of 1/4 inch or more. Reduce the population by using snap traps, automatic catch traps and glue boards.

6.23.5. Chemical Control Methods: You must know all about the baiting techniques of mice, safety considerations for rodent control programs, control of the rodent ectoparasites (similar to fleas/ticks on dogs or cats) left behind, and how to handle the dead rodents and odors left behind. There are two rodenticides that can be used:

6.23.5.1. Anticoagulants (hinders clotting of blood) consisting of bromadiolone.

6.23.5.2. Non-anticoagulants (do not affect clotting of blood) consisting of bromethalin and zinc phosphide. Use poison tracking powders that contain anticoagulant and/or non-anticoagulant formulations.

6.23.6. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.24. Vertebrate Pests: Rats.

6.24.1. Species: Norway and roof rats can carry the plague, murine typhus, salmonellosis, rat-bite fever, leptospirosis, trichinosis, typhus and dysentery.

6.24.2. Target life stage or stages: All.

6.24.3. Ongoing Monitoring Plan.

6.24.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.24.3.2. Techniques and procedures: The Norway rat is a ground dwelling animal so the initial survey should start from ground level and work upwards. The roof rat is primarily a rat found on the roof so the initial survey should start on the roof and work downwards. For rodent inspections see Mice in Section 6.23.

6.24.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.24.4. IPM Strategy and Methods.

6.24.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.24.4.2. Techniques: As with all rodent control methods sanitation is the key to control and Pest Management will educate the public on these control methods. Buildings must be kept clean, litter free, food free, moisture free and rodent proof by closing all openings larger than 1/2 inch. The use of snap traps, glue boards or multi-catch traps is ideal for population reduction.

6.24.5. Chemical Control Methods: See Mice in Section 6.23 for basic controls.

6.24.6. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.25. Vertebrate Pests: Rattlesnakes.

6.25.1. Species: Rattlesnakes are the only health related snakes normally found at SAFB. These snakes can be recognized by their prominent triangular head, prominent pit between eye and nostril and elliptical pupil. Non-poisonous snakes have narrower heads, lack a pit between eye and nostril and have round pupils. Venom can cause tissues damage along with internal bleeding and pain.

6.25.2. Target life stage or stages: Adult.

6.25.3. Ongoing Monitoring Plan.

6.25.3.1. Responsible organization or official: Pest Control (82 CES/SP).

6.25.3.2. Techniques and procedures: Inspect all suspected harboring areas such as wood piles, rock piles, heavy vegetation, and moisture retaining areas.

6.25.3.3. Threshold for management and/or control: One complaint, demand driven inspection.

6.25.4. IPM Strategy and Methods.

6.25.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.25.4.2. Techniques: Pest Management will educate the FM's as needed. Removal of all suspected harboring areas, close mowing of grass and other surrounding vegetation and a good rodent control program are necessary to control rattlesnakes.

6.25.5. Chemical Control Methods: There are currently no approved methods of chemical control.



6.25.6. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

## 6.26. Weed Control.

6.26.1. Species: Plants that are out-of-place and generally considered unplanned and/or unwanted are defined as weeds for purposes of this plan. For example, Bermuda grass in lawn areas is acceptable, but would be considered a weed in a flower or planting bed. Weeds most commonly problematic on base include Johnson grass, sunflowers, dandelions, out-of-place Bermuda grass or buffalo grass, and other commonly found plains flora. Another example of weeds would be the antelope horn milkweed. It is considered a weed throughout most of farming and ranching country in Texas. However, since it is the preferred habitat of the monarch butterfly, it is not generally considered a weed on this base, except if it is out-of-place. All chemicals will be approved through the Pest Management Shop and PMC.

6.26.2. Target life stage or stages: All stages.

### 6.26.3. Ongoing Monitoring Plan.

6.26.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.26.3.2. Techniques and procedures: Visually inspect all utility substations, runways, streets, parking lots and utility right-of-ways, from early spring to late fall.

6.26.3.3. Locations: All base airfield pavements and grounds.

6.26.3.4. Threshold for management and/or control: One complaint, demand driven inspection.

### 6.26.4. IPM Strategy and Methods.

6.26.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.26.4.2. Techniques: Pest Management will educate the FM's as needed on the following control methods. Plowing, mowing and weed eating can be used in some areas for a temporary solution. Other mitigating practices include irrigation and aeration practices, hand-pull weeds, replace turf with other ground cover, (e.g., native vegetation, mulch, rock) and timed mowing schedules to reduce and prevent weed seed heading.

6.26.4.3. Sites/locations to receive non-chemical control: Sheppard AFB, Rec Annex's.

6.26.4.4. Chemical Control Methods: hyvar, "Oust", "Round Up" or other products containing glyphosate are used for eradication. Soil sterilants should not be used for control of crackgrass. NOTE: Currently some herbicide operations on sidewalks and

curbs are contracted to the Grounds Maintenance Contract on this base. Chemical mixtures will be at a percentage that is consistent with the label. The use of selective herbicides such as Tri-Mec (2-4D or Broadleaf) will maintain any unwanted growth in lawn areas that are adequately watered (sprinkler system). Chemicals should be applied sparingly.

6.26.4.5. Avoided by either non-chemical or chemical controls: Sheppard wetlands. See Attachment 4.

6.26.4.6. Treated with caution: Airfield fence lines around wetlands areas. See Attachment 5.

6.26.5. Manpower requirement for IPM Strategy:

6.27. Pests of Ornamental Turf.

6.27.1. Species: Bagworms, webworms, beetles, red spider mites, lacewings, diptera, dothistroma, anthracnose, scale and aphids are all tree and shrub invaders on this base.

6.27.2. Target life stage or stages: Adult.

6.27.3. Ongoing Monitoring Plan.

6.27.3.1. Responsible organization or official: Pest Control Applicator (82 CES/SP).

6.27.3.2. Techniques and procedures: Visual inspections and facility manager request.

6.27.3.3. Locations: Sheppard AFB, Sheppard Recreation annex.

6.27.3.4. Threshold for management and/or control: One complaint, demand driven inspection.

6.27.4. IPM Strategy and Methods.

6.27.4.1. Responsible organization or official: Pest Management (82 CES/SP).

6.27.4.2. Techniques: Pest Management will educate individuals with complaints on the following control methods. Cut infested limbs of trees or shrubs and remove from area; physically remove insects with soap and water solution.

6.27.4.3. Sites/locations to receive non-chemical control: Sheppard AFB and Rec annex's.

6.27.4.4. Chemical Control Methods: Residual treatments of sevin and Tempo.

6.27.4.5. Avoided by either non-chemical or chemical controls: None.

6.27.4.6. Treated with caution: None.

6.27.5. Special health and safety measures required: Per pesticide label directions. See Attachment 5.

6.27.6. Manpower requirement for IPM Strategy: 200 hours annually, at a minimum.

6.28. Golf Course Pests: See attached plan.

## 7. Administration.

7.1. Work Orders: The 82 CES/SP Entomology Shop identifies inspections in base dining facilities, including kitchen areas of the Child Development Center and Youth Center. Periodic inspections are conducted at the Commissary, Base Exchange, Bowling Center Snack Bar, Sheppard Club and outside areas of the Child Development Center and Youth Center. Termite inspections are performed on all permanent buildings every two years. There is no written protocol for accepting requests for pest management work. All entomology work orders and job orders are screened by the Entomology Lead and scheduled to be accomplished.

7.2. Contracts: Work beyond the capability of shop expertise, manpower, or equipment can be contracted. A Statement of Work is prepared and coordinated through HQ AETC/A7CA or approval prior to any contracting action. Work under contract is scheduled through the Entomology Lead. The contractor's work is monitored by the Entomology Lead serving as a QAP. Pesticides applied by the contractor are reported to the Entomology Shop and recorded in the Integrated Pest Management Information System (IPMIS) program.

7.2.1. Inter-Service Support Agreements: N/A.

7.2.2. Out leases: N/A.

## 7.3. Resources.

7.3.1. Funding: The budget for entomology is included in the general civil engineer budget. Spending is tracked in PEC 85734 using shop code 444RZ and organizational code 900.

7.3.2. Staffing: All base entomology and grounds personnel who apply pesticides on base property are required to be state certified applicators. All applicators, technicians, and contractor personnel are listed in the certification module of the IPMIS program. Regular recertification is required and scheduled by the Entomology Shop Lead. Outside contractor personnel who apply pesticides must provide a current state certification and/or license to the Contracting Officer and IPM coordinator.

7.3.3. Materials: See Pesticide Materials.

7.3.4. Facilities: The Entomology Shop, building 2119, was an open bay metal facility also constructed of concrete blocks with a concrete floor. The shop is in compliance with OSHA, AFOSH, and other regulations for facility adequacy. Small amounts of herbicides and insecticides are stored in facility in accordance with OSHA and military codes with no contingency storage.

8. Records and Reports: Records for all pest management actions and chemical quantities are currently maintained in the IPMIS program. Quarterly and special reports are generated from data in the program. The Monthly Active Ingredient Report is provided to Headquarters AETC/A7CA by the end of the first week of the following month. Copies of Safety Data Sheets (SDS) and pesticide labels for each chemical are maintained in the Entomology Shop. The Environmental Branch, Safety Office, Hazardous Materials Pharmacy, and Fire Department also maintain copies of all MSDS/SDS sheets. The QMIS database includes a comprehensive SDS database organized by location and authorized user.

8.1. Training Plans: The Entomology Shop is composed of trained professionals certified by the states of Texas and Oklahoma. In addition, they are involved in the states of Texas and Oklahoma sponsored professional continuing education program.

8.2. Coordination with Food Service Managers, Maintenance Personnel, etc.: The Entomology notifies Public Health and Bioenvironmental before applying pesticides in food preparation and consumption facilities, medical facilities and Child Development Centers. Entomology does not do any fumigation work.

8.3. Termite Inspection Plan: Termite inspections are performed on all permanent buildings every two years. Sheppard AFB does not have a wooden pole inventory and inspection program. Specifications for wood products that contact the ground include treatment standards for termites and soil fungi resistance.

## 9. Health and Safety Measures.

9.1. Requirements: All Entomology and Grounds personnel certified to apply pesticides participate in the medical surveillance program. The program is monitored by the Safety Specialist and administered through Human Resources. A local civilian physician provides the testing. Results are maintained in the individual's personnel record.

### 9.2. Methods to Reduce Potential Hazards.

9.2.1. Pest Management Personnel: The Entomology shop is responsible for providing required personal protective equipment and a safe working environment including laundering facilities, emergency showers and eye washes, a shower room and changing area with lockers, adequate warning signs, and equipment repair. Emergency treatment and antidotes for pesticide poisoning are available at the emergency treatment room at a local hospital. Safety regulations are strictly enforced. Sheppard AFB Grounds

contractors must follow required state laws.

9.2.2. Installation Personnel: The Entomology Shop uses pesticides that contain lower quantities of active ingredients but maintain the same level of effectiveness as other pesticides. Not only does this action increase worker and installation personnel safety, but also is a step towards meeting the goal of an overall reduction in quantities of active ingredients used at Air Force installations.

9.2.3. Public: The base EESOH-MIS includes the list of pesticides maintained in building 2119. The fire plan for the facility takes chemical storage into consideration. In addition, this facility, the entomology truck and other vehicles (i.e. Gators) have spill containment kits.

9.3. Safety and Health Measures associated with the Pest Management/Control Shop: The Entomology Shop is surveyed for compliance with OSHA standards and directives covering illumination, ventilation, chemical use/storage, waste disposal, personal protective equipment, and hazardous noise. The Safety Specialist maintains copies of these surveys and inspections.

9.4. Safety and Health Measures associated with Pest Management Vehicles: All vehicles, including nurse tanks and self-propelled ground applicators, are identified by "contaminated with pesticides" decals. Every container used to dispense (apply) pesticide (except bait boxes used for rodent control) is accompanied by a copy of a readable label for the pesticide within the container. The label is either attached to the container or present on or in the vehicle used to transport the container.

10. Public Laws and Regulations: The Texas Department of Agriculture and Oklahoma Department of Agriculture has developed and administers the Texas and Oklahoma Pesticide Applicators Law Rules and Regulations under Title 2, Oklahoma Statutes. A copy of the Texas and Oklahoma Pesticide Applicators Law Rules and Regulations is available at the Entomology Shop.

11. Coordination with other organizations and agencies: The Entomology Shop coordinates with local, state, and federal agencies when the need arises.

12. Measures for compliance with memorandum of understanding with State Pesticide Regulatory Office(s): Not applicable to Sheppard AFB.

13. Pest Management Operations with Special Environmental Considerations.

13.1. Operations using restricted use pesticides: Restricted use gopher bait is used sparingly in below soil surface applications on the controlled areas of the airfield at labeled application rates.

13.2. Operations with potential to contaminate surface or ground water: wetlands.

- 13.3. Operations more than 640 acres: The only operation more than 640 acres on Sheppard AFB and Frederick airfield is vegetation management in support of the BASH program.
- 13.4. Operations in areas with endangered or protected species: Horned lizard.
- 13.5. Operations involving aerial application: Not applicable to Sheppard AFB.
- 13.6. Operations involving designated noxious weeds: The Oklahoma Noxious Weed Law designates three plants as noxious weeds; Musk Thistle, Scotch Thistle, and Canada Thistle. Entomology personnel inspect the type of thistle infestation, assess the nature and extent of the thistle infestation, and determine the most appropriate treatment, control or eradication method for the type of thistle and location. Texas state law describes any problem plant as a noxious weed, and control measures are to be determined by the applicator.
- 13.7. Operations involving experimental-use permits: Not applicable to Sheppard AFB.
- 13.8. Operations involving environmentally sensitive areas: Sensitive areas where pesticide application could have adverse environmental impact include any area where pesticides are considered for application. On Sheppard AFB there is one wetland area (located north of the skeet range), three golf course ponds (See Appendix 4). Any area where threatened or endangered species occur is also considered sensitive. Sheppard Recreation Annex is near a lake to the north of facilities. No aerial pesticide applications are anticipated. Pesticide application in sensitive areas will have appropriate controls for pesticide drift including inspection of sensitive areas and determination of the speed and direction of the wind.
14. Other Pest Management Plan Issues.
- 14.1. Applicable Pollution Control Projects: None.
- 14.2. Applicable Pollution Abatement Procedures: No pesticide waste is generated. Contaminated pesticides are disposed of in accordance with the base Hazardous Waste Management Plan. There is no surplus of chemicals. The amount required for the job is calculated to include rinsate. All of the chemicals are mixed and used at the job site.
- 14.3. Pesticides Sold in Commissary and Exchange: Not applicable to Sheppard AFB.
15. Pest Management Plan for Services Provided to Other Activities or Installations.
- 15.1. On Installation: Not applicable to Sheppard AFB.
- 15.2. Off Installation: Not applicable to Sheppard AFB.



ATTACHMENT 1 TO APPENDIX I: ACKNOWLEDGEMENT OF UNDERSTANDING

1. I have read and understand the instructions for performing self-help pest control and the pesticide label(s). I will follow the label instructions and all other instructions given me. If I do not understand the instructions, I will have a qualified person explain them to me before continuing. I understand that any pesticide application not in accordance with the label is a violation of the Federal Insecticide, Fungicide, and Rodenticide Act.
2. I will make sure that infants and individuals who may be sensitive or allergic to the pesticides are not present during any applications, nor are they allowed back into the treated area before thorough post-treatment ventilation.
3. I will perform the control procedures myself.
4. I have received the following self-help pest control items. I will not return any of these items nor use any of these products in a manner inconsistent with the label.
  - a. Set of instructions and pesticide labels.
  - b. Cockroach bait stations.
  - c. Max Force ant bait stations.
  - d. Rodent glue traps.
  - e. Wasp freeze/wasp stopper aerosol.
  - f. Sticky cockroach traps.
  - g. Mouse traps; spring type.

(Entomology Shop personnel cross out all items not issued.)

**NAME (Print):** \_\_\_\_\_

**SIGNATURE:** \_\_\_\_\_

**ADDRESS OR  
BUILDING NUMBER:** \_\_\_\_\_

**DATE:** \_\_\_\_\_



## ATTACHMENT 2 TO APPENDIX 1: PESTICIDE/HERBICIDE LIST

Table I-1

Pesticide List

Pesticide	MSN	Usage and Application Sites
WASP FREEZE	6840004592443-1	Wasps, hornets and bees.
TEMPO SC ULTRA	6840013137359	Wasps, hornets and bees.
DUPONT OUST XP HERBICIDE	6840013568891	Herbicide.
SUMMIT B.T.I. BRIQUETS	6840013777049	Mosquitoes.
AMDRO FIRE ANT BAIT	6840PHM00002971	Fire Ants.
SUMMIT B.T.I. BRIQUES	6840PHM00003393	Mosquitoes.
DUPONT HYVAR XL	6840PHM00008012	Herbicide.
ROUNDUP PROMAX	6840PHM00027945	Herbicide.
PLATEAU	6840PHM00029753	Herbicide.
MOSQUITO DUNKS	6840PHM00031103	Mosquitoes.
AVERT GEL BAIT	6840PHM0036396	Cockroaches.
MAXFORCE ANT BAIT	6840PHM00056789	Ants.
WEEDAR 64	6840PHM00024449	Herbicide.
OPTIGARD GEL BAIT	6840PHM00059295	Ants.
PROVOKE	6840PHM00068864	Rodents.
DUPONT ADVION	6840PHM00030816	Cockroaches.
LIQUI-TOX II	6840PHM00068875	Rodents.
FLY TERMINATOR	6840PHM00071232	Flies.

REJEX-IT	6840PHM00073684	Birds.
ONSLAUGHT FASTCAP	6840PHM00093591	Spiders and scorpions.
PROVOKE	6840PHM00068958	Rodents.
TRAPPER	6840PHM00070941	Rodents.
DELTA DUST	6840014313345	Cockroaches, wasps, bees and flies.
PHANTOM	6840015257139	Cockroaches, wasps, bees, crickets, grasshoppers and termites.
PERMADUST	6840PHM00003430	Cockroaches.
CY KICK	6840PHM00003439	Cockroaches, ants, spiders.
ZP TRACKING POWDER	6840PHM00004631	Rodents.
565 PLUS XLO	6840PHM00004957	Flies, gnats, cockroaches.
NIBAN	6840PHM00004958	Crickets, ants (not fire ants), grasshoppers, cockroaches.
QUALI-PRO ORYZALIN	6840PHM00010580	Herbicide.
BANVEL	6840PHM00014551	Herbicide.
GENTROL	6840PHM00024100	Cockroaches, sewer flies, gnats and larvae.
CONTRAC	6840PHM00030819	Rodents.
DEMAND CS	6840PHM00034920	Wasps, cockroaches, crickets, spiders, beetles, scorpions, fleas, ticks, moths and flies.
ZOECON GENTROL IGR	6840PHM00041585	Cockroaches, flies and larvae growth inhibitor.
TEMPRID SC	6840PHM00043882	Ants, cockroaches, wasps, bed bugs, spiders, crickets and grasshoppers.
AQUA RESLIN	6840PHM00053261	Mosquitoes.
RESOLUTE 65WG	6840PHM00055549	Herbicide.
TENGARD SFR	6840PHM00068870	Crickets, ants, spiders, cockroaches, fleas, ticks, wasps and bees.

TERMIDOR	6840PHM00068981	Termites, ants, wasps and cockroaches.
DEMAND G	6840PHM00072435	Cockroaches, beetles, crickets, scorpions, fleas and ticks.
FMC RESIDUAL FOGGER	6840PHM00094992	Fleas, spiders, cockroaches, flies and moths.

### ATTACHMENT 3 TO APPENDIX I: ANNEXES

**Installation Map:** Maps are kept current and available upon request through the 82d Civil Engineer Squadron.

**Pesticide inventory including pesticide name, manufacturer, unit of issue, concentration, quantity, NSN, etc.** is available upon request from the Entomology Shop Leadman.

**Pesticide Labels, Material Safety Data Sheets, and Consumer Protection Information Sheets for Preservative Treated Wood Products:** Pesticide labels and Material Safety Data Sheets are available upon request from the Entomology Shop Leadman. A complete listing of MSDS sheets is also located in Attachment 5.

**List of Safety Items and Personal Protective Equipment:** Directed by Pesticide Label.

**Spill Plan and Pesticide Cleanup Guidance:** Sheppard AFB Spill Prevention and Response Plan are available upon request from the Environmental Branch library. AFPMB TIM No. 15, *Pesticide Spill Prevention and Management*, June 1992, is available upon request from the Entomology Shop Leadman.

**Industrial Hygiene Surveys of Pest Management Shop:** AF Safety Specialist performs annual inspections for AF provided equipment and facility only IAW AFOSH Standards. The Contractor Safety Specialist performs Occupational Safety and Health Administration (OSHA) inspections of the Entomology Shop, administers the respiratory protection program, and coordinates any personnel monitoring as required. Surveys are maintained by both AF and Contractor Safety Specialist.

ATTACHMENT 4 TO APPENDIX E: OUTFALL AND WETLAND LOCATIONS



ATTACHMENT 5 TO APPENDIX I: SDS SHEETS

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G. COMPREHENSIVE SPECIES LIST

This section of the appendix lists fish and wildlife species indigenous to, or whose native range includes, Sheppard AFB and SRA, including mammals, birds, reptiles, amphibians, and fishes. The TPWD and observations by the NRM and Entomology personnel compiled species lists.

Common Name	Scientific Name
<b>Mammals</b>	
Opossum	<i>Didelphis virginia</i>
Least shrew	<i>Cryptotis parvus</i>
Gray shrew	<i>Notiosorex crawfordi</i>
Short-tailed shrew	<i>Blarina brevicauda</i>
Eastern mole	<i>Scalopus aquaticus</i>
Big brown bat	<i>Eptesicus fuscus</i>
Hoary bat	<i>Aeorestes cinereus</i>
Little brown myotis	<i>Myotis lucifugus</i>
Cave myotis	<i>Myotis velifer</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Tri-colored bat	<i>Perimyotis subflavus</i>
Red bat	<i>Lasiurus borealis</i>
Evening bat	<i>Nycticeius humeralis</i>
Mexican free-tailed bat	<i>Tadarida brasiliensis</i>
Nine-banded armadillo	<i>Dasyurus novemcinctus</i>
Black-tailed jackrabbit	<i>Lepus californicus</i>
Desert cottontail	<i>Sylvilagus audubonii</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Swamp rabbit	<i>Sylvilagus aquaticus</i>
Thirteen-lined ground squirrel	<i>Ictidomys tridecemlineatus</i>
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>
Fox squirrel	<i>Sciurus niger</i>
Gray squirrel	<i>Sciurus carolinensis</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Plains pocket gopher	<i>Geomys bursarius</i>
Hispid pocket mouse	<i>Chaetodipus hispidus</i>
Merriam's pocket mouse	<i>Perognathus merriami</i>
Texas kangaroo rat	<i>Dipodomys elator</i>
Beaver	<i>Castor canadensis</i>
Southern plains woodrat	<i>Neotomamicropus</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern grasshopper mouse	<i>Onychomys leucogaster</i>



Common Name	Scientific Name
Deer mouse	<i>Peromyscus maniculatus</i>
White-footed mouse	<i>Peromyscus leucopus</i>
Plains harvest mouse	<i>Reithrodontomys montanus</i>
Hispid cotton rat	<i>Sigmodon hispidus</i>
Fulvous harvest mouse	<i>Reithrodontomys fulvescens</i>
Pygmy mouse	<i>Baiomys taylori</i>
Eastern woodrat	<i>Neotoma floridana</i>
Pine vole	<i>Microtus pinetorum</i>
Texas mouse	<i>Peromyscus atwateri</i>
Norway rat	<i>Rattus norvegicus</i>
House mouse	<i>Mus musculus</i>
Black rat	<i>Rattus rattus</i>
Coyote	<i>Canis latrans</i>
Black bear	<i>Ursus americanus</i>
Striped skunk	<i>Mephitis mephitis</i>
Long-tailed weasel	<i>Neogale frenata</i>
Eastern spotted skunk	<i>Spilogale putorius</i>
Badger	<i>Taxidea taxus</i>
Bobcat	<i>Lynx rufus</i>
White-tailed deer	<i>Odocoileus virginianus</i>
Porcupine	<i>Erethizon dorsatum</i>
<b>Birds</b>	
Eared grebe	<i>Podiceps nigricollis</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Horned grebe	<i>Podiceps auritus</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Brown pelican	<i>Pelecanus occidentalis</i>
Double-crested cormorant	<i>Nannopterum auritum</i>
Common loon	<i>Gavia immer</i>
Wood stork	<i>Mycteria americana</i>
Great blue heron	<i>Ardea herodias</i>
American bittern	<i>Botaurus lentiginosus</i>
Cattle egret	<i>Bubulcus ibis</i>
Green heron	<i>Butorides virescens</i>
Great egret	<i>Ardea alba</i>
Little blue heron	<i>Egretta caerulea</i>
Snowy egret	<i>Egretta thula</i>
Least bittern	<i>Ixobrychus exilis</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>
Yellow-crowned night heron	<i>Nyctanassa violacea</i>
Greater white-fronted goose	<i>Anser albifrons</i>

Common Name	Scientific Name
Canada goose	<i>Branta canadensis</i>
Snow goose	<i>Anser caerulescens</i>
Northern shoveler	<i>Spatula clypeata</i>
Wood duck	<i>Aix sponsa</i>
Cinnamon teal	<i>Spatula cyanoptera</i>
Blue-winged teal	<i>Spatula discors</i>
Mallard	<i>Anas platyrhynchos</i>
Northern pintail	<i>Anas acuta</i>
Green-winged teal	<i>Anas crecca</i>
Ring-necked duck	<i>Aythya collaris</i>
Canvasback	<i>Aythya valisineria</i>
Bufflehead	<i>Bucephala albeola</i>
Redhead	<i>Aythya americana</i>
Lesser scaup	<i>Aythya affinis</i>
Gadwall	<i>Mareca strepera</i>
Greater scaup	<i>Aythya marila</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Common merganser	<i>Mergus merganser</i>
Red-breasted merganser	<i>Mergus serrator</i>
American wigeon	<i>Mareca americana</i>
Turkey vulture	<i>Cathartes aura</i>
Black vulture	<i>Coragyps atratus</i>
Osprey	<i>Pandion haliaetus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Northern harrier	<i>Circus hudsonius</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Mississippi kite	<i>Ictinia mississippiensis</i>
Golden eagle**	<i>Aquila chrysaetos</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Ferruginous hawk	<i>Buteo regalis</i>
American kestrel	<i>Falco sparverius</i>
Prairie falcon	<i>Falco mexicanus</i>
Peregrine falcon	<i>Falco peregrinus</i>

Common Name	Scientific Name
Merlin	<i>Falco columbarius</i>
Wild turkey	<i>Meleagris gallopavo</i>
Northern bobwhite*	<i>Colinus virginianus</i>
Ring-necked pheasant	<i>Phasianus colchicus</i>
American coot	<i>Fulica americana</i>
Sora	<i>Porzana carolina</i>
Virginia rail	<i>Rallus limicola</i>
Whooping crane	<i>Grus americana</i>
Sandhill crane	<i>Antigone canadensis</i>
White-faced ibis	<i>Plegadis chichi</i>
Killdeer	<i>Charadrius vociferus</i>
Snowy plover**	<i>Charadrius nivosus</i>
Mountain plover*	<i>Charadrius montanus</i>
Black-bellied plover	<i>Pluvialis squatarola</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
Semipalmated plover	<i>Charadrius semipalmatus</i>
Piping plover	<i>Charadrius melodus</i>
American golden-plover	<i>Pluvialis dominica</i>
Spotted sandpiper	<i>Actitis macularius</i>
Upland sandpiper	<i>Bartramia longicauda</i>
Willet	<i>Tringa semipalmata</i>
Common snipe	<i>Gallinago gallinago</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Greater yellowlegs**	<i>Tringa melanoleuca</i>
Baird's sandpiper	<i>Calidris bairdii</i>
American avocet	<i>Recurvirostra americana</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
American woodcock	<i>Scolopax minor</i>
Long-billed curlew**	<i>Numenius americanus</i>
Solitary sandpiper	<i>Tringa solitaria</i>
Pectoral sandpiper	<i>Calidris melanotos</i>
White-rumped sandpiper	<i>Calidris fuscicollis</i>
Short-billed dowitcher	<i>Limnodromus griseus</i>
Stilt sandpiper	<i>Calidris himantopus</i>
Semipalmated sandpiper	<i>Calidris pusilla</i>

Common Name	Scientific Name
Western sandpiper	<i>Calidris mauri</i>
Sanderling	<i>Calidris alba</i>
Least sandpiper	<i>Calidris minutilla</i>
Ring-billed gull	<i>Larus delawarensis</i>
Herring gull	<i>Larus argentatus</i>
Laughing gull	<i>Leucophaeus atricilla</i>
Franklin's gull	<i>Leucophaeus pipixcan</i>
Bonaparte's gull	<i>Chroicocephalus philadelphia</i>
Forster's tern	<i>Sterna forsteri</i>
Common tern	<i>Sterna hirundo</i>
Interior least tern	<i>Sternula antillarum athalassos</i>
Caspian tern	<i>Hydroprogne caspia</i>
Black tern	<i>Chlidonias niger</i>
Rock pigeon	<i>Columba livia</i>
Mourning dove	<i>Zenaida macroura</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Greater roadrunner	<i>Geococcyx californianus</i>
Barn owl	<i>Tyto alba</i>
Long-eared owl	<i>Asio otus</i>
Short-eared owl	<i>Asio flammeus</i>
Great horned owl	<i>Bubo virginianus</i>
Eastern screech-owl	<i>Megascops asio</i>
Barred owl	<i>Strix varia</i>
Western burrowing owl*	<i>Athene cunicularia hypugaea</i>
Common nighthawk	<i>Chordeiles minor</i>
Whip-poor-will	<i>Antrostomus vociferous</i>
Chuck-will's-widow	<i>Antrostomus carolinensis</i>
Belted kingfisher	<i>Megaceryle alcyon</i>
Chimney swift	<i>Chaetura pelagica</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Black-chinned hummingbird	<i>Archilochus alexandri</i>
Hairy woodpecker	<i>Dryobates villosus</i>
Downy woodpecker	<i>Dryobates pubescens</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Red-headed woodpecker**	<i>Melanerpes erythrocephalus</i>

Common Name	Scientific Name
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Ladder-backed woodpecker	<i>Dryobates scalaris</i>
Northern flicker	<i>Colaptes auratus</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Golden-fronted woodpecker	<i>Melanerpes aurifrons</i>
Great-crested flycatcher	<i>Myiarchus crinitus</i>
Eastern wood-pewee	<i>Contopus virens</i>
Scissor-tailed flycatcher	<i>Tyrannus forficatus</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Western kingbird	<i>Tyrannus verticalis</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>
Acadian flycatcher	<i>Empidonax virescens</i>
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>
Horned lark	<i>Eremophila alpestris</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Barn swallow	<i>Hirundo rustica</i>
Purple martin	<i>Progne subis</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Tree swallow	<i>Tachycineta bicolor</i>
Bank swallow	<i>Riparia riparia</i>
Blue jay	<i>Cyanocitta cristata</i>
American crow	<i>Corvus brachyrhynchos</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Carolina chickadee	<i>Parus carolinensis</i>
Black-crested titmouse	<i>Baeolophus atricristatus</i>
Verdin	<i>Auriparus flaviceps</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Brown creeper	<i>Certhia americana</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
House wren	<i>Troglodytes aedon</i>
Winter wren	<i>Troglodytes hiemalis</i>

Common Name	Scientific Name
Marsh wren	<i>Cistothorus platensis</i>
Rock wren	<i>Salpinctes obsoletus</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Ruby-crowned kinglet	<i>Corthylio calendula</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>
American pipit	<i>Anthus rubescens</i>
Sprague's pipit**	<i>Anthus spragueii</i>
Wood thrush**	<i>Hylocichla mustelina</i>
Eastern bluebird	<i>Sialia sialis</i>
American robin	<i>Turdus migratorius</i>
Hermit thrush	<i>Catharus guttatus</i>
Veery	<i>Catharus fuscescens</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Gray catbird	<i>Dumetella carolinensis</i>
Northern mockingbird	<i>Mimus polyglottos</i>
Brown thrasher	<i>Toxostoma rufum</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Loggerhead shrike**	<i>Lanius ludovicianus</i>
European starling	<i>Sturnus vulgaris</i>
Bell's vireo	<i>Vireo bellii</i>
Warbling vireo	<i>Vireo gilvus</i>
White-eyed vireo	<i>Vireo griseus</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Orange-crowned warbler	<i>Leiothlypis celata</i>
Black-and-white warbler	<i>Mniotilta varia</i>
Prothonotary warbler**	<i>Protonotaria citrea</i>
Worm-eating warbler	<i>Helmitheros vermivorum</i>
Tennessee warbler	<i>Leiothlypis peregrina</i>
Yellow-breasted chat	<i>Icteria virens</i>
Yellow warbler	<i>Setophaga petechia</i>

Common Name	Scientific Name
Northern parula	<i>Setophaga americana</i>
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>
Cerulean warbler*	<i>Setophaga cerulea</i>
Black-throated green warbler	<i>Setophaga virens</i>
American redstart	<i>Setophaga ruticilla</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Kentucky warbler**	<i>Geothlypis formosa</i>
Yellow-throated warbler	<i>Setophaga dominica</i>
Canada warbler**	<i>Cardellina canadensis</i>
Wilson's warbler	<i>Cardellina pusilla</i>
Northern cardinal	<i>Cardinalis cardinalis</i>
Blue grosbeak	<i>Passerina caerulea</i>
Dickcissel	<i>Spiza americana</i>
Painted bunting	<i>Passerina ciris</i>
Lazuli bunting	<i>Passerina amoena</i>
Lark bunting	<i>Calamospiza melanocorys</i>
Indigo bunting	<i>Passerina cyanea</i>
Pine siskin	<i>Spinus pinus</i>
Lark sparrow	<i>Chondestes grammacus</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
American tree sparrow	<i>Spizelloides arborea</i>
Chipping sparrow	<i>Spizella passerina</i>
Field sparrow	<i>Spizella pusilla</i>
Grasshopper sparrow**	<i>Ammodramus savaannarum</i>
Purple finch	<i>Haemorhous purpureus</i>
House finch	<i>Haemorhous mexicanus</i>
American goldfinch	<i>Spinus tristis</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Song sparrow	<i>Melospiza melodia</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
Baird's sparrow**	<i>Centronyx bairdii</i>

Common Name	Scientific Name
LeConte's sparrow	<i>Ammodramus leconteii</i>
Dark-eyed junco (slate-colored form)	<i>Junco hyemalis</i>
Clay-colored sparrow	<i>Spizella pallida</i>
Fox sparrow	<i>Passerella iliaca</i>
Harris's sparrow	<i>Zonotrichia querula</i>
Lapland longspur	<i>Calcarius lapponicus</i>
Chestnut-collared longspur**	<i>Calcarius ornatus</i>
<b>Reptiles</b>	
Coastal plain cooter	<i>Pseudemys concinna floridana</i>
Red-eared slider	<i>Trachemys scripta elegans</i>
Eastern box turtle	<i>Terrapene carolina</i>
Ornate box turtle	<i>Terrapene ornata</i>
River cooter	<i>Pseudemys concinna</i>
Chicken turtle	<i>Deirochelys reticularia</i>
Mississippi map turtle	<i>Graptemys pseudogeographica kohnii</i>
False map turtle	<i>Graptemys pseudogeographica</i>
Yellow mud turtle	<i>Kinosternon flavescens</i>
Eastern musk turtle	<i>Sternotherus odoratus</i>
Eastern mud turtle	<i>Kinosternon subrubum</i>
Razor-backed musk turtle	<i>Sternotherus carinatus</i>
Smooth softshell	<i>Apalone mutica</i>
Slender glass lizard	<i>Ophisaurus attenuatus</i>
Mediterranean gecko	<i>Hemidactylus turcicus</i>
Texas spiny lizard	<i>Sceloporus olivaceus</i>
Eastern collared lizard	<i>Crotaphytus collaris</i>
Common lesser earless lizard	<i>Holbrookia maculata</i>
Texas horned lizard	<i>Phrynosoma cornutum</i>
Eastern fence lizard	<i>Sceloporus undulatus</i>
Greater earless lizard	<i>Cophosaurus texanus</i>
Green anole	<i>Anolis carolinensis</i>
Common five-lined skink	<i>Plestiodon fasciatus</i>
Prairie skink	<i>Plestiodon septentrionalis</i>
Little brown skink	<i>Scincella lateralis</i>
Coal skink	<i>Plestiodon anthracinus</i>
Great plains skink	<i>Plestiodon obsoletus</i>
Broad-headed skink	<i>Plestiodon laticeps</i>
Six-lined racerunner	<i>Aspidoscelis sexlineata</i>
Texas spotted whiptail	<i>Aspidoscelis gularis gularis</i>
Red-striped ribbonsnake	<i>Thamnophis proximus rubrilineatus</i>
Lined snake	<i>Tropidoclonion lineatum</i>



Common Name	Scientific Name
Southern black racer	<i>Coluber constrictor priapus</i>
North American racer	<i>Coluber constrictor</i>
Ring-necked snake	<i>Diadophis punctatus</i>
Red cornsnake	<i>Pantherophis guttatus</i>
Western ratsnake	<i>Pantherophis obsoletus</i>
Plains hog-nosed snake	<i>Heterodon nasicus</i>
Eastern hog-nosed snake	<i>Heterodon platyrhinos</i>
Night snake	<i>Hypsiglena torquata</i>
Prairie kingsnake	<i>Lampropeltis calligaster</i>
Eastern kingsnake	<i>Lampropeltis getula</i>
Coachwhip	<i>Coluber flagellum</i>
Plain-bellied watersnake	<i>Nerodia erythrogaster</i>
Diamond-backed watersnake	<i>Nerodia rhombifer</i>
Rough greensnake	<i>Opheodrys aestivus</i>
Eastern pinesnake	<i>Pituophis melanoleucus</i>
Graham's crayfish snake	<i>Regina grahamii</i>
Long-nosed snake	<i>Rhinocheilus lecontei</i>
Western groundsnake	<i>Sonora semiannulata</i>
Flat-headed snake	<i>Tantilla gracilis</i>
Eastern milksnake	<i>Lampropeltis triangulum</i>
Southern watersnake	<i>Nerodia fasciata</i>
Brazos river watersnake	<i>Nerodia harteri</i>
Glossy crayfish snake	<i>Regina rigida</i>
Dekay's brownsnake	<i>Storeria dekayi</i>
Red-bellied snake	<i>Storeria occipitomaculata</i>
Plains black-headed snake	<i>Tantilla nigriceps</i>
Checkered gartersnake	<i>Thamnophis marcianus</i>
Western ribbonsnake	<i>Thamnophis proximus</i>
Eastern ribbonsnake	<i>Thamnophis saurita</i>
Common gartersnake	<i>Thamnophis sirtalis</i>
Lined snake	<i>Tropidoclonion lineatum</i>
Rough earthsnake	<i>Haldea striatula</i>
Smooth earthsnake	<i>Virginia valeriae</i>
Texas blind snake	<i>Rena dulcis</i>
Eastern copperhead	<i>Agkistrodon contortrix</i>
Northern cottonmouth	<i>Agkistrodon piscivorus</i>
Western diamond-backed rattlesnake	<i>Crotalus atrox</i>
Western rattlesnake	<i>Crotalus oreganus</i>
Pygmy rattlesnake	<i>Sistrurus miliarius</i>
Timber rattlesnake	<i>Crotalus horridus</i>
Western massasauga	<i>Sistrurus tergeminus</i>

Common Name	Scientific Name
<b>Amphibians</b>	
Dwarf American toad	<i>Anaxyrus americanus charlesmithi</i>
Great plains toad	<i>Anaxyrus cognatus</i>
Texas toad	<i>Anaxyrus speciosus</i>
Woodhouse's toad	<i>Anaxyrus woodhousii</i>
Chihuahuan green toad	<i>Anaxyrus debilis</i>
Couch's spadefoot	<i>Scaphiopus couchii</i>
Plains spadefoot	<i>Spea bombifrons</i>
Eastern spadefoot	<i>Scaphiopus holbrookii</i>
Green frog	<i>Lithobates clamitans</i>
Bullfrog	<i>Lithobates catesbeianus</i>
Northern leopard frog	<i>Lithobates pipiens</i>
Southern leopard frog	<i>Lithobates sphenoccephalus</i>
Plains leopard frog	<i>Lithobates blairi</i>
Southern crawfish frog	<i>Lithobates areolatus areolatus</i>
Eastern narrow-mouthed toad	<i>Gastrophryne carolinensis</i>
Western narrow-mouthed toad	<i>Gastrophryne olivacea</i>
Southern cricket frog	<i>Acris gryllus</i>
Spotted chorus frog	<i>Pseudacris clarkii</i>
Blanchard's cricket frog	<i>Acris blanchardi</i>
Cope's gray treefrog	<i>Hyla chrysoscelis</i>
Gray treefrog	<i>Hyla versicolor</i>
Green treefrog	<i>Hyla cinerea</i>
Streker's chorus frog	<i>Pseudacris strekeri</i>
Eastern cricket frog	<i>Acris crepitans</i>
Eastern tiger salamander	<i>Ambystoma tigrinum</i>
Eastern newt	<i>Notophthalmus viridescens</i>
Small-mouthed salamander	<i>Ambystoma texanum</i>
<b>Fish</b>	
Goldfish	<i>Carassius auratus</i>
Grass carp	<i>Ctenopharyngodon idella</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Central stoneroller	<i>Campostoma anomalum</i>
Suckermouth minnow	<i>Phenacobius mirabilis</i>
Silver chub	<i>Macrhybopsis storeiana</i>
Speckled chub	<i>Macrhybopsis aestivalis</i>
Mississippi silvery minnow	<i>Hybognathus nuchalis</i>
Plains minnow	<i>Hybognathus placitus</i>
Blacktail shiner	<i>Cyprinella venusta</i>
Red shiner	<i>Cyprinella lutrensis</i>

Common Name	Scientific Name
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Fathead minnow	<i>Pimephales promelas</i>
Bullhead minnow	<i>Pimephales vigilax</i>
Emerald shiner	<i>Notropis atherinoides</i>
Chub shiner	<i>Notropis potteri</i>
Red river shiner	<i>Notropis bairdi</i>
Sand shiner	<i>Notropis stramineus</i>
Ghost shiner	<i>Notropis buchanaui</i>
Mimic shiner	<i>Notropis volucellus</i>
Pallid shiner	<i>Hybopsis amnis</i>
White sucker	<i>Catostomus commersonii</i>
Smallmouth buffalo	<i>Ictiobus bubalus</i>
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>
River carpsucker	<i>Carpionodes carpio</i>
Spotted sucker	<i>Moxostoma melanops</i>
Blue catfish	<i>Ictalurus furcatus</i>
Channel catfish	<i>Ictalurus punctatus</i>
Flathead catfish	<i>Pylodictis olivaris</i>
Yellow bullhead	<i>Ameiurus natalis</i>
Black bullhead	<i>Ameiurus melas</i>
Tadpole madtom	<i>Noturus gyrinus</i>
White bass	<i>Morone chrysops</i>
Yellow bass	<i>Morone mississippiensis</i>
Green sunfish	<i>Lepomis cyanellus</i>
Bluegill	<i>Lepomis macrochirus</i>
Longear sunfish	<i>Lepomis megalotis</i>
Redear sunfish	<i>Lepomis microlophus</i>
Largemouth bass	<i>Micropterus salmoides</i>
White crappie	<i>Pomoxis annularis</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Spotted bass	<i>Micropterus punctulatus</i>
Warmouth	<i>Lepomis gulosus</i>
Spotted sunfish	<i>Lepomis punctatus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Orangespotted sunfish	<i>Lepomis humilis</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
Red river pupfish	<i>Cyprinodon rubrofluvialis</i>
Western mosquitofish	<i>Gambusia affinis</i>

Common Name	Scientific Name
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\* DoD Partners in Flight Mission-Sensitive Species.

\*\* DoD Partners in Flight Tier 2 Species.

\*\*\* Authorities used for species taxonomy and nomenclature

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## WICHITA COUNTY

## AMPHIBIANS

**Woodhouse's Toad** *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

## BIRDS

**Bald Eagle** *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

**Black Rail** *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

**Chestnut-collared Longspur** *Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

**Franklin's Gull** *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

**Interior Least Tern** *Sterna antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status:	State Status:	SGCN: N
Endemic: N	Global Rank: G4T3Q	State Rank: S1B

**Lark Bunting** *Calamospiza melanocorys*

Overall, it's a generalist in most short grassland settings including ones with some brushy component plus certain agricultural lands that include grain sorghum. Short grasses include sideoats and blue gramas, sand dropseed (*Sporobolus cryptandrus*), prairie junegrass (*Koeleria macrantha*), buffalograss (*Bouteloua dactyloides*) also with patches of bluestem and other mid-grass species. This bunting will frequent smaller patches of grasses or disturbed patches of grasses including rural yards. It also uses weedy fields surrounding playas. This species avoids urban areas and cotton fields.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

**Mountain Plover** *Charadrius montanus*

Breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

**Piping Plover** *Charadrius melodus*

Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

**Western Burrowing Owl** *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S2

**White-faced Ibis** *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S4B

**Whooping Crane** *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE State Status: E SGCN: Y  
Endemic: N Global Rank: G1 State Rank: S1S2N

**FISH**

**Chub Shiner** *Notropis potteri*

Brazos, Colorado, San Jacinto, and Trinity river basins. Flowing water with silt or sand substrate

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G4 State Rank: S2

**Goldeye** *Hiodon alosoides*

Restricted to the Red River basin; adults in quiet turbid water of medium to large lowland rivers, small lakes, marshes and muddy shallows connected to them.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S3

**Prairie Chub** *Macrhybopsis australis*

Upper Red River basin. Found in flowing water over coarse sand and fine gravel substrates in streams; may be found in intermittent streams and in saline waters.

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G3 State Rank: S1

**Red River Pupfish** *Cyprinodon rubrofluvialis*

Native to the upper Red River and Brazos River basins where it is typically found in saline waters of main channels and in saline springs. Introduced populations also exist in the Canadian River and Colorado River basins. River edges, channels, backwaters, over sand bottoms. Males establish spawning territories typically in shallowest waters up to 50 cm over sandy shoals and in small coves with little or no current.

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S2

**Red River Shiner** *Notropis bairdi*

Red River basin; typically found in turbid waters of broad, shallow channels of main stream, over bottom mostly of silt and shifting sand.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G4 State Rank: S3

**Silver Chub** *Macrhybopsis storeriana*

Red River and Brazos River basins. Mainly restricted to large, often silty rivers. Ranges over gravel to silt substrates but found more commonly over silt or mud bottom.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S3

## INSECTS

**American Bumblebee** *Bombus pennsylvanicus*

Habitat description is not available at this time.

Federal Status: State Status: SGCN: Y  
Endemic: Global Rank: G3G4 State Rank: SNR

**Swift Tiger Beetle** *Cicindela celeripes*

Although Pearson et al. (2006) mention "open forest paths", the word forest is probably being used loosely and probably refers to some sort of xeric, scrubby oak woodland. This tiger beetle is essentially a grassland dweller that inhabits both natural dry prairie and anthropogenic dry grassland. In any woodland context, presumably only open patches are used.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G2G4 State Rank: S2?

## MAMMALS

**Big Brown Bat** *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S5

**Black-tailed Prairie Dog** *Cynomys ludovicianus*

Dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G4 State Rank: S3

**Cave Myotis Bat** *Myotis velifer*

Colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G4G5 State Rank: S2S3

**Eastern Red Bat** *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G3G4 State Rank: S4



**Eastern Spotted Skunk** *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. *S.p. ssp. interrupta* found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G4 State Rank: S1S3

**Hoary Bat** *Aeorestes cinereus* (formerly *Lasiurus cinereus*)

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G3G4 State Rank: S4

**Long-tailed Weasel** *Neogale frenata* (formerly *Mustela frenata*)

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S5

**Mountain Lion** *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S2S3

**Muskrat** *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S5

**Texas Kangaroo Rat** *Dipodomys elator*

Sandy loam surface soils containing some clay and which supports short grasses (buffalo grass) and small to medium sized mesquite; mesquite not required, but mostly in association with scattered mesquite shrubs and sparse, short grasses in areas underlain by firm clay soils; along fencerows adjacent to cultivated fields/roads; burrows into soil with openings usually at base of mesquite or shrub; active throughout year; nocturnal; feeds on grass seeds, insects, and annual and perennial forbs; metabolizes water from foods, but will drink water when available; young born in underground nest chamber.

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G2 State Rank: S1

**Townsend's Big-eared Bat**      *Corynorhinus townsendii*

In Texas, habitat ranges from desert scrub to pinyon-juniper woodland, consistently in areas with canyons or cliffs (Schmidly 1991). Roosts in caves, crevases, trees, and buildings in the Panhandle and Trans-Pecos.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G4                      State Rank: S3?

**Tricolored Bat**                      *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G2G3                      State Rank: S2

## REPTILES

**Prairie Skink**                      *Plestiodon septentrionalis*

The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5                      State Rank: S5

**Slender Glass Lizard**              *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5                      State Rank: S3

**Smooth Softshell**                      *Apalone mutica*

Aquatic: Large rivers and streams; in some areas also found in lakes and impoundments (Ernst and Barbour 1972). Usually in water with sandy or mud bottom and few aquatic plants. Often basks on sand bars and mudflats at edge of water. Eggs are laid in nests dug in high open sandbars and banks close to water, usually within 90 m of water (Fitch and Plummer 1975).

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5                      State Rank: S3

**Texas Horned Lizard**              *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:                      State Status: T                      SGCN: Y  
Endemic: N                              Global Rank: G4G5                      State Rank: S3

**Western Box Turtle**              *Terrapene ornata*

Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5                      State Rank: S3

**Plains Hog-nosed Snake**      *Heterodon nasicus* (formerly Western Hognosed Snake)

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5                      State Rank: S4

**Western Massasauga**              *Sistrurus tergeminus*

Terrestrial: Shortgrass or mixed grass prairie, with gravel or sandy soils. Often found associated with draws, floodplains, and more mesic habitats within the arid landscape. Frequently occurs in shrub encroached grasslands.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G3G4                      State Rank: S3

**Western Rattlesnake**              *Crotalus oreganus* (formerly *Crotalus viridis*)

Terrestrial: Dry desert and prairie grasslands, shrub desert rocky hillsides; edges of arid and semi-arid river breaks.

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5                      State Rank: S5

## PLANTS

**Heller's Marbleseed**              *Onosmodium helleri*

Occurs in loamy calcareous soils in oak-juniper woodlands on rocky limestone slopes, often in more mesic portions of canyons; Perennial; Flowering March-May

Federal Status:                      State Status:                      SGCN: Y  
Endemic: Y                              Global Rank: G3                      State Rank: S3

**Prairie Butterfly-weed**              *Gaura triangulata*

Open sandy areas; Annual; Flowering March-June

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G3G4                      State Rank: S3

**Rolling Plains Goldenrod**              *Solidago mollis* var. *angustata*

Occurs on gypsum outcrops and other xeric habitats; Perennial

Federal Status:                      State Status:                      SGCN: Y  
Endemic: N                              Global Rank: G5T3                      State Rank: S2

## GRAYSON COUNTY

## AMPHIBIANS

**Eastern Tiger Salamander** *Ambystoma tigrinum*

Terrestrial adults generally occur under cover objects or in burrows surrounding a variety of lentic freshwater habitats, such as ponds, lakes, bottomland wetlands, or upland ephemeral pools. The specific terrestrial habitats are also varied and the occurrence of this species seems to be more closely associated with sandy, loamy or other soils which have easy burrowing properties, rather than any particular ecological system type. Requires fishless breeding pools for successful reproduction.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

**Southern Crawfish Frog** *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestrial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

**Strecker's Chorus Frog** *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

**Woodhouse's Toad** *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dunes. Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

## BIRDS

**Bald Eagle** *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

**Black Rail** *Laterallus jamaicensis*

Salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous years dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

**Chestnut-collared Longspur** *Calcarius ornatus*

Occurs in open shortgrass settings especially in patches with some bare ground. Also occurs in grain sorghum fields and Conservation Reserve Program lands

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S3

**Franklin's Gull** *Leucophaeus pipixcan*

This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S2N

**Interior Least Tern** *Sternula antillarum athalassos*

Sand beaches, flats, bays, inlets, lagoons, islands. Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Federal Status: State Status: SGCN: N  
Endemic: N Global Rank: G4T3Q State Rank: S1B

**Piping Plover** *Charadrius melodus*

Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT State Status: T SGCN: Y  
Endemic: N Global Rank: G3 State Rank: S2N

**Rufa Red Knot** *Calidris canutus rufa*

Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore. Bolivar Flats in Galveston County, sandy beaches Mustang Island, few on outer coastal and barrier beaches, tidal mudflats and salt marshes

Federal Status: LT State Status: T SGCN: Y  
Endemic: N Global Rank: G4T2 State Rank: S2N

**Western Burrowing Owl** *Athene cunicularia hypugaea*

Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G4T4 State Rank: S2

**White-faced Ibis** *Plegadis chihi*

Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S4B

**Whooping Crane** *Grus americana*

Small ponds, marshes, and flooded grain fields for both roosting and foraging. Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.

Federal Status: LE State Status: E SGCN: Y  
Endemic: N Global Rank: G1 State Rank: S1S2N

**Wood Stork** *Mycateria americana*

Prefers to nest in large tracts of baldcypress (*Taxodium distichum*) or red mangrove (*Rhizophora mangle*); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G4 State Rank: SHB,S2N

## FISH

**American Eel** *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habitats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G4 State Rank: S4

**Blue Sucker** *Cyprinostomus elongatus*

Blue Sucker usually inhabit rapids, riffles, runs and pools with moderate to fast current, with bottoms of exposed bedrock sometimes in combination with hard clay, sand, gravel, and boulders; generally intolerant of highly turbid conditions. Adults winter in deep pools and move upstream in spring to spawn on riffles. Current distribution in Texas includes the Red River downstream of Lake Texoma, Sabine and Neches rivers, and Colorado River downstream of Austin, Texas. May occur in other river systems (Warren et al. 2000).

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G3G4 State Rank: S3

**Chub Shiner** *Notropis potteri*

Brazos, Colorado, San Jacinto, and Trinity river basins. Flowing water with silt or sand substrate

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G4 State Rank: S2

<b>Goldeye</b>	<i>Hiodon alosoides</i>		
Restricted to the Red River basin; adults in quiet turbid water of medium to large lowland rivers, small lakes, marshes and muddy shallows connected to them.			
Federal Status:	State Status:	SGCN:	Y
Endemic: N	Global Rank: G5	State Rank:	S3
<b>Orangebelly Darter</b>	<i>Etheostoma radiosum</i>		
Streams, creeks, and small to moderate-sized rivers in the Red River basin. Riffle areas of gravel-bottoms streams with moderate to high currents.			
Federal Status:	State Status:	SGCN:	Y
Endemic: N	Global Rank: G4	State Rank:	S3
<b>Paddlefish</b>	<i>Polyodon spathula</i>		
Species occurred in every major river drainage from the Trinity Basin eastward, but its numbers and range had been substantially reduced by the 1950's; recently reintroduced into Big Cypress drainage upstream of Caddo Lake. Prefers large, free-flowing rivers but will frequent impoundments with access to spawning sites.			
Federal Status:	State Status: T	SGCN:	Y
Endemic: N	Global Rank: G4	State Rank:	S3
<b>Red River Shiner</b>	<i>Notropis bairdi</i>		
Red River basin; typically found in turbid waters of broad, shallow channels of main stream, over bottom mostly of silt and shifting sand.			
Federal Status:	State Status:	SGCN:	Y
Endemic: N	Global Rank: G4	State Rank:	S3
<b>Shovelnose Sturgeon</b>	<i>Scaphirhynchus platyrhynchus</i>		
Found only in the Red River below Denison Dam (Lake Texoma). Evidence of the presence of this species in the lower Pecos River, during prehistoric times, strongly suggests that it likely occurred in many Texas rivers. Inhabits flowing water over sandy bottoms or near rocky points or bars.			
Federal Status: SAT	State Status: T	SGCN:	Y
Endemic: N	Global Rank: G4	State Rank:	S2
<b>Silver Chub</b>	<i>Macrhybopsis storeriana</i>		
Red River and Brazos River basins. Mainly restricted to large, often silty rivers. Ranges over gravel to silt substrates but found more commonly over silt or mud bottom.			
Federal Status:	State Status:	SGCN:	Y
Endemic: N	Global Rank: G5	State Rank:	S3

## INSECTS

<b>American Bumblebee</b>	<i>Bombus pennsylvanicus</i>		
Habitat description is not available at this time.			
Federal Status:	State Status:	SGCN:	Y
Endemic:	Global Rank: G3G4	State Rank:	SNR

No accepted common name *Bombus variabilis*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G1G2	State Rank: SNR

## MAMMALS

**Big Brown Bat** *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

**Black Bear** *Ursus americanus*

Generalist. Historically found throughout Texas. In Chisos, prefers higher elevations where pinyon-oaks predominate; also occasionally sighted in desert scrub of Trans-Pecos (Black Gap Wildlife Management Area) and Edwards Plateau in juniper-oak habitat. For ssp. *luteolus*, bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Bottomland hardwoods and large tracts of inaccessible forested areas.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

**Eastern Red Bat** *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

**Eastern Spotted Skunk** *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. *interrupta* found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

**Hoary Bat** *Aeorestes cinereus* (formerly *Lasiurus cinereus*)

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4



**Long-tailed Weasel** *Neogale frenata* (formerly *Mustela frenata*)

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S5

**Mountain Lion** *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S2S3

**Muskrat** *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S5

**Swamp Rabbit** *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G5 State Rank: S5

**Tricolored Bat** *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status: State Status: SGCN: Y  
Endemic: N Global Rank: G2G3 State Rank: S2

## MOLLUSKS

**Texas Heelsplitter** *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status: State Status: T SGCN: Y  
Endemic: N Global Rank: G1G3 State Rank: S1

## REPTILES

**Common Garter Snake** *Thamnophis sirtalis*

Terrestrial and aquatic. Habitats used include the grasslands and modified open areas in the vicinity of aquatic features, such as ponds, streams or marshes. Damp soils and debris for cover are thought to be critical.

Federal Status: State Status: SGCN: N  
Endemic: Global Rank: G5 State Rank: S2

**Eastern Box Turtle**                    *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enter pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:                    State Status:                    SGCN: Y  
Endemic: N                        Global Rank: G5                    State Rank: S3

**Prairie Skink**                        *Plestiodon septentrionalis*

The prairie skink can occur in any native grassland habitat across the Rolling Plains, Blackland Prairie, Post Oak Savanna and Pineywoods ecoregions.

Federal Status:                    State Status:                    SGCN: Y  
Endemic: N                        Global Rank: G5                    State Rank: S5

**Slender Glass Lizard**                *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:                    State Status:                    SGCN: Y  
Endemic: N                        Global Rank: G5                    State Rank: S3

**Smooth Softshell**                    *Apalone mutica*

Aquatic: Large rivers and streams; in some areas also found in lakes and impoundments (Ernst and Barbour 1972). Usually in water with sandy or mud bottom and few aquatic plants. Often basks on sand bars and mudflats at edge of water. Eggs are laid in nests dug in high open sandbars and banks close to water, usually within 90 m of water (Fitch and Plummer 1975).

Federal Status:                    State Status:                    SGCN: Y  
Endemic: N                        Global Rank: G5                    State Rank: S3

**Texas Horned Lizard**                *Phrynosoma cornutum*

Terrestrial: Open habitats with sparse vegetation, including grass, prairie, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive. Occurs to 6000 feet, but largely limited below the pinyon-juniper zone on mountains in the Big Bend area.

Federal Status:                    State Status: T                    SGCN: Y  
Endemic: N                        Global Rank: G4G5                    State Rank: S3

**Timber (canebrake)  
Rattlesnake**                        *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status:                    State Status:                    SGCN: Y  
Endemic: N                        Global Rank: G4                    State Rank: S4

**Western Box Turtle**                *Terrapene ornata*

Terrestrial: Ornate or western box turtles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:                    State Status:                    SGCN: Y  
Endemic: N                        Global Rank: G5                    State Rank: S3

**Western Chicken Turtle**      *Desirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T5	State Rank: S2S3

**PLANTS**

**Bigflower Cornsalad**      *Valerianella stenocarpa*

Usually along creekbeds or in vernal moist grassy open areas (Carr 2015).

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

**Hall's Prairie Clover**      *Dalea hallii*

In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S2

**Sutherland Hawthorn**      *Crataegus viridis* var. *glabriuscula*

In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above/near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T3T4	State Rank: S3



# SHEPPARD AIR FORCE BASE & RECREATION ANNEX

## **Baseline Biological Report**

Sheppard AFB Recreation Annex

September 2015



**Sheppard Air Force Base &  
Recreation Annex**

**Baseline Biological Report**

**Sheppard AFB Recreation  
Annex**

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### Acronyms and Abbreviations

AETC	Air Education and Training Command
AF	airfield
AFB	Air Force Base
BASH	Bird Aircraft Strike Hazard
EOD	explosive ordnance disposal
GPS	global positioning system
LS	shoreline
N	northernmost trap line
P	park
RV	recreational vehicle
SR	southern recreation area(s)
SRA	Sheppard AFB Recreation Annex
TPWD	Texas Parks and Wildlife Department
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service



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## 1. Introduction

Malcolm Pirnie, Inc. (Malcolm Pirnie), in a PIKA - Pirnie JV, LLC joint venture with PIKA, has prepared the following report to support a baseline biological survey on Sheppard Air Force Base (AFB) and the Sheppard AFB Recreation Annex (SRA) at Lake Texoma. The project is being undertaken at the request of the United States (U.S.) Department of Air Force Civil Engineer Center (AFCEC) and 82 CES/CEI of Sheppard AFB under Contract Number FA3002-08-D-0001.

The purpose of the survey was to gather baseline information in order to supplement current knowledge of vegetation and wildlife at the installations and provide recommendations for future management and enhancement of vegetation and wildlife habitat. The specific objectives were to:

1. Evaluate current animal and plant species.
2. Identify, document, and map:
  - a. Threatened, endangered, and rare species
  - b. Invasive species
  - c. High quality, rare, native habitats and plants
3. Assess overall condition of vegetation including impacts due to development of the area for recreational purposes.
4. Make recommendations for management of existing vegetation and enhancement of future vegetation requirements.

Field surveys were conducted from May 4 through May 8 of 2015. Surveys included avian point counts, small mammal live trapping, vegetation mapping, and documentation of incidental sightings of reptiles, sensitive species, and large mammals.

## 2. Existing Information

### 2.1 Site History and Operations

Sheppard AFB was constructed during World War II as an Army Air Corps Training Center. After the war, the base was inactivated as part of a reduction in military only to be reopened in 1948. The base became a permanent facility dedicated to aircraft maintenance and training in 1950. In 1959, the base became a technical training facility to support U.S. Air Force (USAF) personnel, other services, and foreign nations (Air Force, 2012).



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The primary missions assigned to Sheppard AFB involve the 82<sup>nd</sup> Training Wing conducting technical and field training along with the 80<sup>th</sup> Flying Training Wing conducting flight training (Air Force, 2010).

SRA is a 415-acre property located on the shores of Lake Texoma, Texas. The land is an out-grant from the Army Corps of Engineers, established as a recreational area for off-duty military personnel and their families. Cabin sites, a recreation hall, and miscellaneous buildings reside on approximately 56 developed acres across the property (Air Force, 2010).

## 2.2 Site Location and Land Use

Sheppard AFB is located between the Red River to the north and Wichita River to the south (Figure 1). It is approximately five miles north of Wichita Falls, Wichita County, Texas in the Rolling Plains ecoregion. This region extends north from the Edwards Plateau in Texas to western sections of Oklahoma (Griffith, 2004). The landscape is characterized by gently rolling plains and contains rangeland broken with streams and rivers draining east and southeast.

Sheppard AFB consists of 3,297 acres of mixed use land, including grounds owned, but not maintained, at the off-installation Frederick Auxiliary location. Approximately 2,206 acres are dedicated to flight training and maintenance in the form of the airfield and associated hangars, training centers, and maintenance buildings. Permanent personnel and tenant units utilize the 291 acres of improved lands in cantonment and housing areas. Areas of semi-improved and unimproved grassland border the airfield to the north and east. A previously maintained golf course to the south has been converted into a park area that is currently transitioning from maintained to semi-improved vegetation, mowed to airfield standards. Unimproved areas include the wooded areas and wetlands along the western boundary of the installation. Semi- and unimproved areas account for approximately 727 acres of Sheppard AFB property (Air Force, 2010). Survey areas will be discussed in Section 3, Methods.

The SRA is approximately 120 miles east of Sheppard AFB (Figure 1). It is located on the western end of Lake Texoma approximately nine miles northwest of Gordonville, Grayson County, Texas. The SRA lies in the Eastern Cross Timbers ecoregion, a stretch of woodland spanning from eastern Cooke County to the western Hill County (Griffith, 2004). Lake Texoma is a dual-state lake bordered by both Texas and Oklahoma. It covers over 144,000 surface acres, a natural lake of the Red River.

Land use at SRA is primarily recreational in nature, providing wooded hiking trails, Recreational Vehicle (RV) camp sites, cabin rentals, picnic areas, a boat launch, and



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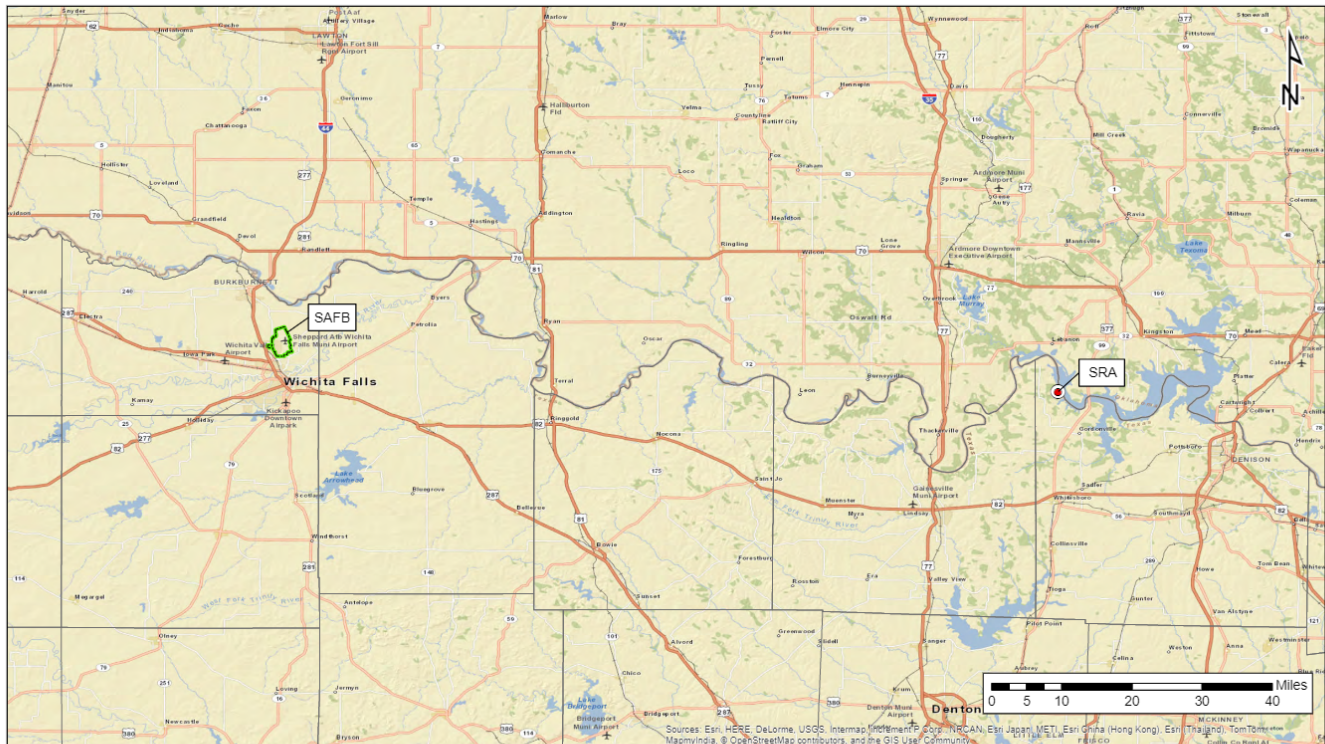
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docking area. Approximately 56 acres are improved grounds dedicated to these pursuits, with another nine acres utilized as athletic grounds. Approximately 63 acres are semi-improved, maintained grassland, while the remaining 288 acres are unimproved woodland.



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	<p>Sheppard Air Force Base (SAFB) Wichita Falls Wichita County Texas</p>	<p>&amp;</p> <p>Sheppard AFB Recreation Annex (SRA) Whitesboro Grayson County Texas</p>	<p><b>Baseline Biological Report Vicinity Map</b></p>	<p>Figure <b>1</b></p>
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## 2.3 Regional Vegetation

### 2.3.1 Sheppard AFB

The area surrounding Wichita Falls is dominated by species consistent with the Rolling Plains ecosystem. Native grasses include little bluestem (*Schizachyrium scoparium*), blue grama (*Bouteloua gracilis*), sideoats grama (*Bouteloua curtipendula*), Indiangrass (*Sorghastrum nutans*), and sand bluestem (*Andropogon hallii*). Many rangelands in this region have been invaded by annual and perennial forbs, legumes, and woody species due to historic livestock grazing practices and lack of naturally occurring fire on the landscape. Dominant woody species include honey mesquite (*Prosopis glandulosa*), redberry juniper (*Juniperus pinchotii*), yucca (*Yucca* sp.), lotebush (*Ziziphus obtusifolia*), sugarberry (*Celtis laevigata*), bumelia (*Bumelia lanuginosa*), pricklypear (*Opuntia* sp.), skunkbush sumac (*Rhus trilobata*), plum (*Prunus* sp.), western soapberry (*Sapindus drummondii*), little leaf sumac (*Rhus microphyllum*), shin oak (*Quercus* sp.), agarito (*Berberis trifoliolata*), catclaw acacia (*Acacia greggii*), lime pricklyash (*Zanthoxylum fagara*), and sand sage (*Oligosporus filifolius*). Mesquite grasslands dominate vast areas of this ecological region. Bottomlands along larger streams contain American elm (*Ulmus americana*), buttonbush (*Cephalanthus occidentalis*), pecan (*Carya illinoensis*), and cottonwood (*Populus deltoides*).

An invasive species survey was completed by PIKA – Pirnie staff in 2008 to document invasive populations on Sheppard AFB and provide recommendations to manage invasive species. During the survey, the dominant invasive species observed were King Ranch bluestem (*Bothriochloa ischaemum*), mesquite (*Prosopis* sp.), salt cedar (*Tamarix* sp.), and Russian thistle (*Kali tragus*) (PIKA-Pirnie, 2008).

### 2.3.2 SRA

Native vegetation at SRA is characteristic of the Eastern Cross Timbers ecoregion. Dominant tree species are pecan, bur oak (*Quercus marcocarpa*), blackjack oak (*Quercus marilandica*), American elm, slippery elm (*Ulmus rubra*), ash (*Fraxinus* sp.), osage orange (*Maclura pomifera*), cottonwood, sugarberry (*Celtis laevigata*), eastern red cedar (*Juniperus virginiana*), and black willow (*Salix nigra*) (TPWD, 2014). Common grasses include big bluestem (*Andropogon gerardi*), sideoats grama, buffalograss (*Bouteloua dacyloides*), and little bluestem (TPWD, 2014).

## 3. Methods

### 3.1 Vegetation Mapping

Vegetation was mapped and dominant species identified across the unimproved areas of Sheppard AFB and SRA using the meandering transect method. Unique species were



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recorded and comprehensive species lists created. When plant complexes within vegetation communities were observably different, the boundary was mapped using Trimble XH GPS units, capable of sub-meter accuracy. When invasive vegetation was identified, per the Texas Department of Agriculture noxious species list, it was added to the vegetation list and mapped as an invasive species. This was meant to update the 2008 survey and is not an exhaustive list.

### 3.2 Avian Survey

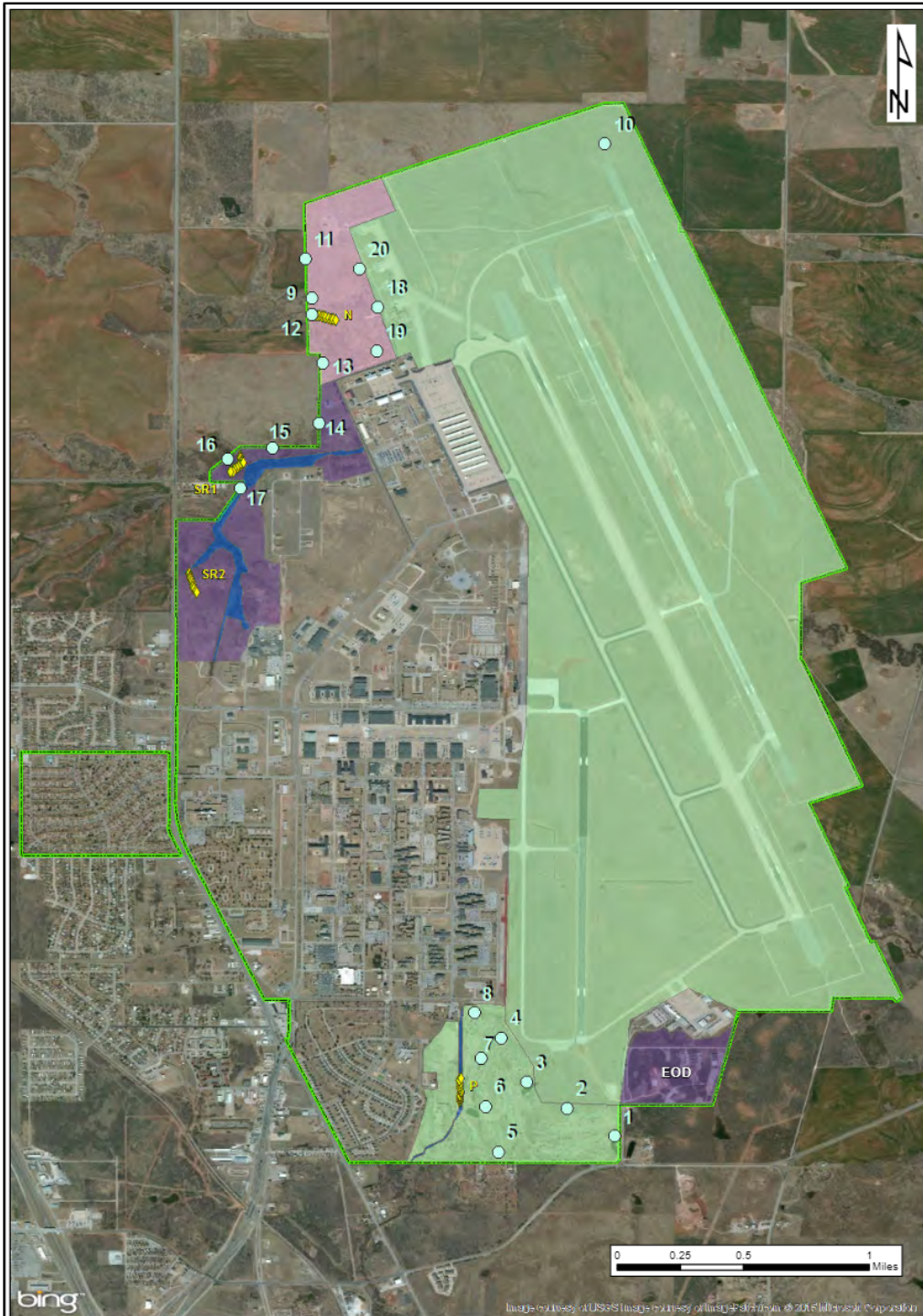
A field team of two avian biologists surveyed 20 points within Sheppard AFB and 19 points at SRA as shown in Figures 2 and 3. Avian point counts were completed for each identified vegetation assemblage. Each point was surveyed once. Morning counts began at sunrise and continued until four hours after sunrise. Evening counts were conducted from three hours before sunset until sunset. No counts were conducted during steady rain or high winds, as these factors are known to interfere with both auditory and visual detection of birds. Each point was surveyed for 10 minutes, with three minutes of quiet prior to the count to acclimate birds to surveyor presence. Surveyors recorded all avian species detected within a 150 meter radius around the point count station. Birds were identified either by sightings or by song and call recognition. In order to prevent overlap of point radii, and possible double-counting of birds, points were spaced at least 300 meters apart.

Additionally, a species richness list was maintained while mammal monitoring and vegetation mapping. Each species seen or heard while within the base or SRA was documented. Secondary signs, such as scat, pellets, burrows, and scrapes were also considered, if they were useful in establishing a positive identification. If surveyors were unable to determine species from the sign, secondary signs were noted but not included in the species list.



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SAFB Boundary	Maintained Grassland	USAF Wichita County, TX <b>Baseline Biological Report</b>	
Avian Count Location	Mesquite Woodland		
Mammal Trap Location	Mixed Mesquite Woodland	<b>Sheppard AFB</b> 	
Riparian	EOD		





bing

0 0.125 0.25 0.5 Miles

Images courtesy of USGS Images courtesy of InSitu/Petaluma © 2016 Microsoft Corporation

- SRA
- Maintained Grassland
- Mixed Woodland
- Avian Count Location
- Mammal Trap Locations

USAF Grayson County, TX Baseline Biological Report	
<b>Sheppard AFB Recreation Annex</b>	
	FIGURE <b>3</b>



### 3.3 Small Mammal Monitoring

The survey protocol for small mammal monitoring was adapted from the U.S. Department of Agricultural Forest Service Multiple Species Inventory and Monitoring Technical Guide Version 1.0 (Manley et al., 2006).

Sherman traps (perforated folding traps) were deployed along a 100 meter long transect with traps spaced ten meters apart. Four transect lines were placed within areas of differing vegetation assemblages and habitat types. Transect locations were chosen based on access to water, topography, and ground cover. Transects were composed of multiple trap sizes: small (2" x 2.5" x 6.5"), medium (3" x 3.5" x 9"), and large (4" x 4.5" x 12"). Each transect consisted of one large trap, two small traps, and seven medium traps.

Traps were placed near habitat features such as logs, burrows, the base of trees, and where possible in areas that provide cover from weather (e.g. under shrubs, in tall grass, under downed trees). Transects were used rather than a grid because they appear to be more effective and efficient at detecting the composition of small mammals at a site, given similar trap effort (Steele et al., 1984), (Read et al., 1988), (Pearson and Ruggiero, 2003).

Sherman traps were baited with a mixture of rolled oats and black oil sunflower seeds. Small traps and traps placed near drainages were baited with mealworms, since these traps have a greater potential for capturing shrews. The higher caloric content of the mealworms helps sustain a shrew's high metabolic rate. All traps were set, opened, and baited in the late afternoon (by dark) of the first day, and checked during the morning of the second day for trap night one. During the morning check, all captures were processed and all traps closed during the afternoon hours. These steps were repeated on the second day for a total of two trap nights.

Data collection consisted of species identification, sex, age, breeding status, weight, lengths (hind foot, ear, tail, head/body); and marking (using a sharpie on rump) to help identify recaptures, and photographs. Once all data had been collected, the animal was released. Before transferring traps to a new location, they were thoroughly cleaned and disinfected using a mild bleach/water solution to minimize the potential spread of disease.

### 3.4 Reptiles and Amphibians

Continuous monitoring effort was employed to survey for herptiles on both Sheppard AFB and SRA. While conducting avian and mammal surveys and vegetation mapping, incidental observations of reptiles and amphibians were recorded and photographed, if possible.



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### 3.5 Threatened, Endangered and Rare Species

The U.S. Fish and Wildlife Service (USFWS) and the Texas Parks and Wildlife Department (TPWD) maintain lists of federally and state listed threatened, endangered and rare species (TPWD, 2015). The county lists for Wichita and Grayson Counties were consulted prior to the initiation of field surveys (Appendix A). During each set of monitoring, sensitive species were noted, documented with a GPS point and, where possible, photographed.

#### 3.5.1 Sheppard AFB

Based on habitat requirements and the Wichita County threatened and endangered species list, all threatened and endangered species with the potential to occur on Sheppard AFB were identified prior to field work. These species are listed below, along with a description of their preferred habitat.

The Texas kangaroo rat (*Dipodomys elator*) is a state listed threatened species. It is associated with scattered mesquite shrubs and sparse, short grasses in areas underlain by firm clay soils. This kangaroo rat prefers areas along fencerows adjacent to cultivated fields and roads (TPWD, 2015).

The Texas horned lizard (*Phrynosoma cornutum*) is a state listed threatened species. The lizard occurs in open, arid and semi-arid areas with sparse vegetation, including grass, cactus, scattered brush, or scrubby trees. It may occur on a variety of soils from sandy to rocky (TPWD, 2015). Harvester ants are a preferred food of the Texas horned lizard and could indicate population viability in areas where there are multiple mounds and suitable lizard habitat. Harvester ant mounds were opportunistically documented during completion of surveys.

#### 3.5.2 SRA

A separate list of threatened and endangered species with the potential to occur at SRA was maintained based on the Grayson County species list. Due to the remote and fairly undisturbed nature of the annex, sensitive species were considered more likely to occur within the annex than on Sheppard AFB.

The Henslow's Sparrow (*Ammodramus henslowii*) is a Texas rare species that winters in the bunch grass and pine prairies found in the eastern part of the state. They require grassy cover interspersed with bare ground for running and foraging (TPWD, 2015). Not strong flyers, these birds may utilize the grassy areas of SRA as stopover habitat during migration.



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Similar in habits to the Henslow's Sparrow, the Texas rare Sprague's Pipit (*Anthus spragueii*) also overwinters in Texas. This species is strongly tied to native upland prairie and can be locally common in coastal grasslands, usually in flocks (TPWD, 2015). SRA could be potential stopover habitat during migration.

Alligator snapping turtles (*Macrochelys temminckii*), a state threatened species, can be found in most perennial water bodies, usually with a mud bottom and aquatic vegetation. They may migrate several miles along rivers or wet corridors (TPWD, 2015).

The Timber rattlesnake (*Crotalus horridus*) is a state threatened species that can be found in almost any habitat that provides dense ground cover over limestone, sandy soil, or black clay. Habitats include swamps, floodplains, pine and deciduous woodlands, riparian zones, and abandoned farmland (TPWD, 2015).

#### 4. Field Survey Results

##### 4.1 Sheppard AFB

###### 4.1.1 Vegetation Mapping

Four vegetation types were identified and mapped within the survey areas at Sheppard AFB: riparian, maintained grassland, mixed mesquite woodland, and mesquite brushland. Figure 2 shows the distribution of these vegetation types across the base. A list of species documented within each area is provided in Appendix B. Example photos of these vegetation types are located in the photographic log (Appendix C).

Riparian areas included stream corridors, forested wetlands, and herbaceous wetlands. These areas were identified along streams on the western side of the installation and within the former golf course, now a park. Dominant riparian species consisted of green ash (*Fraxinus pennsylvanica*), red mulberry (*Morus rubra*), American elm, water hickory (*Carya aquatica*), screwbean mesquite (*Prosopis pubescens*), black willow, blackfruit spikerush (*Eleocharis melanocarpa*), giant ragweed (*Ambrosia trifida*), and annual ragweed (*Ambrosia artemisiifolia*).

Maintained grasslands exist within the airfield and surrounding areas and within the park. Due to restricted access at the airfield, five vegetation plots were completed to determine dominant vegetation types. Dominant species included little barley (*Hordeum pusillum*), annual ragweed, cheatgrass (*Bromus tectorum*), and common yarrow (*Achillea millefolium*).

Mixed mesquite woodland was identified within the explosive ordnance disposal (EOD) area and along the western perimeter of the installation surrounding the northern riparian



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area. Mixed mesquite woodland was characterized by mature mesquite dominated areas with a variety of codominant tree species such as sugarberry, western soapberry, cottonwood, and ash. Canopy cover for woodlands is between 40 and 66 percent.

Mesquite brushland was identified on the northwestern corner of the installation. This area was dominated by sporadic to moderately dense mesquite trees and grasses such as King Ranch bluestem, needle-and-thread grass (*Hesperostipa comata*), and Japanese brome (*Bromus arvensis*).

#### 4.1.2 Avian Survey

Twenty points within the survey area of the installation were surveyed over the course of two morning and two evening survey periods (Figure 2). The second morning survey was delayed due to rain, but no counts were shortened because of weather conditions. Point count locations were chosen in an effort to assess avian species within a representative sample of each of the four vegetation assemblages described above.

Forty-six species were identified during point counts and incidental monitoring. Appendix D provides the full species list, and Appendix E contains the point count data sheets. Several of these were migratory species using the base as a stopover location to feed and rest before continuing north. A pair of Swainson's Hawks (*Buteo swainsoni*) was determined to be nesting just outside of the installation boundary, east of the airfield. A pair of Mississippi Kites (*Ictinia mississippiensis*) likely had a nest near the former golf course, as they were observed together multiple times in the vicinity and were observed with nesting material. No sensitive bird species were observed within Sheppard AFB.

#### 4.1.3 Small Mammals

Four trap lines consisting of ten traps each were placed within the installation, one within the park, two within the western wetlands areas, and one within the far northern portion of the base west of the airfield (Figure 2). Species captured within Sheppard AFB were the eastern woodrat (*Neotoma floridana*), hispid cotton rat (*Sigmodon hispidus*), and the deer mouse (*Peromyscus maniculatus*). Photographs of typical trap locations and captured animals are provided in the photographic log. Trapping data forms are located in Appendix F.

Within the park (P), traps were set parallel to the stream running north to south in an unmaintained area. The vegetation surrounding the stream was dominated by typical riparian vegetation including dense tall grasses and moderately dense trees. All three species were captured within the park.



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Two traps lines were set within the western undeveloped area referred to as the southern recreation areas (SR) and designated as areas 1 and 2. Traps within SR1 were set parallel to a stream flowing west. This area was primarily flat and characterized by dense riparian vegetation including mixed hardwoods, shrubs, and mixed grasses. The deer mouse and hispid cotton rat were captured within SR1. Traps within SR2 were placed within mixed mesquite woodland. The topography was primarily flat and dominated by tall grasses and mesquite trees. All three species were captured within SR2.

The northernmost trap line (N) was set near the western fence parallel to a stream flowing north. The traps were placed within a grassland dominated by Needle-and-thread grass, little barley, and cheatgrass. The deer mouse and hispid cotton rat were captured at this trap line.

On the second day of trapping, the site experienced heavy rain causing flooding in some trap locations near stream channels. Flooding caused some traps to be displaced by flowing water and these traps were not set for the second trap night.

#### 4.1.4 Reptiles and Amphibians

Based on the identified habitat types within the installation, many species of reptile and amphibian have the potential to occur on Sheppard AFB. However, due to the highly variable habits, sizes, and environmental requirements known to occur between species, this group was best surveyed using ongoing active observations rather than trapping or evenly spaced counts.

During the ongoing monitoring, two species of snake, Texas ratsnake (*Elaphe obsoleta*) and black racer (*Coluber constrictor*) were observed within the installation, both near water sources. A red-eared slider turtle (*Trachemys scripta elegans*) was observed at the northern boundary fence during the airfield assessment. A red-eared slider, pond slider (*Trachemys scripta*), yellow mud turtle (*Kinosternon flavescens*), and spiny softshell turtle (*Apalone spinifera*) were observed within the drainage and ponds in the former golf course.

#### 4.1.5 Threatened, Endangered, and Rare Species

The Texas horned lizard is known to occur on base; however no individuals were observed during this baseline biological survey. No threatened or endangered animal or plant species were observed within Sheppard AFB.



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## 4.2 SRA

### 4.2.1 Vegetation Mapping

Two vegetation types were mapped within SRA: mixed woodland and maintained grassland (Figure 3). A list of species documented within each vegetation type is provided as Appendix B. Example photos of these vegetation types are located in the photographic log (Appendix C).

Mixed hardwood dominated woodland was identified throughout the base in unmaintained areas on the western boundary and in the southeastern portion of the annex. Dominant tree species were eastern red cedar, green ash (*Fraxinus pennsylvanica*), pecan, western soapberry, oaks (*Quercus* sp.), and flowering dogwood (*Cornus florida*).

Maintained grasslands exist along the roadways and in the northern portion of the annex. Dominant species within these environments were Bermudagrass (*Cynodon dactylon*), little bluestem, sweetclover (*Melilotus officinalis*), switchgrass (*Panicum virgatum*), and annual bluegrass (*Poa annua*).

### 4.2.2 Avian Survey

Nineteen points within SRA were surveyed over three morning and one evening survey periods (Figure 3). Point count locations were chosen in an effort to assess avian species within a representative sample of both habitat types within the recreation annex.

Fifty-nine species were identified during point counts and incidental monitoring. Appendix E contains the point count data sheets. Several of these were migratory species using the annex as a stopover location to feed and rest before continuing north. A pair of Mississippi Kites likely had a nest near the wooded area at the southern entrance, as they were observed together multiple times in the vicinity. No sensitive bird species were observed within SRA.

### 4.2.3 Small Mammals

Trap lines were placed in diverse habitats within SRA in an effort to capture a diversity of small mammals. Live traps were placed within the historic airfield, within a wooded area in the center of the annex, along the shoreline of the lake on the southeast perimeter, and on the western boundary of the annex (Figure 3). Species captured within SRA were the same as those captured within Sheppard AFB, the eastern woodrat, hispid cotton rat, and deer mouse.

The historic airfield (AF) is currently maintained grassland with sporadic to dense trees. Traps were placed along a north-south line extending from an area with sporadic trees to a



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densely wooded area. All areas had dense ground cover consisting of tall grasses and sweetclover. The only species captured within the historic airfield was the hispid cotton rat.

The wooded area within the center of the annex was bisected by a fence and is identified as trap line F on the attached data forms. This area was characterized by dense trees with little to no ground cover. The topography was flat and low. No animals were captured at this location during either trap night.

Traps were placed at the shoreline (LS) of Lake Texoma at an inlet on the eastern side of the annex. The area was characterized by dense vegetation of shrubs, trees, and ground cover. Deer mice and eastern woodrats were captured at this trap location. Similarly to Sheppard AFB, this location experienced flooding on the second day and a few traps were found submerged and empty after the second trap night.

On the western side of the annex, traps were placed in a wooded area at the outskirts of a maintained area used for boat storage and near maintenance sheds. Traps were placed on a gently sloping hillside. The area was characterized by dense trees with little ground vegetation, however most areas were covered in thick leaf litter. No animals were captured on either trap night.

Heavy rains occurred on both trap nights yielding over a half inch on May 6 and over two inches on May 7. Heavy rain is known to disrupt small mammal foraging patterns. Low capture rates on SRA may have been due to the inclement weather.

#### 4.2.4 Reptiles and Amphibians

As with Sheppard AFB, a range of reptile and amphibian species have the potential to inhabit the largely undisturbed environments within SRA. Each habitat within the annex was also surveyed using continuous active observation so as to potentially observe the greatest number of species and individuals.

Two juvenile timber rattlesnakes were observed within SRA: one near the wooded area on the west side of the Annex, and one in a shrub within a wetland on the eastern boundary. These are state listed threatened species. A lined racer was observed in the wetland meadow. Ground skinks (*Scincella lateralis*) were found within the wooded areas, as well as Texas toad (*Bufo speciosus*), Woodhouse's toad (*Bufo woodhousii*), northern cricket frog (*Acris crepitans*), and Great Plains narrow-mouthed toad (*Gastrophryne olivacea*). A three-toed box turtle (*Terrapene carolina triunguis*) was observed within the lacustrine habitat at the northwestern boundary of the annex. Timber rattlesnakes were the only sensitive species observed within SRA.



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#### 4.2.5 Threatened, Endangered and Rare Species

As noted above, timber rattlesnakes prefer dense ground cover over limestone, sandy soil, or black clay. Habitats include swamps, floodplains, pine and deciduous woodlands, riparian zones, and abandoned farmland. SRA has several of these habitats.

### 5. Vegetation Condition and Recommendations

#### 5.1 Sheppard AFB

The four vegetation communities mapped within Sheppard AFB indicate predominantly balanced ecological function, with minimal need for conditional improvements. The grasslands within the park area are transitioning from an actively maintained monoculture into native grassland (Appendix B-1). With consistent preservation, this grassland has the potential to become a biodiverse community suited to the climate and precipitation of the region. Native habitat is beneficial for resident fauna, including possible sensitive species. The PIKA - Pirnie team recommends minimal ground disturbance within the transitioning park area to allow native vegetation to establish.

The maintained grasslands surrounding the airfield appear in stable condition. One of the dominant species within the grassland was cheatgrass, an invasive species. If any seeding is required, seed with a drought-resistant, native grassland mix. Several red harvester ant mounds were observed during vegetation mapping, indicating potential food sources for Texas horned lizards. As some mowing is required around the airfield to prevent Bird Aircraft Strike Hazard (BASH) occurrences, it is recommended to mow during the colder months when vegetation is dormant.

King Ranch bluestem was the predominant grass within mesquite brushland areas. This is an invasive species that has the potential to spread. The PIKA - Pirnie team recommends sowing a native seed mix in these areas.

The riparian areas and mixed mesquite woodland are established environments that require little maintenance. The PIKA - Pirnie team recommends leaving them as they are.

#### 5.2 SRA

Both the mixed woodland and maintained grassland communities mapped within SRA indicated stable environments. As a recreational area, SRA provides RV and primitive camp sites, picnic areas, maintained hiking trails, cabin rentals, and a marina. Typically, primary impacts to vegetation from these activities arise from firewood gathering and trail or campsite erosion. These impacts were not observed in either vegetation community. Hiking trails were well maintained and vegetation was established on all sides. While the



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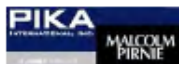
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primitive camping sites provided fire rings, there was no sign that vegetation near the areas had been stripped of dead wood or branches. RV camping and cabin use are limited impact activities, and the marina is maintained outside of any vegetation.

Four hunting stands were discovered in the mixed woodland on the western boundary of SRA. Hunting is prohibited within the annex, so the stands were removed without damage to the trees or surrounding vegetation. However, there is potential for further unauthorized land use, due to the undefined boundaries of SRA. The PIKA – Pirnie team recommends scheduling assessments of the lesser used woodlands, especially where there are no trails. This would allow for early detection of illegal or unsanctioned activities such as hunting or firewood collection.



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## **Appendix A**

Threatened and Endangered  
Species County Lists



## **Baseline Biological Report**

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## WICHITA COUNTY

### BIRDS

		Federal Status	State Status
<b>American Peregrine Falcon</b>	<i>Falco peregrinus anatum</i>	DL	T
year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.			
<b>Arctic Peregrine Falcon</b>	<i>Falco peregrinus tundrius</i>	DL	
migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.			
<b>Baird's Sparrow</b>	<i>Ammodramus bairdii</i>		
shortgrass prairie with scattered low bushes and matted vegetation; mostly migratory in western half of State, though winters in Mexico and just across Rio Grande into Texas from Brewster through Hudspeth counties			
<b>Bald Eagle</b>	<i>Haliaeetus leucocephalus</i>	DL	T
found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds			
<b>Interior Least Tern</b>	<i>Sterna antillarum athalassos</i>	LE	E
subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony			
<b>Mountain Plover</b>	<i>Charadrius montanus</i>		
breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous			
<b>Peregrine Falcon</b>	<i>Falco peregrinus</i>	DL	T
both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies ( <i>F. p. anatum</i> ) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, <i>F.p. tundrius</i> is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.			
<b>Sprague's Pipit</b>	<i>Anthus spragueii</i>	C	
only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.			

## WICHITA COUNTY

### BIRDS

Federal Status    State Status

- Western Burrowing Owl**    *Athene cunicularia hypugaea*  
open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows
- Whooping Crane**    *Grus americana*    LE    E  
potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

### MAMMALS

Federal Status    State Status

- Black-tailed prairie dog**    *Cynomys ludovicianus*  
dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups
- Cave myotis bat**    *Myotis velifer*  
colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (*Hirundo pyrrhonota*) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore
- Gray wolf**    *Canis lupus*    LE    E  
extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands
- Plains spotted skunk**    *Spilogale putorius interrupta*  
catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie
- Red wolf**    *Canis rufus*    LE    E  
extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies
- Texas kangaroo rat**    *Dipodomys elator*    T  
mesquite not required, but mostly in association with scattered mesquite shrubs and sparse, short grasses in areas underlain by firm clay soils; along fencerows adjacent to cultivated fields/roads; burrows into soil with openings usually at base of mesquite or shrub; active throughout year; nocturnal; feeds on grass seeds, insects, and annual and perennial forbs; metabolizes water from foods, but will drink water when available; young born in underground nest chamber

### REPTILES

Federal Status    State Status

- Texas horned lizard**    *Phrynosoma cornutum*    T

## WICHITA COUNTY

### REPTILES

Federal Status    State Status

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

## GRAYSON COUNTY

### AMPHIBIANS

Federal Status      State Status

**Southern Crawfish Frog**      *Lithobates areolatus areolatus*

The Southern Crawfish Frog can be found in abandoned crawfish holes and small mammal burrows. This species inhabits moist meadows, pasturelands, pine scrub, and river flood plains. This species spends nearly all of its time in burrows and only leaves the burrow area to breed. Although this species can be difficult to detect due to its reclusive nature, the call of breeding males can be heard over great distances. Eggs are laid and larvae develop in temporary water such as flooded fields, ditches, farm ponds and small lakes. Habitat: Shallow water, Herbaceous Wetland, Riparian, Temporary Pool, Cropland/hedgerow, Grassland/herbaceous, Suburban/orchard, Woodland – Conifer.

### BIRDS

Federal Status      State Status

**American Peregrine Falcon**      *Falco peregrinus anatum*

DL                      T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

**Arctic Peregrine Falcon**      *Falco peregrinus tundrius*

DL

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

**Bald Eagle**      *Haliaeetus leucocephalus*

DL                      T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

**Cerulean Warbler**      *Dendroica cerulea*

treetops of riverbank woodlands, swamps, and bottomlands; mainly insectivorous

**Eskimo Curlew**      *Numenius borealis*

LE                      E

historic; nonbreeding: grasslands, pastures, plowed fields, and less frequently, marshes and mudflats

**Henslow's Sparrow**      *Ammodramus henslowii*

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

**Interior Least Tern**      *Sterna antillarum athalassos*

LE                      E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony



## GRAYSON COUNTY

### BIRDS

		Federal Status	State Status
<b>Peregrine Falcon</b>	<i>Falco peregrinus</i>	DL	T
<p>both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (<i>F. p. anatum</i>) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, <i>F. p. tundrius</i> is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.</p>			
<b>Piping Plover</b>	<i>Charadrius melodus</i>	LT	T
<p>wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats</p>			
<b>Red Knot</b>	<i>Calidris canutus rufa</i>	T	
<p>Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. A small plump-bodied, short-necked shorebird that in breeding plumage, typically held from May through August, is a distinctive and unique pottery orange color. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (<i>Donax</i> spp.) on beaches and dwarf surf clam (<i>Mulinia lateralis</i>) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.</p>			
<b>Sprague's Pipit</b>	<i>Anthus spragueii</i>	C	
<p>only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.</p>			
<b>Western Burrowing Owl</b>	<i>Athene cunicularia hypugaea</i>		
<p>open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows</p>			
<b>Whooping Crane</b>	<i>Grus americana</i>	LE	E
<p>potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties</p>			
<b>Wood Stork</b>	<i>Mycteria americana</i>		T
<p>forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960</p>			

## GRAYSON COUNTY

### FISHES

		Federal Status	State Status
<b>Blue sucker</b>	<i>Cypleptus elongatus</i>		T
larger portions of major rivers in Texas; usually in channels and flowing pools with a moderate current; bottom type usually of exposed bedrock, perhaps in combination with hard clay, sand, and gravel; adults winter in deep pools and move upstream in spring to spawn on riffles			
<b>Creek chubsucker</b>	<i>Erimyzon oblongus</i>		T
tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto rivers; small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks			
<b>Goldeye</b>	<i>Hiodon alosoides</i>		
Red River basin below reservoir; spawns spring to July in shallow firm-bottomed backwaters or gravel shoals in tributaries, eggs semibuoyant drift downstream or to quiet water; adults in quiet turbid water of medium to large lowland rivers, small lakes, marshes and muddy shallows connected to them; young feed on microcrustaceans and other inverts; adults on surface water insects, also frogs, fishes, and small mammals			
<b>Orangebelly darter</b>	<i>Etheostoma radiosum</i>		
Red through Angelina River basins; just headwaters ranging from high gradient streams to more sluggish lowland streams, gravel and rubble riffles preferred; eggs buried in gravel and riffle raceways, post-larvae live in quiet water, move into progressively faster water as they mature, young feed mostly on copepods and cladocerans, adults on mayfly and fly larvae, spawn late February through mid-April in eastern Texas			
<b>Paddlefish</b>	<i>Polyodon spathula</i>		T
prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawns in fast, shallow water over gravel bars; larvae may drift from reservoir to reservoir			
<b>Shovelnose sturgeon</b>	<i>Scaphirhynchus platorynchus</i>		T
open, flowing channels with bottoms of sand or gravel; spawns over gravel or rocks in an area with a fast current; Red River below reservoir and rare occurrence in Rio Grande			

### MAMMALS

		Federal Status	State Status
<b>Plains spotted skunk</b>	<i>Spilogale putorius interrupta</i>		
catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie			
<b>Red wolf</b>	<i>Canis rufus</i>	LE	E
extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies			

### MOLLUSKS

		Federal Status	State Status
<b>Texas heelsplitter</b>	<i>Potamilus amphichaenus</i>		T

## GRAYSON COUNTY

### MOLLUSKS

Federal Status

State Status

quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins

### REPTILES

Federal Status

State Status

**Alligator snapping turtle**

*Macrochelys temminckii*

T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

**Texas horned lizard**

*Phrynosoma cornutum*

T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

**Timber rattlesnake**

*Crotalus horridus*

T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

**Appendix B**

Vegetation Lists



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Sheppard Air Force Base & Lake  
Texoma Recreation Annex

B

## Vegetation List: Sheppard AFB Riparian Areas

<b>Common Name</b>	<b>Scientific Name</b>
boxelder	<i>Acer negundo</i>
common yarrow	<i>Achillea millefolium</i>
annual ragweed	<i>Ambrosia artemisiifolia</i>
lanceleaf ragweed	<i>Ambrosia bidentata</i>
giant ragweed	<i>Ambrosia trifida</i>
big bluestem	<i>Andropogon gerardii</i>
butterfly milkweed	<i>Asclepias tuberosa</i>
slimleaf milkweed	<i>Asclepias stenophylla</i>
sideoats grama	<i>Bouteloua curtipendula</i>
Texas grama	<i>Bouteloua rigidisetata</i>
soft brome	<i>Bromus hordeaceus</i>
cheatgrass	<i>Bromus tectorum</i>
sedge	<i>Carex</i>
water hickory	<i>Carya aquatica</i>
pecan	<i>Carya illinoensis</i>
sugarberry	<i>Celtis laevigata</i>
Texas redbud	<i>Cercis canadensis var. texensis</i>
partridge pea	<i>Chamaecrista fasciculata</i>
Bermudagrass	<i>Cynodon dactylon</i>
Queen Anne's lace	<i>Daucus carota</i>
blackfruit spikerush	<i>Eleocharis malanocarpa</i>
Texas stork's bill	<i>Erodium texanum</i>
white ash	<i>Fraxinus pennsylvanica</i>
common sunflower	<i>Helianthus annuus</i>
Maximilian sunflower	<i>Helianthus maximiliani</i>
little barley	<i>Hordeum pusillum</i>
common rush	<i>Juncus effusus</i>
eastern redcedar	<i>Juniperus virginiana</i>
weedy dwarf dandelion	<i>Krigia caespitosa</i>
southern pepperwort	<i>Lepidium austrinum</i>
perennial ryegrass	<i>Lolium perenne</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Texas lupine	<i>Lupinus texensis</i>
sweetclover	<i>Melilotus officinalis</i>
bractless blazingstar	<i>Mentzelia nuda</i>
Nuttall's sensitive-briar	<i>Mimosa nuttallii</i>
mulberry	<i>Morus</i>
red mulberry	<i>Morus rubra</i>

Texas wintergrass	<i>Nassella leucotricha</i>
showy evening primrose	<i>Oenothera grandis</i>
tulip pricklypear	<i>Opuntia phaeacantha</i>
switchgrass	<i>Panicum virgatum</i> var. <i>virgatum</i>
American sycamore	<i>Platanus occidentalis</i>
eastern cottonwood	<i>Populus deltoides</i>
honey mesquite	<i>Prosopis glandulosa</i>
screwbean mesquite	<i>Prosopis pubescens</i>
Mexican plum	<i>Prunus mexicana</i>
white oak	<i>Quercus alba</i>
Texas red oak	<i>Quercus buckleyi</i>
chinquapin oak	<i>Quercus muehlenbergii</i>
beaksedge	<i>Rhynchospora</i>
black willow	<i>Salix nigra</i>
soapberry	<i>Sapindus</i>
fescue	<i>Schedonorus</i>
little bluestem	<i>Schizachyrium</i> <i>scoparium</i>
roadside blue-eyed grass	<i>Sisyrinchium langloisii</i>
Canada goldenrod	<i>Solidago altissima</i>
downy ragged goldenrod	<i>Solidago petiolaris</i>
St. Augustine grass	<i>Stenotaphrum</i> <i>secundatum</i>
salt cedar	<i>Tamarix ramosissima</i>
common dandelion	<i>Taraxacum officinale</i>
eastern poison ivy	<i>Toxicodendron radicans</i>
puncturevine	<i>Tribulus terrestris</i>
white clover	<i>Trifolium repens</i>
broadleaf cattail	<i>Typha latifolia</i>
American elm	<i>Ulmus americana</i>
cedar elm	<i>Ulmus crassifolia</i>
Texas vervain	<i>Verbena halei</i>

## Vegetation List: Sheppard AFB Maintained Grasslands

<b>Common Name</b>	<b>Scientific Name</b>
Texas Indian mallow	<i>Abutilon fruticosum</i>
common yarrow	<i>Achillea millefolium</i>
southwestern needlegrass	<i>Achnatherum eminens</i>
slenderleaf false foxglove	<i>Agalinis tenuifolia</i>
crested wheatgrass	<i>Agropyron cristatum</i>
upland bentgrass	<i>Agrostis perennans</i>
nodding onion	<i>Allium cernuum</i>
annual ragweed	<i>Ambrosia artemisiifolia</i>
giant ragweed	<i>Ambrosia trifida</i>
eastern bluestar	<i>Amsonia tabernaemontana</i>
plains dozedaisy	<i>Aphanostephus ramosissimus</i>
sixweeks threeawn	<i>Aristida adscensionis</i>
broadleaf milkweed	<i>Asclepias latifolia</i>
showy milkweed	<i>Asclepias speciosa</i>
Milkvetch	<i>Astragalus sp.</i>
sideoats grama	<i>Bouteloua curtipendula</i>
blue grama	<i>Bouteloua gracilis</i>
field mustard	<i>Brassica rapa</i>
red brome	<i>Bromus rubens</i>
cheatgrass	<i>Bromus tectorum</i>
Cherokee sedge	<i>Carex cherokeensis</i>
tall thistle	<i>Cirsium altissimum</i>
field bindweed	<i>Convolvulus arvensis</i>
Bermudagrass	<i>Cynodon dactylon</i>
Queen Anne's lace	<i>Daucus carota</i>
Arizona cottontop	<i>Digitaria californica</i>
Canada wildrye	<i>Elymus canadensis</i>
squirreltail	<i>Elymus elymoides</i>
redstem stork's bill	<i>Erodium cicutarium</i>
Texas stork's bill	<i>Erodium texanum</i>
Indian blanket	<i>Gaillardia pulchella</i>
Maximilian sunflower	<i>Helianthus maximiliani</i>
little barley	<i>Hordeum pusillum</i>
common pepperweed	<i>Lepidium densiflorum</i>
Texas bluebonnet	<i>Lupinus subcarnosus</i>
Texas lupine	<i>Lupinus texensis</i>
littleleaf sensitive-briar	<i>Mimosa microphylla</i>

Texas wintergrass	<i>Nassella leucotricha</i>
common evening primrose	<i>Oenothera biennis</i>
panicgrass	<i>Panicum sp</i>
honey mesquite	<i>Prosopis glandulosa</i>
lady's tresses	<i>Schiedeella sp.</i>
little bluestem	<i>Schizachyrium scoparium</i>
Canada goldenrod	<i>Solidago canadensis</i>
white heath aster	<i>Symphyotrichum ericoides</i>
sky blue aster	<i>Symphyotrichum oolentangiense</i>
purpletop tridens	<i>Tridens flavus</i>
white clover	<i>Trifolium repens</i>
purpletop vervain	<i>Verbena bonariensis</i>



Vegetation List: Sheppard AFB Mixed Mesquite Woodland and Mesquite Brushland

<b>Common Name</b>	<b>Scientific Name</b>
common yarrow	<i>Achillea millefolium</i>
meadow garlic	<i>Allium canadense</i>
great ragweed	<i>Ambrosia trifida</i>
Arkansas dozedaisy	<i>Aphanostephus skirrhobasis</i>
slimleaf milkweed	<i>Asclepias stenophylla</i>
butterfly milkweed	<i>Asclepias tuberosa</i>
Canadian milkvetch	<i>Astragalus canadensis</i>
King Ranch bluestem	<i>Bothriochloa ischaemum</i>
blue grama	<i>Bouteloua gracilis</i>
Texas grama	<i>Bouteloua rigidiseta</i>
Japanese brome	<i>Bromus arvensis</i>
rescuegrass	<i>Bromus catharticus</i>
cheatgrass	<i>Bromus tectorum</i>
purple poppymallow	<i>Callirhoe involucrata</i>
shepherd's purse	<i>Capsella bursa-pastoris</i>
sugarberry	<i>Celtis laevigata</i>
partridge pea	<i>Chamaecrista fasciculata</i>
hooded windmill grass	<i>Chloris cucullata</i>
Texas thistle	<i>Cirsium texanum</i>
white prairie clover	<i>Dalea candida</i>
wildrye	<i>Elymus</i>
Virginia wildrye	<i>Elymus virginicus</i>
Engelmann's daisy	<i>Engelmannia</i>
Texas stork's bill	<i>Erodium texanum</i>
Carolina geranium	<i>Geranium carolinianum</i>
common sunflower	<i>Helianthus annuus</i>
phlox heliotrope	<i>Heliotropium convolvulaceum</i>
needle-and-thread grass	<i>Hesperostipa comata</i>
little barley	<i>Hordeum pusillum</i>
bush morning-glory	<i>Ipomoea leptophylla</i>
eastern redcedar	<i>Juniperus virginiana</i>
southern pepperwort	<i>Lepidium austrinum</i>
Texas lupine	<i>Lupinus texensis</i>
sweetclover	<i>Melilotus officinalis</i>
Texas wintergrass	<i>Nassella leucotricha</i>
pricklypear	<i>Opuntia</i>

Christmas mistletoe	<i>Phoradendron tomentosum</i>
woolly plantain	<i>Plantago patagonica</i>
Virginia plantain	<i>Plantago virginica</i>
western soapberry	<i>Sapindus drummondii</i>
swordleaf blue-eyed grass	<i>Sisyrinchium chilense</i>
silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Canada goldenrod	<i>Solidago altissima</i>
downy ragged goldenrod	<i>Solidago petiolaris</i>
Johnsongrass	<i>Sorghum halepense</i>
northern slender lady's tresses	<i>Spiranthes lacera</i>
white heath aster	<i>Symphyotrichum ericoides</i>
Sky blue aster	<i>Symphyotrichum oolentangiense</i>
white tridens	<i>Tridens albescens</i>
white clover	<i>Trifolium repens</i>
purple sandgrass	<i>Triplasis purpurea</i>
Louisiana vetch	<i>Vicia ludoviciana</i>

## Vegetation List: SRA Mixed Woodland

<b>Common Name</b>	<b>Scientific Name</b>
common yarrow	<i>Achillea millefolium</i>
great ragweed	<i>Ambrosia trifida</i>
nodding beardtongue	<i>Penstemon laxiflorus</i>
southern dewberry	<i>Rubus trivialis</i>
little bluestem	<i>Schizachyrium scoparium</i>
American beautyberry	<i>Callicarpa americana</i>
sedge	<i>Carex</i>
pecan	<i>Carya illinoensis</i>
black hickory	<i>Carya texana</i>
sugarberry	<i>Celtis laevigata</i>
shortstalk chickweed	<i>Cerastium brachypodium</i>
eastern redbud	<i>Cercis canadensis</i>
partridge pea	<i>Chamaecrista fasciculata</i>
yellowspine thistle	<i>Cirsium ochrocentrum</i>
roughleaf dogwood	<i>Cornus drummondii</i>
flowering dogwood	<i>Cornus florida</i>
downy hawthorn	<i>Crataegus mollis</i>
green hawthorn	<i>Crataegus viridis</i>
common persimmon	<i>Diospyros virginiana</i>
Virginia wildrye	<i>Elymus virginicus</i>
red lovegrass	<i>Eragrostis secundiflora</i>
purple lovegrass	<i>Eragrostis spectabilis</i>
eastern daisy fleabane	<i>Erigeron annuus</i>
stretchberry	<i>Forestiera pubescens</i>
Virginia strawberry	<i>Fragaria virginiana</i>
Carolina buckthorn	<i>Frangula caroliniana</i>
white ash	<i>Fraxinus americana</i>
green ash	<i>Fraxinus pennsylvanica</i>
honeylocust	<i>Gleditsia triacanthos</i>
possumhaw	<i>Ilex decidua</i>
common rush	<i>Juncus effusus</i>
eastern redcedar	<i>Juniperus virginiana</i>
whitegrass	<i>Leersia virginica</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Texas lupine	<i>Lupinus texensis</i>
osage orange	<i>Maclura pomifera</i>
Nuttall's sensitive-briar	<i>Mimosa nuttallii</i>
Roemer's mimosa	<i>Mimosa roemeriana</i>

white mulberry	<i>Morus alba</i>
red mulberry	<i>Morus rubra</i>
pricklypear	<i>Opuntia</i>
foxglove beardtongue	<i>Penstemon digitalis</i>
downy phlox	<i>Phlox pilosa</i>
water knotweed	<i>Polygonum amphibium</i>
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>
eastern cottonwood	<i>Populus deltoides</i>
Chickasaw plum	<i>Prunus angustifolia</i>
white oak	<i>Quercus alba</i>
Texas red oak	<i>Quercus buckleyi</i>
bur oak	<i>Quercus macrocarpa</i>
blackjack oak	<i>Quercus marilandica</i>
chinquapin oak	<i>Quercus muehlenbergii</i>
post oak	<i>Quercus stellata</i>
black oak	<i>Quercus velutina</i>
early buttercup	<i>Ranunculus fascicularis</i>
smooth sumac	<i>Rhus glabra</i>
climbing rose	<i>Rosa setigera</i>
black willow	<i>Salix nigra</i>
wingleaf soapberry	<i>Sapindus saponaria</i>
green bulrush	<i>Scirpus atrovirens</i>
saw greenbrier	<i>Smilax bona-nox</i>
Johnsongrass	<i>Sorghum halepense</i>
eastern poison ivy	<i>Toxicodendron radicans</i>
yellow salsify	<i>Tragopogon dubius</i>
white clover	<i>Trifolium repens</i>
winged elm	<i>Ulmus alata</i>
American elm	<i>Ulmus americana</i>
cedar elm	<i>Ulmus crassifolia</i>
summer grape	<i>Vitis aestivalis</i>
graybark grape	<i>Vitis cinerea</i>
cliff fern	<i>Woodsia</i>

Vegetation List: SRA Maintained Grassland

<b>Common Name</b>	<b>Scientific Name</b>
common yarrow	<i>Achillea millefolium</i>
Cuman ragweed	<i>Ambrosia psilostachya</i>
great ragweed	<i>Ambrosia trifida</i>
valley redstem	<i>Ammannia coccinea</i>
big bluestem	<i>Andropogon gerardii</i>
horsetail milkweed	<i>Asclepias subverticillata</i>
Bermudagrass	<i>Cynodon dactylon</i>
plains lovegrass	<i>Eragrostis intermedia</i>
Sand Love	<i>Eragrostis trichodes</i>
longleaf buckwheat	<i>Eriogonum longifolium</i>
stork's bill	<i>Erodium</i>
Carolina geranium	<i>Geranium carolinianum</i>
bearded skeletongrass	<i>Gymnopogon ambiguus</i>
Needle-and-thread grass	<i>Hesperostipa comata</i>
little barley	<i>Hordeum pusillum</i>
rush	<i>Juncus</i>
little bur-clover	<i>Medicago minima</i>
sweetclover	<i>Melilotus officinalis</i>
wirestem muhly	<i>Muhlenbergia frondosa</i>
switchgrass	<i>Panicum virgatum</i>
western wheatgrass	<i>Pascopyrum smithii</i>
nodding beardtongue	<i>Penstemon laxiflorus</i>
woolly plantain	<i>Plantago patagonica</i>
annual bluegrass	<i>Poa annua</i>
southern dewberry	<i>Rubus trivialis</i>
curly dock	<i>Rumex crispus</i>
azure blue sage	<i>Salvia azurea</i>
little bluestem	<i>Schizachyrium scoparium</i>
silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Texas vervain	<i>Verbena halei</i>

**Appendix C**

Photographic Log





**Baseline Biological Report**


Sheppard Air Force Base & Lake  
Texoma Recreation Annex

C


<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>1</b>	<b>Date:</b> 5/6/2015		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> Example of typical habitat along trap transect line within the park (P).			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>2</b>	<b>Date:</b> 5/6/2015		
<b>Direction Photo Taken:</b> Southeast			
<b>Description:</b> Example of typical habitat along trap transect line within southern recreational area 1 (SR1).			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>3</b>	<b>Date:</b> 5/28/2015		
<b>Direction Photo Taken:</b> Northwest			
<b>Description:</b> Example of typical habitat along trap transect line within southern recreational area 2 (SR2).			


<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>4</b>	<b>Date:</b> 5/6/2015		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> Example of typical habitat along trap transect line within northern area (N).			




Property Name: Sheppard AFB		Location: Wichita County, Texas	Project No. 06261043.0000
Photo No. <b>5</b>	Date: 5/6/2015		
Direction Photo Taken: N/A			
Description: Eastern wood rat captured in the park in trap 1 (P 01).			


Property Name: Sheppard AFB		Location: Wichita County, Texas	Project No. 06261043.0000
Photo No. <b>6</b>	Date: 5/6/2015		
Direction Photo Taken: N/A			
Description: Hispid cotton rat captured in the northern area in trap 6 (N 06).			


<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> 7	<b>Date:</b> 5/5/2015		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> Deer mouse captured in northern area in trap 2 (N 02).			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> 8	<b>Date:</b> 5/4/201		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> Mississippi Kite ( <i>Ictinia mississippiensis</i> ) observed within park/former golf course..			





Property Name: Sheppard AFB		Location: Wichita County, Texas	Project No. 06261043.0000
Photo No. <b>9</b>	Date: 5/28/2015		
Direction Photo Taken: Northeast			
Description: Killdeer ( <i>Charadrius vociferus</i> ) and pectoral sandpiper ( <i>Calidris melanotos</i> ) observed east of airfield near drainage outflow.			

Property Name: Sheppard AFB		Location: Wichita County, Texas	Project No. 06261043.0000
Photo No. <b>10</b>	Date: 5/4/2015		
Direction Photo Taken: N/A			
Description: A Texas ratsnake ( <i>Elaphe obsoleta</i> ) observed in northwestern corner of installation.			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>11</b>	<b>Date:</b> 5/4/2015		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> Red eared slider? in pond in park.			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>12</b>	<b>Date:</b> 5/4/2015		
<b>Direction Photo Taken:</b> Northwest			
<b>Description:</b> Representative photo of grassland surrounding air field.			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>13</b>	<b>Date:</b> 5/5/2015		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> Representative photo of mesquite woodland in northwestern area of base.			

<b>Property Name:</b> Sheppard AFB		<b>Location:</b> Wichita County, Texas	<b>Project No.</b> 06261043.0000
<b>Photo No.</b> <b>14</b>	<b>Date:</b> 5/4/2015		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> Representative photo of dominant vegetation in park.			



Property Name:

Sheppard AFB

Location:

Wichita County, Texas

Project No.

06261043.0000

Photo No.

15

Date:

5/6/2015

Direction Photo Taken:

Southeast

Description:

Representative photo of dominant vegetation in riparian area along stream within park.




<b>Property Name:</b> Sheppard AFB Recreation Annex		<b>Location:</b> Grayson County, Texas	<b>Project No.</b> WI001423.0001
<b>Photo No.</b> <b>1</b>	<b>Date:</b> 5/7/2015		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> Example of typical habitat along trap transect line within the airfield (AF).			

<b>Property Name:</b> Sheppard AFB Recreation Annex		<b>Location:</b> Grayson County, Texas	<b>Project No.</b> WI001423.0001
<b>Photo No.</b> <b>2</b>	<b>Date:</b> 5/7/2015		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> Example of typical habitat along trap transect line along the side of the lake (LS).			

<b>Property Name:</b> Sheppard AFB Recreation Annex		<b>Location:</b> Grayson County, Texas	<b>Project No.</b> WI001423.0001
<b>Photo No.</b> <b>3</b>	<b>Date:</b> 5/7/2015		
<b>Direction Photo Taken:</b> Southeast			
<b>Description:</b> Example of typical habitat along trap transect line near the boat storage area (B).			

<b>Property Name:</b> Sheppard AFB Recreation Annex		<b>Location:</b> Grayson County, Texas	<b>Project No.</b> WI001423.0001
<b>Photo No.</b> <b>4</b>	<b>Date:</b> 5/7/2015		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> Example of typical habitat along trap transect line within wooded area bisected by fence (F).			



Property Name: Sheppard AFB Recreation Annex		Location: Grayson County, Texas	Project No. WI001423.0001
Photo No. <b>5</b>	Date: 5/7/2015		
Direction Photo Taken: N/A			
Description: Timber rattlesnake ( <i>Crotalus horridus</i> ) observed along trapping transect along lake (LS).			

Property Name: Sheppard AFB Recreation Annex		Location: Grayson County, Texas	Project No. WI001423.0001
Photo No. <b>6</b>	Date: 5/6/2015		
Direction Photo Taken: N/A			
Description: Black racer ( <i>Coluber constrictor</i> )			

Property Name: Sheppard AFB Recreation Annex		Location: Grayson County, Texas	Project No. WI001423.0001
Photo No. <b>7</b>	Date: 5/8/2015		
Direction Photo Taken: N/A			
Description: Three toed box turtle ( <i>Terrapene carolina triunguis</i> )			

Property Name: Sheppard AFB Recreation Annex		Location: Grayson County, Texas	Project No. WI001423.0001
Photo No. <b>8</b>	Date: 5/7/2015		
Direction Photo Taken: N/A			
Description: Ground skink ( <i>Scincella lateralis</i> )			

**Appendix D**

Avian Species Lists



**Baseline Biological Report**

Sheppard Air Force Base & Lake  
Texoma Recreation Annex

## Avian Species List: Sheppard AFB

<b>Code</b>	<b>Common Name</b>	<b>Scientific Name</b>
AMCR	American Crow	<i>Corvus brachyrhynchos</i>
AMRO	American Robin	<i>Turdus migratorius</i>
BAOR	Baltimore Oriole	<i>Icterus galbula</i>
BARS	Barn Swallow	<i>Hirundo rustica</i>
BCNH	Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>
BHCO	Brown-headed Cowbird	<i>Molothrus ater</i>
BLJA	Blue Jay	<i>Cyanocitta cristata</i>
BUOR	Bullock's Oriole	<i>Icterus bullockii</i>
CACH	Carolina Chickadee	<i>Poecile carolinensis</i>
CAEG	Cattle Egret	<i>Bubulcus ibis</i>
CANG	Canada Goose	<i>Branta canadensis</i>
CEDW	Cedar Waxwing	<i>Bombycilla cedrorum</i>
CHSW	Chimney Swift	<i>Chaetura pelagica</i>
CLSW	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
COGR	Common Grackle	<i>Quiscalus quiscula</i>
DICK	Dickcissel	<i>Spiza americana</i>
EAKI	Eastern Kingbird	<i>Tyrannus tyrannus</i>
EAME	Eastern Meadowlark	<i>Sturnella magna</i>
EAPH	Eastern Phoebe	<i>Sayornis phoebe</i>
EUCD	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>
EUST	European Starling	<i>Sturnus vulgaris</i>
GBHE	Great Blue Heron	<i>Ardea herodias</i>
GRSP	Grasshopper Sparrow	<i>Ammodramus savannarum</i>
GTGR	Great-tailed Grackle	<i>Quiscalus mexicanus</i>
HOFI	House Finch	<i>Haemorhous mexicanus</i>
KILL	Killdeer	<i>Charadrius vociferus</i>
LBHE	Little Blue Heron	<i>Egretta caerulea</i>
LBWO	Ladder-backed Woodpecker	<i>Dryobates scalaris</i>
MIKI	Mississippi Kite	<i>Ictinia mississippiensis</i>
MODO	Mourning Dove	<i>Zenaida macroura</i>
NOCA	Northern Cardinal	<i>Cardinalis cardinalis</i>
NOMO	Northern Mockingbird	<i>Mimus polyglottos</i>
PABU	Painted Bunting	<i>Passerina ciris</i>
PESA	Pectoral Sandpiper	<i>Calidris melanotos</i>
PUMA	Purple Martin	<i>Progne subis</i>
ROPI	Rock Pigeon	<i>Columba livia</i>
RTHA	Red-tailed Hawk	<i>Buteo jamaicensis</i>
RWBL	Red-winged Blackbird	<i>Agelaius phoeniceus</i>

SAVS	Savannah Sparrow	<i>Passerculus sandwichensis</i>
SNEG	Snowy Egret	<i>Egretta thula</i>
STFL	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>
SWHA	Swainson's Hawk	<i>Buteo swainsoni</i>
TUVU	Turkey Vulture	<i>Cathartes aura</i>
WCSP	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
WEKI	Western Kingbird	<i>Tyrannus verticalis</i>
WWDO	White-winged Dove	<i>Zenaida asiatica</i>

Avian Species List: SRA

<b>Code</b>	<b>Common Name</b>	<b>Scientific Name</b>
ACFL	Acadian Flycatcher	<i>Empidonax vireescens</i>
AMCR	American Crow	<i>Corvus brachyrhynchos</i>
AMRE	American Redstart	<i>Setophaga ruticilla</i>
BAOR	Baltimore Oriole	<i>Icterus galbula</i>
BARS	Barn Swallow	<i>Hirundo rustica</i>
BAWW	Black-and-white Warbler	<i>Mniotilta varia</i>
BCTI	Black-crested Titmouse	<i>Baeolophus atricristatus</i>
BEWR	Bewick's Wren	<i>Thryomanes bewickii</i>
BGGN	Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>
BHCO	Brown-headed Cowbird	<i>Molothrus ater</i>
BHVI	Blue-headed Vireo	<i>Vireo solitaries</i>
BLGR	Blue Grosbeak	<i>Passerina caerulea</i>
BLJA	Blue Jay	<i>Cyanocitta cristata</i>
BWTE	Blue-winged Teal	<i>Anas discors</i>
BTNW	Black-throated Green Warbler	<i>Setophaga virens</i>
BUOR	Bullock's Oriole	<i>Icterus bullockii</i>
CACH	Carolina Chickadee	<i>Poecile carolinensis</i>
CAEG	Cattle Egret	<i>Bubulcus ibis</i>
CANG	Canada Goose	<i>Branta canadensis</i>
CARW	Carolina Wren	<i>Thryothorus ludovicianus</i>
CEDW	Cedar Waxwing	<i>Bombycilla cedrorum</i>
CLSW	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
COGR	Common Grackle	<i>Quiscalus quiscula</i>
CONI	Common Nighthawk	<i>Chordeiles minor</i>
EABL	Eastern Bluebird	<i>Sialia sialis</i>
EAKI	Eastern Kingbird	<i>Tyrannus tyrannus</i>
EAPH	Eastern Phoebe	<i>Sayornis phoebe</i>
EATO	Eastern Towhee	<i>Pipilo erythrophthalmus</i>
EUST	European Starling	<i>Sturnus vulgaris</i>
GTGR	Great-tailed Grackle	<i>Quiscalus mexicanus</i>
HOSP	House Sparrow	<i>Passer domesticus</i>
INBU	Indigo Bunting	<i>Passerina cyanea</i>
KILL	Killdeer	<i>Charadrius vociferus</i>
LARB	Lark Bunting	<i>Calamospiza melanocorys</i>
LASP	Lark Sparrow	<i>Chondestes grammacus</i>
MIKI	Mississippi Kite	<i>Ictinia mississippiensis</i>

MALL	Mallard	<i>Anas platyrhynchos</i>
MODO	Mourning Dove	<i>Zenaida macroura</i>
NOCA	Northern Cardinal	<i>Cardinalis cardinalis</i>
NOMO	Northern Mockingbird	<i>Mimus polyglottos</i>
OROR	Orchard Oriole	<i>Icterus spurius</i>
PABU	Painted Bunting	<i>Passerina ciris</i>
RBWO	Red-bellied Woodpecker	<i>Melanerpes carolinus</i>
RCKI	Ruby-crowned Kinglet	<i>Regulus calendula</i>
REVI	Red-eyed Vireo	<i>Vireo olivaceus</i>
RWBL	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
SAVS	Savannah Sparrow	<i>Passerculus sandwichensis</i>
SNEG	Snowy Egret	<i>Egretta thula</i>
SOSP	Song Sparrow	<i>Melospiza melodia</i>
STFL	Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>
SWTH	Swainson's Thrush	<i>Catharus ustulatus</i>
TEWA	Tennessee Warbler	<i>Leiothlypis peregrina</i>
TUTI	Tufted Titmouse	<i>Baeolophus bicolor</i>
WAVI	Warbling Vireo	<i>Vireo gilvus</i>
WEKI	Western Kingbird	<i>Tyrannus verticalis</i>
WEVI	White-eyed Vireo	<i>Vireo griseus</i>
YBCU	Yellow-billed Cuckoo	<i>Coccyzus americanus</i>
YTWA	Yellow-throated Warbler	<i>Setophaga dominica</i>
YWAR	Yellow Warbler	<i>Setophaga petechia</i>

**Appendix E**

Avian Point Count Data Forms



**Baseline Biological Report**

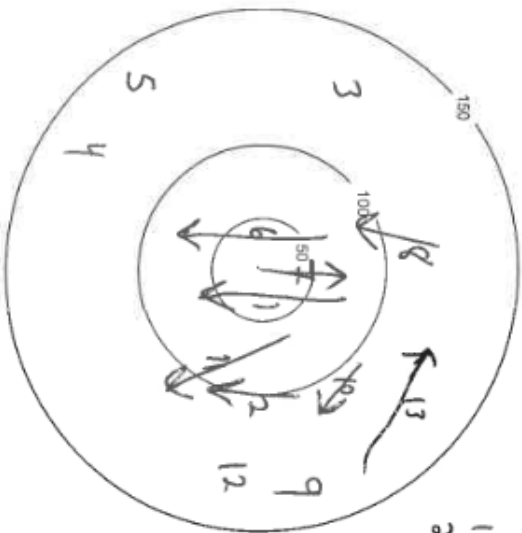
Sheppard Air Force Base & Lake  
Texoma Recreation Annex

E



Migrato rd Survey

Observer: **DET SW** Date: **5.5.2015** Transect: **S** Station #: **5** Start time: **1730** End time: **1740** Temp:  
 Habitat: **Woodland** Cloud cover: **007** Wind:  Precipitation: **None**

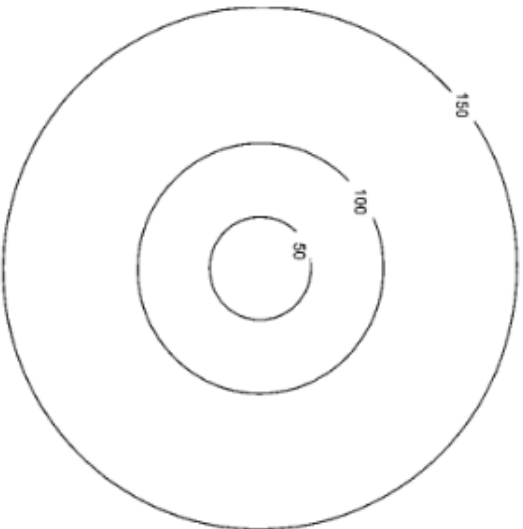


Detect: detection method; A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: **NAD83 UTM Z14**  
**694463E 3750769N LTRRA1**

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	Purple Martin	2									
2	Rufous Martin	2									
3	Little Egret	1									
4	ACR	15									
5	BRB	3									
6	Snowy Egret	2									
7	Starling	1									
8	TUVA	1									
9	WEK	1									
10	Purple Martin	1									
11	Snowy Egret	1									
12	Starling	2									
13	MOB	2									
14											
15											

Migratory rd Survey

Observer: ACT Date: 5/16/15  
 Habitat: FO+VJ Transect: R14 Station #: 1 Start time: 08:08 End time: 08:18 Temp: 68  
 Cloud cover: 100 Wind: 2-9 Precipitation: 0



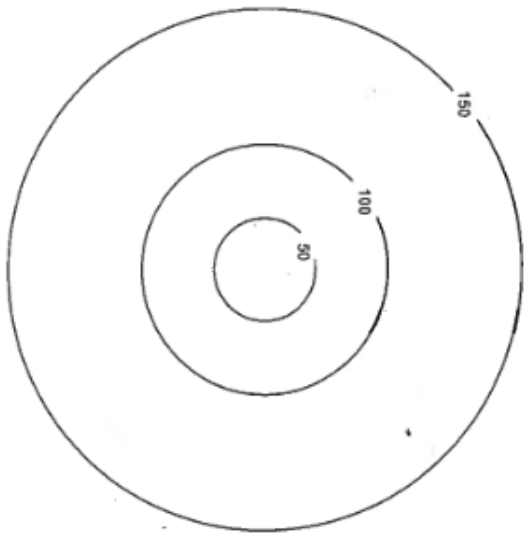
Det: detection method: A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes:  
 Source is chainaw outside of boundary, but ring  
 and bud  
 LTRA 2

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	BUJA	1	A	C							
2	NO79	1	A	S							
3	BAUW	1	A	S							
4	ABCA	1	A	SC							
5	LFUE	1	A	S							
6	BROR	1	A	S							
7	NOCA	1	A	C							
8	RLSA	1	A	C							
9	RSUB	1	A	C							
10	AMCR	2	A	C							
11	SOSP	1	A	S							
12	QICH	1	A	C							



Migratory Bird Survey

Observer: ACT Date: 5/6/15 Transect: A14 Station #: 6 Start time: 0919 End time: 1029 Temp:   
 Habitat: Sunflower field Cloud cover: 100 Wind: 1-2 Precipitation: N

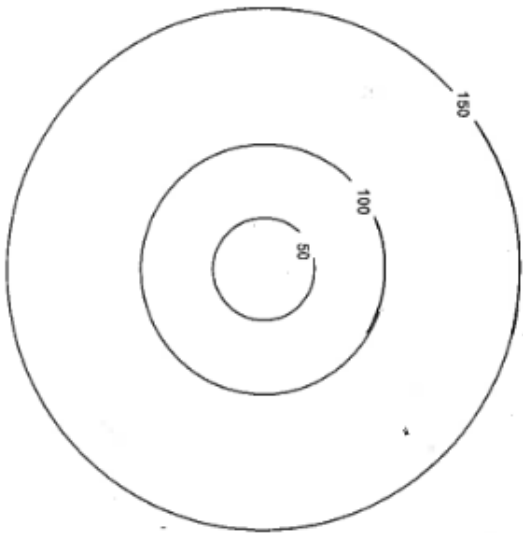


Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	WTC	1	A	S							
2	TOT	1	A	S							
3	ACT	1	A	S							
4	SOT	1	A	S							
5	ACT	2	A	S							
6	ACT	1	A	S							
7	ACT	1	A	S							
8	ACT	1	A	S							
9	ACT	1	A	S							
10	ACT	1	A	S							
11	ACT	1	A	S							
12	ACT	1	A	S							
13	ACT	1	A	S							

Det: detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distances= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points: ACT, FEV, WAVE  
 Non-avian wildlife observed:  
 Notes:  
Many birds in the juniper within the point  
TRP 4

Migratory Bird Survey

Observer: ACT Date: 5/6/15  
 Habitat: Prairie with oak savanna  
 Transect Path: Station #: 7  
 Cloud cover: 100%  
 Start time: 0730  
 End time: 1046  
 Wind: S-W  
 Precipitation: N  
 Temp: 76

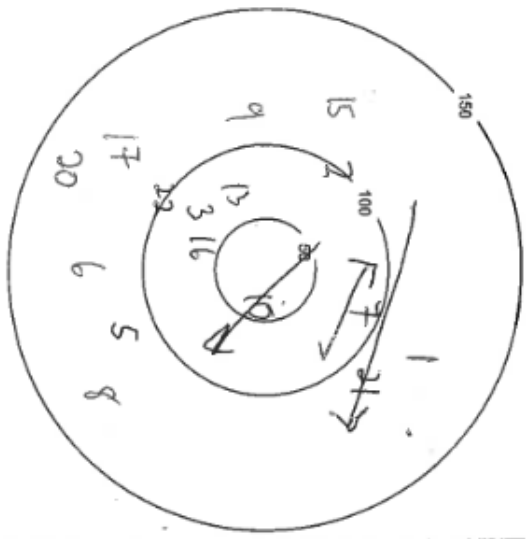


Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	SEUN	15	N/A	T, F, C							
2	GRJA	1	A	C							
3	COVA	1	F	C							
4	LEUE	1	A	S							
5	LEUD	1	A	C, S							
6	EAAT	1	Y	P							
7	ANCB	1	A	C							
8	CAPI	1	A	S							
9	PIJA	1	A	C							
10	COVA	1	A	C							
11	BABU	1	A	S							
12	MOXA	1	A	S							
13	FAAT	4	V	F, P							
14	COVA	1	A	S							
15	BACA	1	AN	S, F, C							
16	WHPE	1	A	S							

Det: detection method: A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points: SEUN, MOXA (N, E), BABA, GRJA  
 Non-swain wildlife observed: KBUD  
 Notes:  
LTRA 5

Migrator and Survey

Observer: D.F. Act Date: 5/7/15 Station #: 7001  
 Habitat: Cloud cover: 0-7% Shift time: 0812 End time: 0822 Temp: 60  
 Wind: 0-2 Precipitation: None

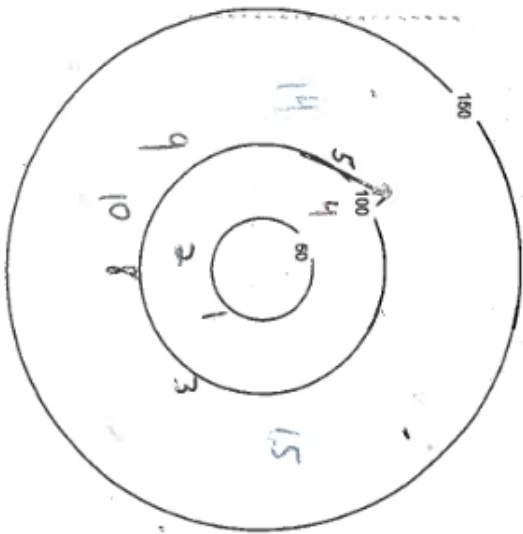


Dat: detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: MAD83 UTM 214  
 694694E 3750811N  
 LTRAC

Obs#	Spp.	#	Dat	behavior	Dist	Obs#	Spp.	#	Dat	behavior	Dist
1	CEJA	1									
2	EATL	1									
3	DEK	1									
4	VEWA	1									
5	NOCA	1									
6	NOCA	1									
7	BASZ	3									
8	BASZ	1									
9	PABU	1									
10	CATS	1									
11	DEK	1									
12	BGCM	2									
13	CASP	1									
14	KRWA	1									
15	CATG	3									
16	NOCA	2									
17	MODD	1									
18	CACH	1		Singing							
19	VEWA	1		W							
20	DEK	1									
21	COGR	1									
22	WTCU	1									

Observer: T + DF Date: 5-7-2015  
 Habitat: CRSS  
 Transsect: Station #: 7-002  
 Cloud cover: 100% Start time: 0830 End time: 0941  
 Wind: --- Precipitation: Miss Temp: 61

Migrator rd Survey



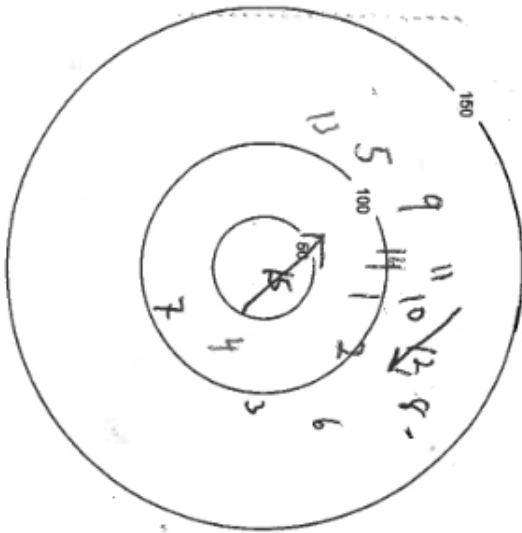
Detect: detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points: COYE  
 Non-avian wildlife observed:  
 Notes: WAD82 UTM Z14  
 644497E 3750798N  
 LTRR 7

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	DECK	1									
2	ACFL	1									
3	CAFE	2									
4	BCTI	2									
5	BKSW	2									
6	MOZD	1									
7	PABD	1									
8	YEMA	2		Sleeping							
9	YEMA	1									
10	EMBL	1									
11	OVAN	1									
12	PRBU	1									
13	BHCO	2									
14	MOOC	2									
15	MOCA	1									
16											
17											

Handwritten marks: a checkmark and the number '773'.

Migrator rd Survey  
7-093

Observer: T + DF Date: 5.7.2015  
 Habitat: ~~Forest~~ Woodland / Edge  
 Transect: Station #: 1007  
 Chut cover: 100%  
 Start time: 0819  
 End time: 0909  
 Temp: 6.0  
 Precipitation: None



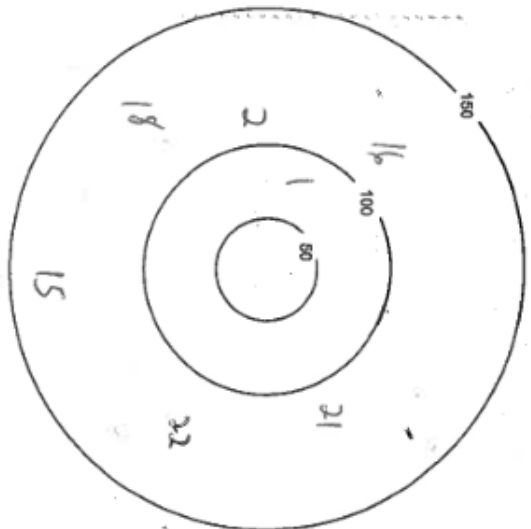
Obs#	Spp.	#	Del	behavior	Diel	Obs#	Spp.	#	Del	behavior	Diel
1	NOCA	1		Singing							
2	NOCA	1		"							
3	NOCA	1		"							
4	SOSP	1		"							
5	MADO	1		"							
6	CARW	1		"							
7	BETI	1		"							
8	ANCR	1		"							
9	BEWR	1		(calling Singing)							
10	BAOR	1		"							
11	EABL	1		"							
12	BASV	2		"							
13	BATA	1		(calling Singing)							
14	BCTI	1		"							
15	BASW	1		Fly							
16											
17											
18											
19											
20											

Dist: detection method: A=sudo, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distances= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points: BALW  
 Non-avian wildlife observed:  
 Notes: NAD83 UTM Z14  
 694373E 3750563N  
 UTRA 8



Observer: ACT + DF Date: 5-7  
 Habitat: Open Lakeshore  
 Transect: Station #: 7-004  
 Cloud cover: 100%  
 Sighting time: 0918  
 End time: 0928  
 Temp: 60  
 Wind: 0-1  
 Precipitation: None - Mist

Migratory Bird Survey



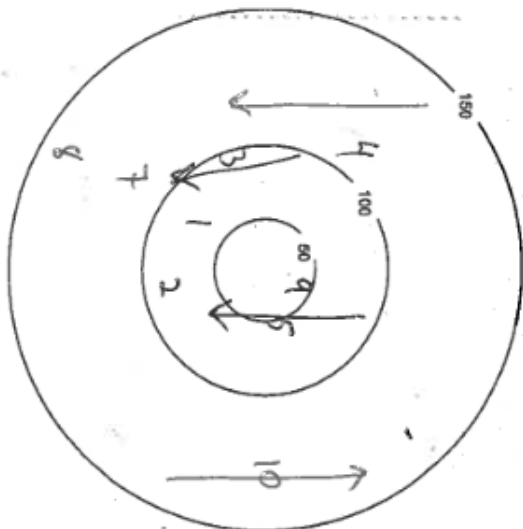
Dat: detection method; A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= including, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points: BEWR, BROR(F)  
 Non-vian wildlife observed:  
 Notes: NAD83 UTM Z14  
 694322E 3751089N  
 LTPA 9

Obs#	Spp.	#	D&T	behavior	Diet	Obs#	Spp.	#	Dat	behavior	Diet
1	HOSR	4									
2	BASW	2									
3	CLSV	3									
4	RUBL	1									
5	MOJO	1									
6	WEKT	2									
7	COGR	1									
8	BAOR	1									
9	COGR	1									
10	ACTE	1									
11	CLSV	6									
12	WEKT	1									
13	EAKI	1									
14	YELW	1									
15	BAOR	1									
16	NOCA	1									
17	EAKI	3									
18	NOJO	1									
19	RGTI	1									
20	BEWR	1									
21	CACH	1									
22	NOCA	1									
23											
24											
25											

CLING

Migratory rd Survey

Observer: ACT - DF Date: 5-7-2015  
 Habitat: Open Grassland / Lake Shore  
 Transect: Station #: 7-005  
 Cloud cover: 100% Slight time: 0745 End time: 0955  
 Wind: S @ 2-10 Precipitation: No/A/E Temp: 60°

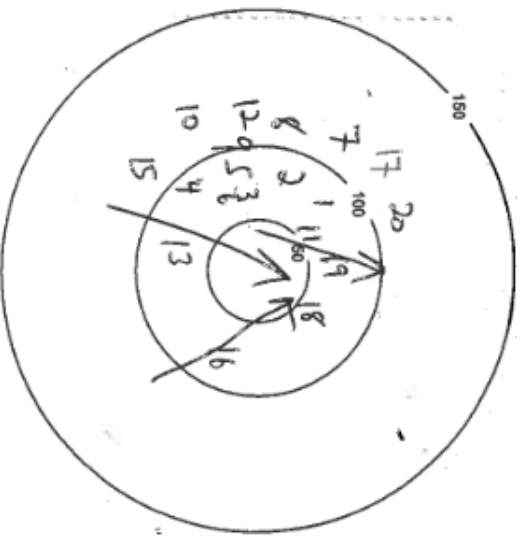


Dat: detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: NAD88 UTM Z14  
 694831E 3751143N  
 LTPA-10

Obs#	Spp.	#	Det	behavior	Diet	Obs#	Spp.	#	Det	behavior	Diet
1	SAVS	1									
2	EABL	2									
3	CLSV	20									
4	CAGO	5									
5	SAKT	1									
6	STPL	1									
7	SAVS	2									
8	DICK	1									
9	KILL	1									
10	SWEG	1									
11											
12											
13											
14											

Migrator rd Survey

Observer: ACT - DF Date: 5-7-2015  
 Habitat: Wood/road/Lake Shore  
 Station #: 7-006  
 Cloud cover: 00  
 Sight time: 1001  
 End time: 1011  
 Wind: S-10  
 Precipitation: No/N/S  
 Temp: 60



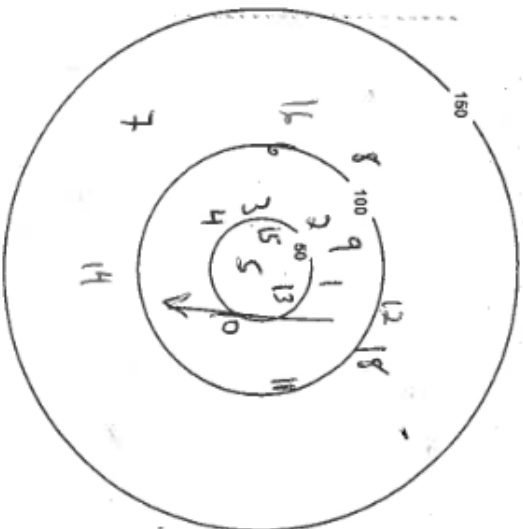
Detect: detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: NA082 OTM Z14  
 694916E 3750732N  
 LTRP 11

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	RAOR	1									
2	RWV	1									
3	AHCR	1									
4	ORCO	1									
5	CAPV	1									
6	VEVA	1									
7	NOCA	1									
8	BLGR	1									
9	VEWH	1									
10	BCTI	1									
11	TNBN	1									
12	PEBV	1									
13	AHCR	1									
14	ORCR	1									
15	ORCO	2									
16	CSW	1									
17	NOCA	2									
18	REVO	1									
19	SABG	1									
20	CHCH	1									
21	VTWH	1									
22											
23											
24											
25											

Migrator rd Survey

7-207

Observer: ACT + DF Date: 5-7-2015  
 Habitat: Wood Island / Ledge Shore  
 Transect: Station #: 1007  
 Cloud cover: 100%  
 Shift time: 0830 End time: 1040  
 Wind: S-10 Precipitation: NONE  
 Temp: 60

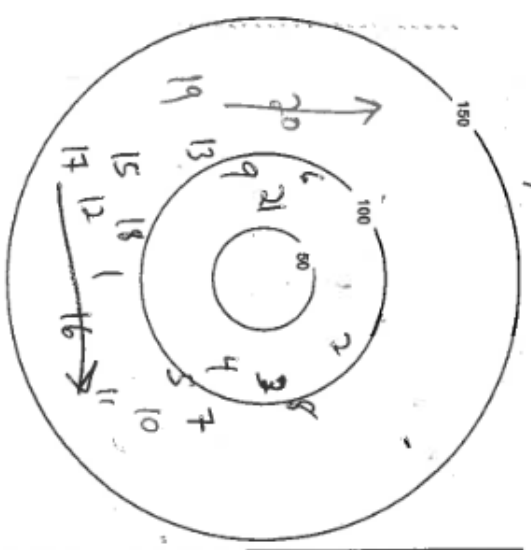


Diet detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distances: 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: NAD83 UTM Z14  
 695038E 3750552N  
 LTRA 12

Obs#	Spp.	#	Det	behavior	Diet	Obs#	Spp.	#	Det	behavior	Diet
1	LASP	1									
2	BOOR	1									
3	RELA	1									
4	DAOR	1									
5	BLOR	1									
6	VEVA	1									
7	RLTA	1									
8	TABU	1									
9	BAOR	3									
10	CLSU	4									
11	LASP	1									
12	ABTA	1									
13	NOC	1									
14	REBL	1									
15	EARL	1									
16	VELVA	1									
17	EARL	1									
18	BRCA	2									
19	CARV	1									
20	VELVA	2									

Migratory rd Survey

Observer: ACT-DF Date: 5-8-2015  
 Habitat: Grass / Woodland  
 Transect: Station #: 8-001  
 Cloud cover: 100% Wind: — Shift time: 0730 End time: 0809 Temp: 60  
 Precipitation: No ME

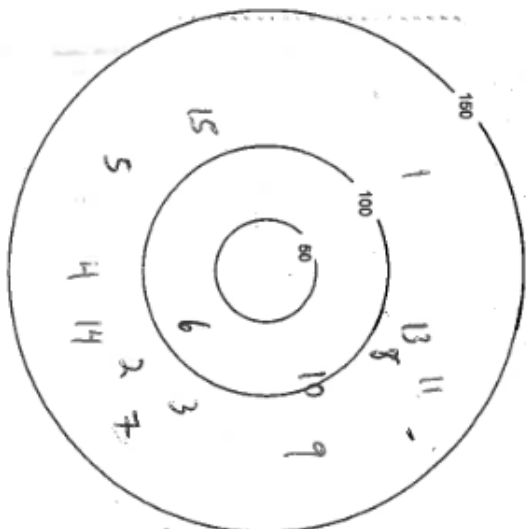


Obs#	Spp.	#	Det	behavior	Diet	Obs#	Spp.	#	Det	behavior	Diet
1	AYGR	1									
2	BLWT	1									
3	BLWT	1									
4	BCTT	1									
5	ANCA	1									
6	NOCA	1									
7	PARU	1									
8	CAWR	1									
9	MACR	1									
10	WEVI	1									
11	BCTT	1									
12	MOBO	1									
13	CAWR	1									
14	BLWT	1									
15	BGSN	1									
16	MOBO	1									
17	VICU	1									
18	BAOR	1									
19	PARU	1									
20	CEVA	4									
21	NOCA	3									

Det: detection method: A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-swain wildlife observed:  
 Notes:  
 644 221 E  
 3756544 N  
 LTRAVIS

8-002 Migrator rd Survey

Observer: Act-DF Date: 5-8-2015  
 Habitat: Woodlot  
 Transsect: Station #: 101  
 Cloud cover: 100%  
 Shift time: 0830 End time: 0830  
 Wind: — Precipitation: N/A  
 Temp: 60



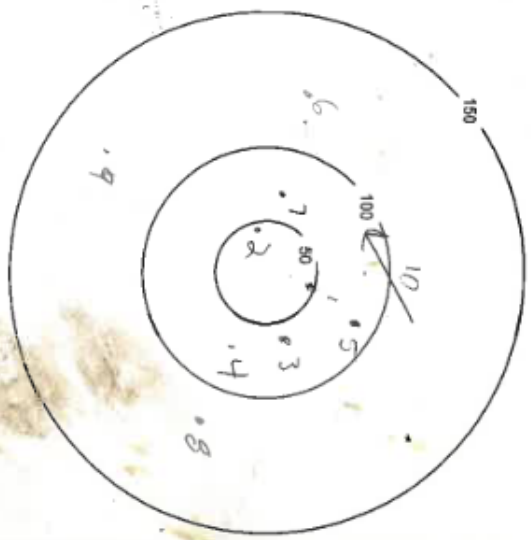
Obs#	Sp.	#	Det	behavior	Dist	Obs#	Sp.	#	Det	behavior	Dist
1	SVTH	1									
2	MOCA	1									
3	PABU	1									
4	NOCA	1									
5	AHR	1									
6	BAOR	1									
7	REVE	1									
8	CHCH	1									
9	NOCA	1									
10	BEWA	1									
11	MOPO	1									
12	CHCH	1									
13	PABU	1									
14	BCIE	1									
15	DECK	1									

Det: detection method, A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: NAD83 UTM Z14  
 694494E 3750168N  
 LTRA 14



Migrator rd Survey

Observer: SW + JF Date: 1/11/15  
 Station #: 16115  
 Transact: Cloud cover: Wind: Precipitation: 2000  
 Start time: 15:15 End time: 16:25 Temp: 27



Detect: detection method; A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes:  
 LTRA 11

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	WYV	1	V								
2	WYV	1	V								
3	NOCA	1									
4	BAOR	1									
5	EAH	1									
6	KOOR	1									
7	NOCA	2									
8	BAOR	1									
9	WYV	1									
10	BAOR	1									



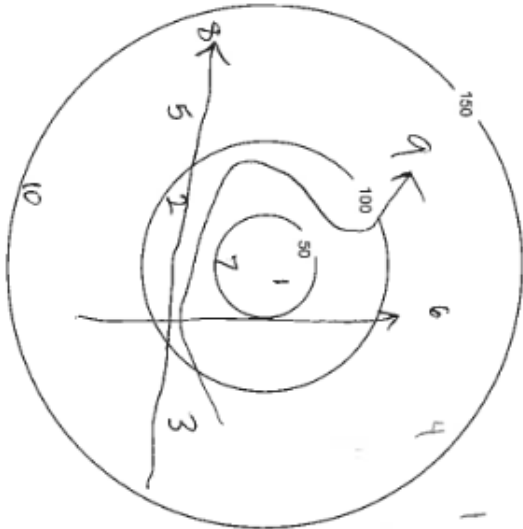






Observer: ACT CAR Date: 5/4/15 Station #: 1 Start time: 1711 End time: 1721 Temp: 76  
 Habitat: Redwood golf course Transect: Golf Edge Cloud cover: 85 Wind: S Precipitation: N

(GE) Migratory rd Survey

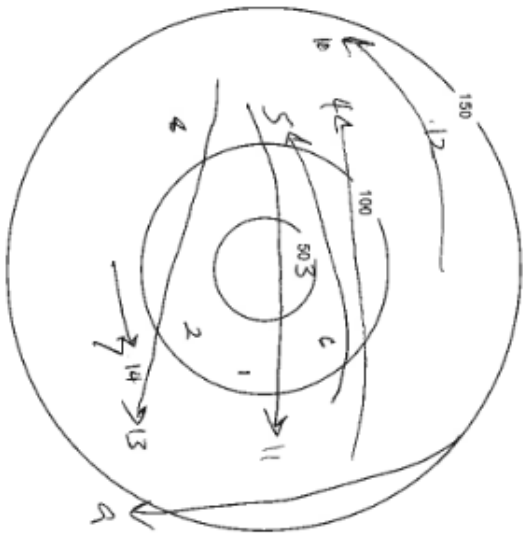


Det: detection method; A=audio, V=visual  
 Behavior: P=perched, C=calling, S=singing, FO=flyover, F=foraging  
 T=territory display, I=incubating, NB=nest building, Fy=feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes:  
 SAFB 1

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	WIND	1	A	P/S	100						
2	CARD	2	V	F	100						
3	NOCA	1	A	S	100						
4	NOCA	1	A	S	100						
5	EAME	1	A	S	100						
6	EUST	1	V	FD	100						
7	SFEL	1	V	P	100						
8	WIND	2	V	FO	100						
9	CHSW	1	V	FO	100						
10	WAKE	1	V	P	100						

Migratory rd Survey

Observer: ACT CAR Date: 5/4/15 Transsect: GE Station #: 2 Start time: 1730 End time: 1740 Temp: 74  
 Habitat: GRASSLAND Cloud cover: 70 Wind: S-6 E Precipitation: N



Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
<del>1</del>	<del>MONO</del>	1	V	P	2						
2	STFL	1	A	S	2						
3	GRSP	1	A	S	1						
4	GRGR	1	V	FO	—						
5	MONO	1	V	FO	—						
6	GRSP	1	A	S	2						
7	EAHE	1	A	S	3						
8	EAHE	1	A	S	3						
9	BRNH	1	V	FO	—						
10	TUVU	1	V	FO	—						
11	HOFE	1	V/A	FO, C	—						
12	EAHE	2	V	C	3						
13	WUJO	3	V	FO	—						
<del>14</del>	<del>WUJO</del>	—	—	—	—						
14	BEKE	1	V	FO	3						

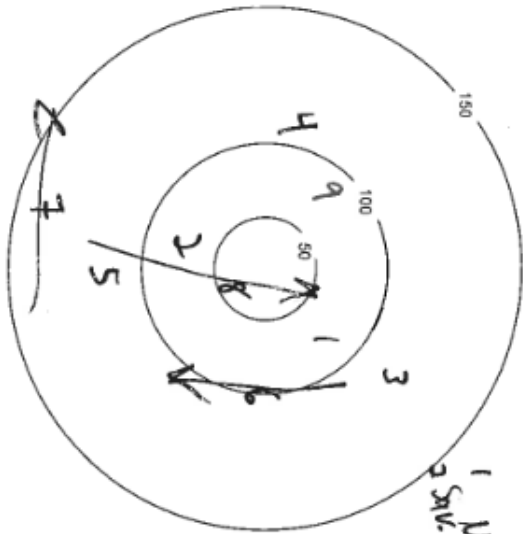
Det: detection method: A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes:  
 SAFB 2





Observer: Scott V Date: 5.4.2015  
 Habitat: Open Grass - Golf Course Transect: Station # 1 Start time: 1:05 End time: 1:13 Temp: 75°  
 Cloud cover: 80% Wind: 7 E Precipitation: None

Migratory rd Survey



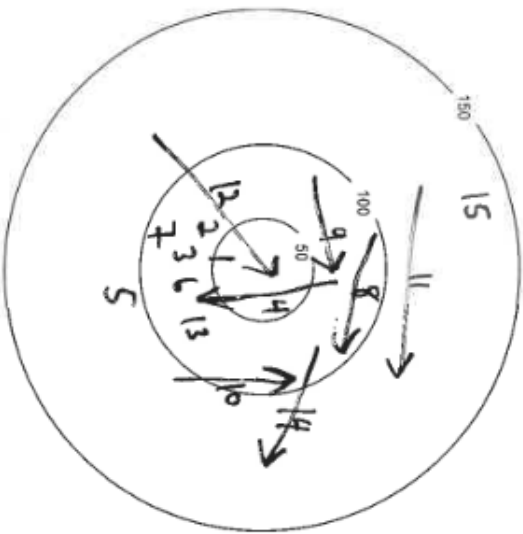
Dist: detection method: A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: NADGS UTM 24  
 546133E 3757491N  
 SAFB S

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	NPHO	1									
2	Sav. Sparrow	1									
3	Grackle	1									
4	MOB	1									
5	Bluejay	2									
6	Grackle	1									
7	Grackle	1									
8	Grackle	1									
9	Ball's Oriole	2									
10											



Observer: **SW + DF** Date: **5.4.2015** Station #: **2** Start time: **17:26** End time: **17:36** Temp:   
 Habitat: **Open Grass - Golf** Transsect: Cloud cover: **90%** Wind: **10 E** Precipitation: **None**

Migratory Bird Survey

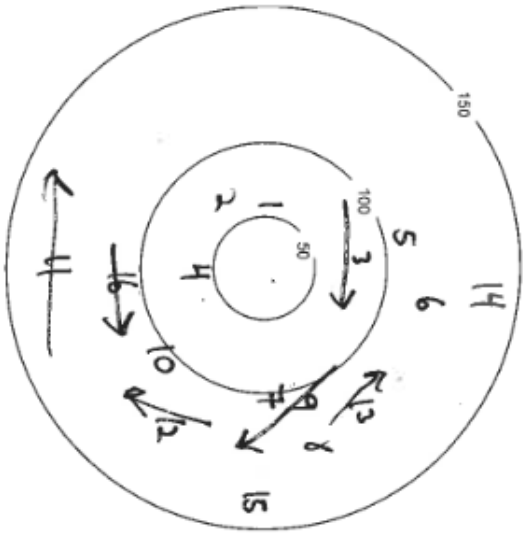


Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	Canada Goose	6									
2	MODO	2									
3	RVBL	1									
4	KILL	1									
5	AMRO	1									
6	Redback woodpecker	1									
7	Scissor-tail Flycatcher	1									
8	Starling	3									
9	Mockingbird	1									
10	MODO	2									
11	MODO	2									
12	TUVU	1									
13	AMRO	1									
14	Starling	6									
15	Canada Goose	2									

Det: detection method: A=audio, V=visual  
 Behavior: P=perched, C=calling, S=singing, FO=flyover, F=foraging  
 T=territory display, I=incubating, NB=nest building, Fy=feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: **NADRS OTM 214**  
**SH605E 3757782N**  
**SAFB 6**

Observer: **SV & DF** Date: **5.4.2015** Station #: **3** Start time: **17:44** End time: **17:54** Temp: **25°**  
 Habitat: **Open Grass - Golf** Cloud cover: **10%** Wind: **SE 10** Precipitation: **None**

Migrato rd Survey ~~17:44~~ 17:54

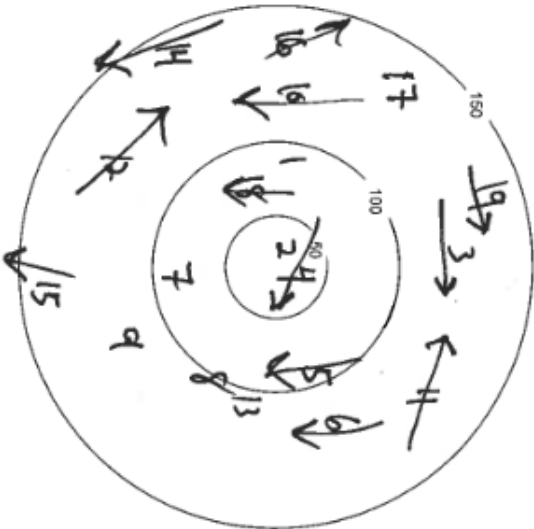


Det: detection method: A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes: **NAD 03 UTM 2 14**  
**546029E 3758087N**  
**SAFR 7**

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	AMRO	1									
2	Great Grackle	1									
3	MODO	1									
4	AMRO	1									
5	Great Grackle	1									
6	AMRO	1									
7	Savannah Sparrow	1									
8	Grackle	1									
9	Starling	4									
10	Scissortail Fly	1									
11	Egret Snowy	3									
12	ArbDN	1									
13	Scissor Fly	1									
14	Starling	5									
15	Green Heron	1									
16	Cliff Swallow	1									

Migrato, rd Survey

Observer: **SU-DF** Date: **5-4-2015** Station #: **4** Start time: **1800** End time: **1810** Temp: **75°**  
 Habitat: **Open Grass** Cloud cover: **30%** Wind: **E 10** Precipitation: **None**



Det: detection method: A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:

Non-avian wildlife observed:

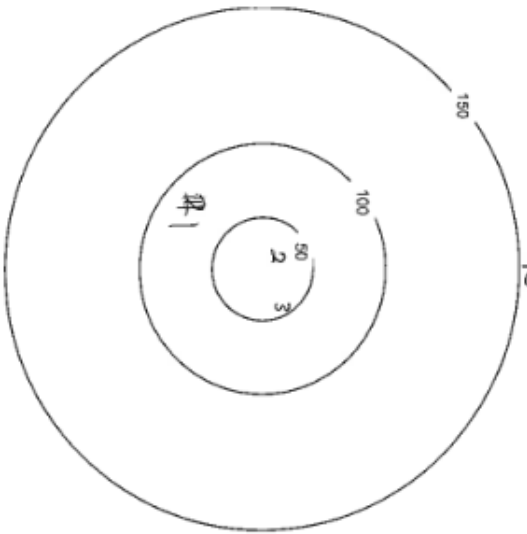
Notes: **NAD83 UTM Z14**  
**546002E 3758372N**  
**SAFB 8**

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	Coffin	3									
2	Gackle	2									
3	Starling	2									
4	Miss. Kite	1									
5	Savannah Sparrow	3									
6	Starling	1									
7	AHCR	1									
8	Scissor Fly	1									
9	AHRD	1									
10	Miss. Kite	2									
11	MODO	1									
12	MODO	1									
13	Scissor	1									
14	MODO	2									
15	Scissor	1									
16	Purple Martin	1									
17	Starling	1									
18	Grackle	1									
19	MODO	1									



Migrator rd Survey

Observer: ACT Date: 5/4/15 Transect: \_\_\_\_\_ Station #: \_\_\_\_\_ Start time: 10:50 End time: 11:00 Temp: 76  
 Habitat: GRASSLAND Cloud cover: 70% Wind: 4-7m/h Precipitation: N



Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	WBEW	1	A	S	2						
2	WBEW	1	V/A	P.S	<del>2</del> 1						
3	WBEW	1	V/A	P.S	1						
4	GRSP	1	A	S	2						
5	GRSP	1	A	S	2						
6	WBEW	1	A	S	3						
7	WBEW	1	V/A	P.S	2						
8	GRSP	1	A	S	1						
9	GRSP	1	A/V	S.P	2						
10	GRSP	1	A	S.C	1						
11	WBEW	1	A	S	2						

Det: detection method; A=audio, V=visual

Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:

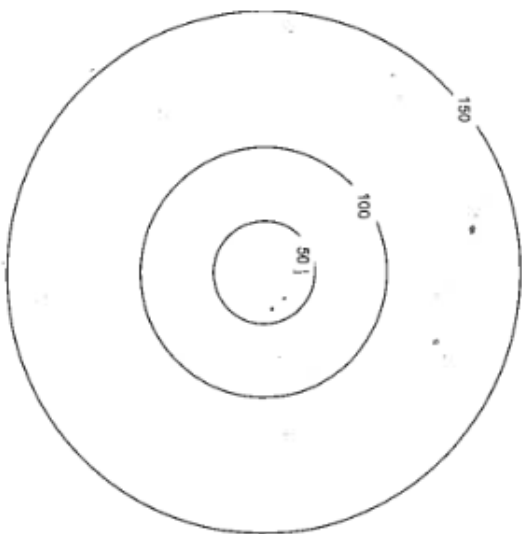
Non-avian wildlife observed:

Notes:

No formal transect. on airfield, rd very quiet  
 SAFB 10

Migratory Bird Survey

Observer: ACT, CAP Date: 5/5/15  
 Habitat: Grassland, Cropland  
 Transect: 47 Station #: 1 Start time: 0741 End time: 0751 Temp: 67  
 Cloud cover: 00 Wind: 2-5 Precipitation: N



**Det:** detection method: A=audio, V=visual  
**Behavior:** P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FY= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
**Species between points:**  
**Non-avian wildlife observed:**  
**Notes:**  
 S A F B 11

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	GRSP	1	AV	S	1						
2	DICK	1	AV	S,P	1						
3	DICK	1	A	S	2						
4	DICK	1	A	S	2						
5	RWB	1	A	C	2						
6	RTA	1	A	FO	2						
7	STFL	1	VA	C,P	2						
8	STFL	1	VA	S,P	2						
9	MDD	1	V	FO	-						
10	AMPO	1	V	FO	-						
11	DICK	1	A	S	2						
12	EAWE	1	A	S	3						
13	EAWE	1	A	FO	-						
14	STFL	1	AV	FO	-						



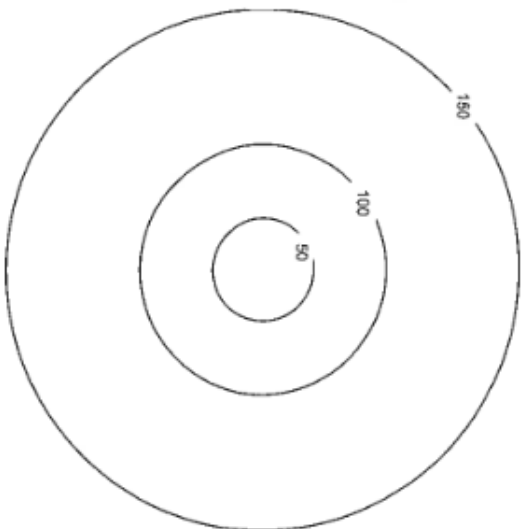






Migrato rd Survey

Observer: ACT Date: 5/5/15  
 Habitat: Washland / Prairie Cloud cover: 100%  
 Station #: 1 Start time: 7:01 End time: 12:11  
 Wind: 2-4 Precipitation: N Temp: 62



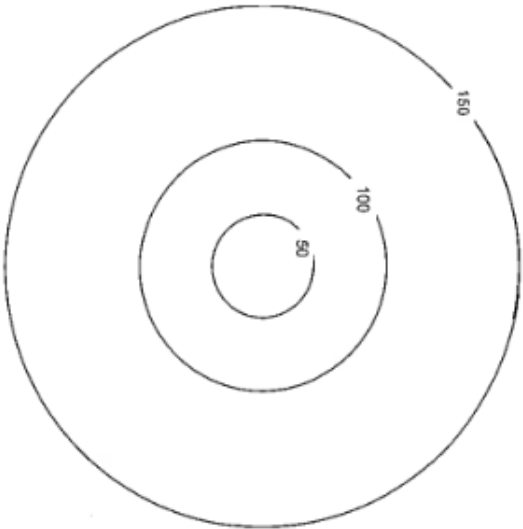
Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	STFL	1	V/A	Pc							
2	CAEG	12	V	FO							
3	FAWT	2	V	P							
4	CACT	1	A	S							
5	NOCA	1	A	S							
6	ROPE	2	V	FO							
7	MABO	2	V	FO							
8	STFL	2	V/A	SC							
9	EUCD	2	V	FO							
10	WEAR	1	V	P							
11	NOCA	1	A	S							
12	GTRR	1	V	FO							
13	EUST	1	V	FO							
14	CEWA										
15	PHBU	1	V	PS							
16	CHSU	1	V	FO							
17	STFL	1	V	Pc							

Det: detection method, A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:  
 Non-avian wildlife observed:  
 Notes:  
 SAFB 15

Migrato rd Survey

Observer: ACT Date: 5/2/15 Transect 01 Station # 3 Start time: 027 End time: 1037 Temp: 55  
 Habitat: Wetland forest Cloud cover: 10 Wind: 2-3 Precipitation: 0



Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	MTRE	1	V	P	1						
2	LELL	1	V/A	Roost							
3	FAUL	1	A	S							
4	Abca	1	A	S							
5	GTOR	2	V	P							
6	STSE	2	V	P							
7	CEWA	13	V/A	EdBk							
8	ROBE	1	A	C							
9	STGR	1	V	Ro							
10	BHCO	2	V	Ro							
11	NOVA	1	V	A							
12	SAEG	1	V	F							
13	CGR	4	V	Pc							
14	STGR	1	V	FO							
15	FUCD	2	V	FO							
16	GFHE	1	V	FO							
17	ROPE	3	V	FA							
18	CLSW	3	V/A	FO,F							
19	EUIT										

Det: detection method; A=audio, V=visual

Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging

T= territory display, I= incubating, NB= nest building, FY= feeding young

Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:

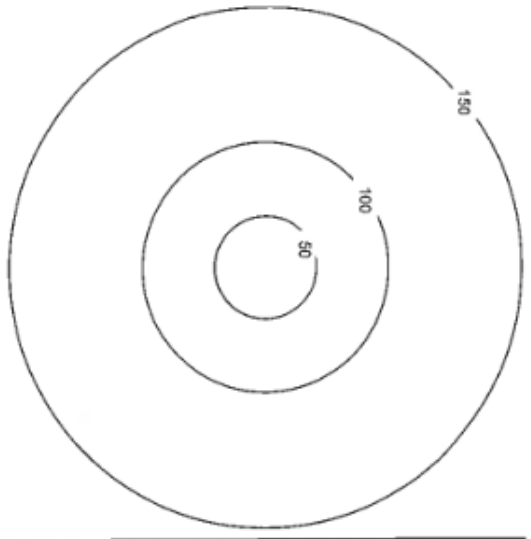
Non-avian wildlife observed:

Notes:

SATB 16

Migratory Bird Survey

Observer: Art Date: 5/5/15 Transect: 01 Station #: 4 Start time: 7:11 End time: \_\_\_\_\_  
 Habitat: Meadow Cloud cover: \_\_\_\_\_ Wind: \_\_\_\_\_ Precipitation: \_\_\_\_\_ Temp: \_\_\_\_\_

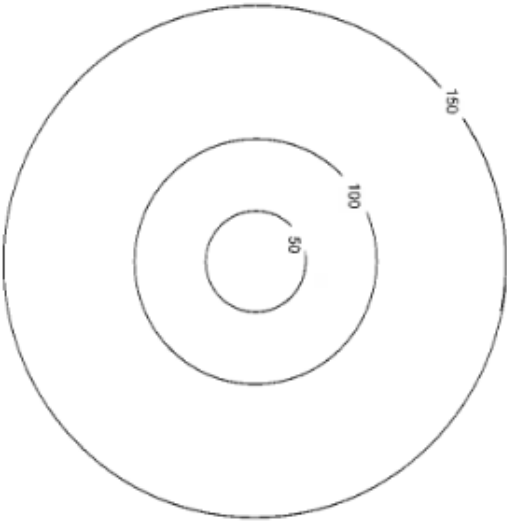


Det: detection method; A=audio, V=visual  
 Behavior: P=perched, C=calling, S=singing, FO=flyover, F=foraging  
 T=territory display, I=incubating, NB=nest building, FY=feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)  
 Species between points:  
 Non-avian wildlife observed:  
 Notes:  
SAFIS 17

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	NYA	1	A	S							
2	DRK	1	A	S							
3	GLSU	4	V	FO, F							
4	EUST	1	V	FO							
5	DICK	1	A	S							
6	DICK	1	A	S							
7	FAME	1	A	S							
8	ANMO	1	A	S							
9	NODO	4	V	FO							
10	ANNA	1	A	S							
11	GLCP	1	V	FO							
12	EUCB	1	V	FO							
13	PURP	1	V	FO							
14	MADG	2	V	FO							

Migratory Bird Survey

Observer: SJT DE Date: 5/5/15 Transect (km): Station #: 1 Start time: 0745 End time: 0755 Temp: 66  
 Habitat: Prairie / mesquite Cloud cover: 100 Wind: \_\_\_\_\_ Precipitation: \_\_\_\_\_



Det: detection method, A=audio, V= visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, FJ= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:

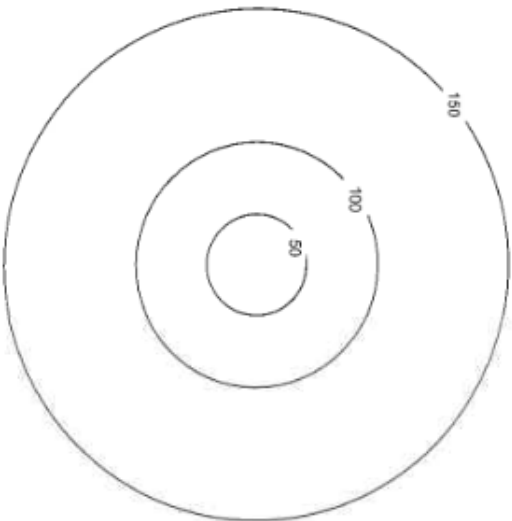
Non-avian wildlife observed: UTM 14Z

Notes: 54539, 414 E  
3763118, 50 N  
SAT 8 18

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	SAVJ	2	V		1						
2	RUBZ	1	VA		1						
3	BECK	1	A		1						
4	SUE6	1	V	FO	—						
5	MND	1	V	FO	—						
6	EUST	1	V	FO	—						
7	STFL	2			3						
8	EUST	1		FO	—						
9	STFL	3			3						
10	STFL	1	V	FO	—						
11	EAME	1	A		1						
12	STGR	1	V	FO	—						
13	STFL	1	VA	FO	—						
14	MADb	1			—						
15	MND	1			2						
16	EUST	1			1						
17	SAVS	1			2						
18	MND	1			—						
19	MND	2	V	FO	—						
20	GRSP	2			1						
21	EUST	1			1						
22	EUST	1			1						
23	BECK	1			2						
24	MND	3	V	FO	—						

Migratory Bird Survey

Observer: SUJ + DF Date: 5/5/15 Station #: 2 Start time: 0802 End time: 0812 Temp: 6.7  
 Habitat: Prairie Cloud cover: 100 Wind: 2-3 Precipitation: N



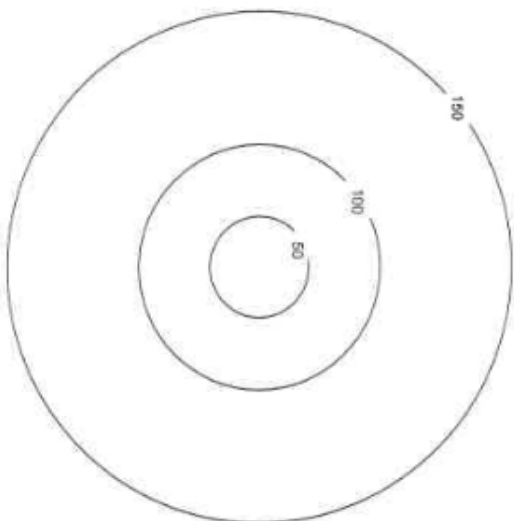
Det: detection method, A=audio, V=visual  
 Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging  
 T= territory display, I= incubating, NB= nest building, Fy= feeding young  
 Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:  
 Non-avian wildlife observed:  
 Notes:  
SAFB 19

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	WEKI	2	A, V		1						
2	WICK	2	A		1						
3	MND	2	V	FO							
4	MND	2	V								
5	MND	2	V	FO							
6	MND	2	A								
7	SAVJ	2	A, V		2						
8	FLYS	3	V		3						
9	GTGE	1	A		3						
10	HUMA	1	V		3						
11	SPEG	1	V		2						
12	WPHO	2	A	FO							
13	EUST	2	A, V		1						
14	MND	1	V		2						
15	MND	1	V		2						
16	EUST	1	V	FO							
17	EUST	1	V		2						
18	CLSD	1	V		2						
19	GTGE	1	V, A		1						

Migratory Bird Survey

Observer: SJ + DE Date: 5/5/15 Transect: Ring Station #: 3 Start time: 0830 End time: 0844 Temp: \_\_\_\_\_  
 Habitat: prairie Cloud cover: 100 Wind: 3 Precipitation: light



Det: detection method, A=audio, V= visual

Behavior: P= perched, C=calling, S= singing, FO= flyover, F= foraging

T= territory display, I= incubating, NB= nest building, FJ= feeding young

Distance= 1 (0-50m), 2 (50-100m), 3 (100-150m)

Species between points:

Non-avian wildlife observed:

Notes:

SAFB 20

Obs#	Spp.	#	Det	behavior	Dist	Obs#	Spp.	#	Det	behavior	Dist
1	EAHE	1			1						
2	EJIT	2			2						
3	MOB	1			2						
4	EJIT	1			2						
5	EJIT	2			2						
6	EJIT	1			2						
7	MOB	1			2						
8	EJIT	2			1						
9	MOB	2			2						
10	EJIT	2			1						
11	CSM	1			3						
12	EJIT	1	V	FO	1						
13	EJIT	1			1						
14	MOB	1			2						
15	MOB	1	V	FO	1						
16	STZ	1			1						
17	CSM	1			2						
18	EJIT	1			2						
19	EAHE	1			1						

UTM

147

545461.54 E

3762595.8 N

**Appendix F**

Small Mammal Trapping Data Forms



**Baseline Biological Report**

Sheppard Air Force Base & Lake  
Texoma Recreation Annex

F





















Sherman Trapping  
 Sherman AFB Lake Texoma RA

OBS: \_\_\_\_\_ Day (#): 1 Visit (morn/aft): MORN Start Time: 6:14 End Time: 8:34  
 Mon Pt: AF Date: 9/7/15 Start Temp: 64 End Temp: 61 %Cloud: 100 Precip: \_\_\_\_\_

Required Data: **TRAP#**, **SPECIES** = scientific name, **AGE**: 1 = adult, 2 = subadult, 3 = juvenile, **SEX**: 1 = female, 2 = male, 3 = unk,  
**BREED**: 1 = non-breeding, 2 = pregnant, 3 = lactating, 4 = testes enlarged, 5 = unk,  
**RECAP** = is it a recapture? **MARK** = did you mark it?

Optional Data: **WEIGHT** to nearest 0.1 gram, record for new captures and uncertain IDs,  
**LENGTH** to nearest mm, record for distinguishing features of tricky sp, etc.

Trap number check: 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210,  
 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410,  
 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610,  
 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810

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TRAP #	SPECIES	AGE	SEX	BREED	RECAP	MARK ?	Total Wt.	Bag Wt.	Head/ Body Length	Tail Length	Total Length	Hind Foot	Ear Length	Comments
AF 1	False White													
2	COTTON RAT				NO	NO	150	11	123	100		27	13	PHOTO MISLABELED L52 517
8														Delusio A
10														Delusio A
LS 4	False White													Delusio A
8/9	False White				NO	YES	33	11	65	20		18	12	Mislabaled Photo 107
9/10	White Rat?		M		NO	NO	117	11	177	120		30	20	
24														
25														

Incidental sightings: \_\_\_\_\_









# MIDWESTERN STATE UNIVERSITY

College of Science & Mathematics, Department of Biology, 3410 Taft Boulevard,  
Wichita Falls, TX 76308-2099 (940) 397-4163/ FAX (940) 397-4831

14 November 2012

## REPORT ON VISUAL ASSESSMENT OF SOUTHEAST SHEPPARD SITE

RE: PRESENCE AND HABITAT SUITABILITY  
FOR TEXAS KANGAROO RAT (*DIPodomys ELATOR*)

At the invitation of Leslie Pena, environmental technician for 82nd Civil Engineering Squadron at Sheppard AFB, we carried out a visual inspection on 13 November 2012 of the southeastern plot of the base supporting the obstacle course and assorted storage and training buildings. This assessment was intended to determine the presence, potential or realized, of the Texas kangaroo rat (*Dipodomys elator*)--a species protected as a threatened species by the state of Texas.

The Texas kangaroo rat is a species with very specific and predictable habitat requirements that have been well documented in the scientific literature (e.g. Stangl et al., 1992; Stasey et al., 2010; and references cited therein). Briefly stated, this rodent prefers low grasses and areas of barren dirt surrounding elevated and well drained burrow sites of friable soils. These requirements were not met at the time and place of our visit. Most of the site is of rank, overgrown understory dominated by dense mesquite woodland. Where terrain was more opened (e.g. along perimeter fenceline and mowed areas around roadways and structures), we found none of the characteristic burrow systems of this species. The possibility of occasional vagrant animals from surrounding mesquite pasturage is not likely, given the similar overgrown vegetation of adjoining properties.

Thanks in advance for considering my comments. Feel free to contact either of us for any further information.

Sincerely,

Frederick B. Stangl, Jr., PhD  
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### Literature Cited:

- Stangl, F.B., Jr., T.S. Schafer, J.R. Goetze, and W.B. Pinchak. 1992. Opportunistic use of modified and disturbed habitat by the Texas kangaroo rat (*Dipodomys elator*). *Texas Journal of Science*, 44:25-35.
- Stasey, W.C., J.R. Goetze, P.R. Sudman, and A.D. Nelson. 2010. Differential use of grazed and ungrazed plots by *Dipodomys elator* (Mammalia: Heteromyidae) in northcentral Texas. *Texas Journal of Science*, 62:3-14.

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**SHEPPARD AIR FORCE BASE  
DROUGHT CONTINGENCY PLAN**

**29 March 2016**



**82 CES/CEIV**

**82D TRAINING WING  
SHEPPARD AIR FORCE BASE, TEXAS**

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**Coordinator Identification Page**  
**SAFB Drought Contingency Plan**  
**Plan OPR: 82 CES/CEIV**

This form is completed by the plan OPR. It contains three parts: Part I identifies (name and/or office symbol) the individual that will conduct the administrative review (spelling/grammar). Part II identifies the Subject Matter Experts (SME) who should review and provide corrections/comments during the review process. Part III identifies the individuals who need to coordinate on the rewritten/changed plan.

---

Part I. Administrative Review Identification (Name and/or Office Symbol)

82 CES/CEIV Administrative Assistant

---

Part II. SME Identification (Name and/or Office Symbol)

82 CES/CEIV Flight Chief  
82 CES/Electrical Engineer/Energy Manager  
82 CES/CEP

---

Part III. Coordination Process Identification (Name and/or Office Symbol)

82 TRW/IGX	82 MSG/CC	82 TRG/CC
80 FTW/CC	982 TRW/CC	882 TRG/CC
82 MDG/CC	782 TRG/CC	82 TRW/JA

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**DEPARTMENT OF THE AIR FORCE  
AIR EDUCATION AND TRAINING COMMAND**

29 March 2016

MEMORANDUM FOR DISTRIBUTION (SEE ANNEX Z)

FROM: 82 CES/CL

SUBJECT: Sheppard Air Force Base (SAFB) Drought Contingency Plan

1. The attached plan is the 82 CES/CEIV supporting plan required by Texas Commission on Environmental Quality (TCEQ).
2. This plan is in effect for planning purposes upon receipt. Execution will be when directed by the Commander, 82 TRW or designated representative.
3. Requests for additions, deletions, and/or changes should be directed to the plan OPR, (82 CES\CEIV).
4. Supporting implementing instructions, operating instructions or checklists must be prepared by tasked organizations and forwarded to 82 CES/CEIV for review and coordination within 30 days of publication.
5. This plan supersedes SAFB Drought Contingency Plan which should be destroyed IAW Records Disposition Schedule, Series 10, Table 10-04, Rule 04.00, (or other disposition directives depending upon plan classification).

  
MARK Mc BURNETT, GS-14, DAF  
Base Civil Engineer

Attachment:  
SAFB Drought Contingency Plan

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**SECURITY INSTRUCTIONS AND RECORD OF CHANGES/REVIEWS**

1. The long title of this plan is Sheppard Air Force Base Drought Contingency Plan. This title is For Official Use Only.
2. This document is "For Official Use Only".
3. Reproduction of this document in whole or in part to assist the tasked organizations in support of developing operating instructions/checklists is authorized.
4. The provisions of AFI 10-701, *Operations Security Program*, and AFI 10-701, SAFB Sup were considered during the formation of this plan.

**RECORD OF CHANGES**

<u>CHANGE NUMBER</u>	<u>DATE ENTERED</u>	<u>POSTED BY</u>
1.	8 December 2009	OPR
2. Updates per City Requirements	12 February 2016	OPR

**RECORD OF REVIEW**

<u>REVIEWED BY</u>	<u>DATE REVIEWED</u>	<u>REMARK</u>
Stephanie Manry	8 Dec 09	Current
Darcas Pena	4 Feb 11	Current
Leeni Vilpas	25 May 14	Current
Jennifer Nader	12 Feb 16	see changes above

**SAFB DROUGHT CONTINGENCY PLAN SUMMARY**

1. **PURPOSE:** The Drought Contingency Plan is the responsibility of each installation staff member. The purpose is to ensure that public water systems have a contingency plan ready in case of drought or similar water shortages. Laws, regulations and Executive Orders (EO) combine to provide the authority and requirements described in the Sheppard AFB Drought Contingency Plan. This plan is consistent with the Drought Contingency Plan of the City of Wichita Falls TX.
2. **CONDITIONS FOR IMPLEMENTATION:** This plan will be implemented upon receipt. Continuous support is required.
3. **OPERATIONS TO BE CONDUCTED:** All current and planned installation activities (e.g., master planning, construction requests, site approval requests and training exercise plans) shall be planned and conducted so as to ensure effective and timely coordination with installation historic resources management personnel.
4. **KEY ASSUMPTIONS:** None.
5. **OPERATIONAL CONSTRAINTS:** None.
6. **OPSEC:** Normal.
7. **TIME TO COMMENCE EFFECTIVE OPERATIONS:** This plan will be implemented upon signature and communicated to all installation personnel (military, civilian, tenants and contractors) on base.
8. **COMMAND RELATIONSHIPS:** Normal.
9. **LOGISTIC APPRAISAL:** Normal. This program requires only materials needed in current operations.
10. **PERSONNEL APPRAISALS:** Normal. This plan is logistically feasible from a personnel appraisal standpoint and within the installation's capabilities to execute under most circumstances.

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## SHEPPARD AFB DROUGHT CONTINGENCY PLAN

### 1. INTRODUCTION

SAFB has prepared this Drought Contingency Plan to provide guidance for the base populace during shortages of water. This plan is consistent with the Drought Contingency Plan of the City of Wichita Falls TX. The Drought Contingency Plan is a requirement by Texas Commission on Environmental Quality (TCEQ), as well as by Texas Administrative Code (TAC), Title 30, Part 1, Chapter 288, Subchapter B, Drought Contingency Plans.

### 2. MANAGEMENT CONTROLS

#### A. Conservation Education Program

1. To further water conservation efforts, SAFB has initiated base wide education activities.
2. Appendix A highlights water conservation tips for the base populace to implement at home.

### 3. DROUGHT MANAGEMENT PROGRAMS

#### B. Water Conservation Measures for the City of Wichita Falls

The City of Wichita Falls, under Section 106-186 of the City Ordinance states that it shall be unlawful for any person, firm, corporation, or other entity, at any time of the year, to:

- Irrigation:
  - Run outside spray type irrigation on any day of the week between 10:00 am and 7:00 pm unless a there is use of a hand-held hose that is equipped with a positive shut-off nozzle, soaker hose, bucket, watering can, bubbler, or drip irrigation system.
  - Fail to repair a controllable leak.
  - Operate a faulty irrigation system.
  - Allow water to flow during irrigation that streams in a way that extends 50 feet or greater from the area being irrigated.
  - Operate a soaker hose, bubbler or drip irrigation system in a manner that causes the delivery of more water than the system intended the system to deliver; or that allows water to run for a distance greater than 5 feet or more from the area being irrigated.
- Car Washing:
  - Wash a vehicle at any location other than a commercial car wash, car dealership, detail or automotive shop unless the hose is equipped with a positive shut-off nozzle that stops the flow of water upon release by operator.
  - Allow a customer to use a nozzle at a commercial car wash, car dealership, detail or automotive shop that discharges more than 3.0 gallons per minute.
- Restaurants/Bars/Clubs/Cafeterias
  - Provide drinking water, unless requested.
  - Use a pre-rinse nozzle that discharges more than 1.6 gallons per minute.
  - Use a hand-held pre-rinse, or rinsing nozzle without a positive shut-off.
- Ice Machines
  - Install new machines that are single pass, water cooled.

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- Hotels/Short-Term Lodging
  - Fail to offer a towel/linen reuse water conservation option and place informational signage relating to this requirement.

C. YEAR ROUND WATER CONSERVATION

- The base populace is under a mandatory water conservation policy, which prohibits all lawn watering between the hours of 10:00 am and 7:00 pm, seven days a week, all year long. All base agencies and contractors are prohibited from watering, unless a hand held hose (equipped with a shut off nozzle), bucket, timed irrigation systems or watering can is used.

- The base populace will be prohibited from washing any motor vehicle or equipment at any location other than a wash rack without a shutoff nozzle. The shutoff nozzle will be used to stop the flow of water through the hose when released by the operator. Base fundraiser car washes will be limited to 25 per year maximum. All base car wash fundraiser requests must be approved through 82 CES/CEIV prior to commencement.

D. STAGE 1: DROUGHT WATCH

- A Drought Watch will be initiated when 1) the combined storage of Lake Kickapoo and Arrowhead reach a combined 65% capacity of the conservation pool storage capacity; 2) demand exceeds design treatment capacity of the City of Wichita Falls for three consecutive days (or exceeds 90% of design) or 3) the water supply is unable to deliver water due to mechanical failure or damage of major water system components which require more than 72 hours to repair or 4) the water system is contaminated, or the water system fails from acts of man or nature.

E. STAGE 1: DROUGHT WATCH ACTIONS – WICHITA FALLS

- Wichita Falls City Council and other City departments will be notified of the impending problem and the proposed immediate and future actions. This phase will consist of year round restrictions and supply augmentation measures. In conjunction with the Public Information Office, with the goal of reducing the amount of water being used by 5%, initiate an education program through all available media to:

- Alert the public to the depletion of the reservoirs; current rate of withdrawals and the effect of such withdrawals; current meteorological conditions and long range forecast from the National Weather Service.

- Alert the public to the drought management program, the various stages and measures and the possibility of implementation.
- Keep a constant flow of information to the public to condition them for more stringent measures.
- Public outreach through all forms of media.
- Provide Landscape Waivers for irrigation of new landscaping plants whereby water would be permitted to maintain adequate growth until plants are established, but not to exceed 30 days.
- It shall be unlawful to:
  - Apply spray irrigation outside of two times per week based on address as outlined in City Zoning Maps.
  - Allow water to run along curb lines, or stream in a way that exceeds 50 feet or greater from the area being irrigated.

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- Allow Golf Course watering other than the designated two periods per week with the exception of greens, when warranted by weather, but will be subject to prohibition of spray irrigation between 10:00 am and 7:00 pm.

### F. STAGE 1: DROUGHT WATCH ACTIONS - SHEPPARD AFB

- The purpose of declaring a drought watch is to heighten base sensitivity to water conservation. The following actions will occur at SAFB:
  - Alert SAFB command structure of the impending drought condition and the proposed immediate and future actions.
  - In conjunction with the 82 TRW Public Affairs Office, initiate an education program through all available media to:
    - Alert the base populace of the depletion of Lake Arrowhead and Kickapoo; current meteorological conditions and an extended forecast from base weather.
    - Alert the base populace to the drought management program, the various stages and measures and possibility of implementation.
    - Keep a constant flow of information to the base populace to condition them for more stringent measures.
    - Encourage the base populace to conserve water through use of Appendix B of this plan.
    - Base car wash fund-raisers are prohibited.
    - 82 CONS will notify base contractors of the drought condition and the immediate measures SAFB has implemented.
    - Implement the above Water Conservation Measures as well as the measures listed in Appendix A of this plan.

### G. STAGE 2: DROUGHT WARNING

- A Drought Warning phase will be issued when the combined storage level declines to 50% total storage in Lake Arrowhead and Kickapoo, demand exceeds design of City of Wichita Falls treatment capacity for three days after a drought watch has been declared (or exceeds 110% of design) or the water supply system is unable to deliver water due to mechanical failure or damage of major water system components which will require more than 48 hours to repair, if a Drought Watch is in progress. This phase will consist of the year-round restrictions and supply augmentation measures. If the warning is the result of treatment capacity limitations, Stages 1-3 will be implemented as appropriate.

### H. STAGE 2: DROUGHT WARNING RESTRICTIONS - CITY OF WICHITA FALLS

- Mail a copy of the Conservation Ordinance and the Water Rationing Zone Map with a cover letter describing the drought conditions to each water account.
  - Landscape waivers may be granted for a period of time not to exceed 30 days with an application to the City Public Works Department and payment of a fee as set by separate ordinance. The applicant must agree to pay a water rate that is three (3) times the normal rate for that customer for all consumption rates over 10CCF.
- It shall be unlawful for any person, firm, corporation or entity to:
  - Run outside irrigation systems including sprinklers, automatic sprinkler systems and

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unattended water hoses except on the day of the week permitted for an area as identified on the water rationing zone map.

- Run any type of outside watering on any day of the week between 10:00 am and 7:00 pm, except as authorized by subsection (d) (1) of the Conservation Ordinance.
  - Fail to repair a controllable leak, including, but not limited to a broken sprinkler head, pipe, or leaking valve.
  - Operate a soaker hose, bubbler or drip irrigation system in a manner that causes the delivery of more water than the system intended the system to deliver; or that allows water to run for a distance greater than 5 feet or more from the area being irrigated.
  - Wash any motor vehicle at a residence or place of business, unless the hose is equipped with a positive shut-off nozzle that stops the flow of water when released by the operator.
  - Wash using a nozzle at a commercial car wash, car dealership, detail shop, or automotive shop that discharges more than 3.0 gallons per minute.
  - Install new ice machines that are single pass, water cooled.
  - Provide drinking water to customers at restaurants, bars, or clubs unless such request is made by the customer. Use a pre-rinse discharge nozzle that discharges more than 1.6 gallons per minute, or hand held pre-rinse, or rinsing without a positive shut-off in restaurants, bars, or clubs.
  - Fail to offer towel and line reuse conservation options to its lodgers, renters, or customers, and maintain informational signage in each applicable guest room.
  - Wash sidewalks, driveways or concrete slabs unless an immediate health of safety risk present.
- Form a Drought Emergency Task Force to guide the remainder of this drought contingency plan and to interface with the public with the goal of reducing the amount of water by 15%.
  - Non-essential operational uses of water by city crews should be suspended; for example: the flushing of water mains and fire hydrants, street sweeping, water jet cleaning of sanitary sewer mains, training of fire fighters, watering by the Parks Department.
  - Notify wholesale customers of the situation and ask each to adopt similar reduction goals for their systems in accordance with their individual contracts with the City of Wichita Falls. Pro rata curtailment by wholesale customers will be based upon their contractual limits as provided in the Texas Water Code 11.039.
  - Implement water conservation.
  - Implement water conservation surcharge for excessive use for all applicable accounts.

### I. STAGE 2: DROUGHT WARNING ACTIONS FOR SHEPPARD AIR FORCE BASE

- Mandatory Program for Non-Essential Outdoor Uses
  - When a Drought Warning is declared, a number of actions will commence. The purpose of this stage of action is to reduce the current net withdrawal from the reservoirs by at least 15%. The following actions will occur:
  - Every available forum will be used to continue to educate the base populace regarding the status of our water supply and to make pleas for water conservation. This can be accomplished by various means including, but not limited to; an article in the base public Web page; other electronic or printed media; TSTV-Channel 14.
  - 82 CONS will notify base contractors of the drought condition and the immediate measures

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SAFB has implemented.

- Irrigate priority two areas (see Figure 1) only on Mondays before 11:00 am and after 7:00 pm.
- Implement above Water Conservation Measures as well as measures listed in Appendix A.

### J. STAGE 3: DROUGHT EMERGENCY

- A Drought Emergency will be declared when the combined storage level of Lake Arrowhead and Kickapoo drops to 40% of the total conservation pool storage capacity. When a Drought Emergency is declared, action will be taken to reduce the current net withdrawal from reservoirs by an additional 20% or more (with the 15% reduction from Stage 2 that will make a Total of 35% reduction).
- The drought emergency will remain in effect until the drought has broken and sufficient water has been captured in the reservoirs to exceed the 40% level with a reasonable expectation that the drought is permanently broken. This phase consists of non-voluntary, restrictive measures imposed in two additional stages.

### K. STAGE 3: DROUGHT EMERGENCY RESTRICTIONS - CITY OF WICHITA FALLS

- During Stage 3 all restrictions from Stage 2 remain in effect in addition to the following restrictions. For questions please contact the Public Works Department at 940.761.7477.
- Waivers:
  - The Public Works Department will not issue any waivers during a Stage 3 Drought Emergency.
- Irrigation:
  - Utilize spray irrigation during the day as specified by Stage 2 restrictions, except for the following hours:
  - 2:00 am-7:00 am for Automatic Sprinkler Systems.
  - 7:00 pm-11:00 pm for Hose Ended Sprinkler Systems.
- Car Dealers:
  - It shall be unlawful for a car dealer to wash its inventory of cars on any day other than the day the property is authorized to spray irrigate in accordance with the Water Rationing Zone Map in effect.
- Car Washes:
  - All self-serve and full-service car washes within the corporate City Limits will be required to close the car washing portion of their business on one day each week. The scheduled day of closure shall coincide with the day that car wash is allowed to spray irrigate, in accordance with the Water Rationing Zone map.
  - It shall be unlawful for a car wash to use a nozzle that discharges more than three gallons per minute.
  - It shall be unlawful for a car wash to wash any of its bays with water, except on Sundays.
- Public and Private Golf Courses:
  - Greens:
    - Golf courses may utilize Spray Irrigation on greens at any time for the purposes of cooling golf course putting surfaces when warranted by weather conditions and only with

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- run cycles of less than five minutes.
- Golf course greens are exempt from the Spray Irrigation days established in (d) (1) (b), and greens may be Spray Irrigated any day of the week.
  - Tee-Boxes:
    - It shall be unlawful for golf courses to Spray Irrigate Tee-Boxes, except on the day of the week permitted for the area as identified on the Water Rationing Zone map.
    - Golf courses are exempt from the spray irrigation time limitations of Stage 3. Golf courses will continue to be subject to the prohibition of spray irrigation during the daylight hours between 11:00 am & 7:00 pm.
  - Fairways
    - It shall be unlawful for golf courses to Spray Irrigate fairways.
  - Irrigation-Watering: Spray, Sprinkler, Drip, Bubbler, Soaker:
    - It shall be unlawful to utilize spray irrigation during the day (as specified in Stage 2) in any but the following hours:
      - 2:00 am to 7:00 am for Automatic Sprinkler System
      - 7:00 pm to 11:00 pm for Hose-End Sprinkler Systems
    - Spray Irrigate or Spray Irrigation - a category of irrigation methods that utilizes devices that spray water away from the device orifice(s). These include, but are not limited to, pop up sprays, rotors, oscillating sprinklers and impact sprinklers. A hand held hose is not Spray Irrigation.
    - Automatic Sprinkler System - a system of irrigation components made up of permanently installed underground PVC lines and spray irrigation devices that are controlled from an automatic irrigation controller.
    - Hose-end Sprinkler System - a device on the end of a garden hose that can be set in place and periodically moved from one location to another.
      - Unlawful: It shall be unlawful to operate a soaker hose, bubbler or drip irrigation system in a manner that causes the delivery of more water than the hose, bubbler or system was intended by the manufacturer to deliver.
  - Drip Irrigation and Soaker Hose:
    - Drip Irrigation - a method of irrigation that applies water in a drop fashion directly to the soil beneath, rather than projecting the water in a stream away from its orifice. To be classified in this category, the maximum allowable flow is six gallons per hour/per emitter.
    - Soaker Hose - an irrigation device made of permeable rubber hose that allows water to be applied slowly and directly to the soil without being sprayed up into the air. Soaker hoses fall into the drip irrigation category. A soaker hose will not spray water regardless of its orientation.
    - Unlawful: It shall be unlawful to operate a soaker hose, bubbler or drip irrigation system in a manner that causes water to run down the curb. Nursery Plant Stock is exempt from the irrigation and landscape watering restrictions of this subsection.
  - Restaurants, Bars, Clubs and School Cafeterias:
    - It shall be unlawful for a food establishment to thaw food with water. Food must be thawed by another method that is approved by the Health Code, i.e., refrigeration or cooking process.
    - It shall be unlawful for a food establishment to clean kitchen or food handling areas with spray hoses. The cleaning of kitchen and food handling areas shall be accomplished by means of brooms and mops only.
    - It shall be unlawful to provide drinking water to customers of restaurants, bars, or clubs unless the customer requests such water.

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- It shall be unlawful to use a pre-rinse nozzle that discharges more than 1.6 gallons per minute.
- Swimming Pools:
  - Pools - It shall be unlawful to operate a water feature on a Residential Pool, including, but not limited to, fountains, waterfalls, descents, arcs and slides.
  - Residential Pool – A pool that is located on private property under the control of the property owner or the owner’s tenant and that is intended for use by not more than two residential families and their guests. It includes a pool serving only a single-family home or duplex.
  - If repairing a pool, it shall only be drained to a level necessary to affect the repair, and no further. Owners of pools that follow this restriction will be allowed to re-fill their pool after the repair.
  - Pool Owner/Operator – Fee title holder of the property upon which the pool is located, and/or business manager, complex manager, property owners, association manager, rental agent or other individual who is in charge of the day to day operation or maintenance of the property.
  - Owners Operators of pools are restricted from draining the pool once it closed for the season.
- Lodging:
  - It shall be unlawful, as the owner or operator of a hotel, motel, short-term rental or other establishment that offers or provides lodging or rental accommodations for compensation to:
    - Fail to offer towel and linen reuse water conservation operations.
    - Fail to post informational signage to communicate information relating to the requirement.
    - Fail to offer the opportunity for guest participation.
- Washing sidewalks, driveways, buildings or concrete slabs:
  - Unlawful to wash sidewalks, driveways, buildings, or concrete slabs unless an immediate health or safety risk is present.
- Charges:
  - A water conservation surcharge will be applied to all Residential and Irrigation accounts when the City is under a Stage 2 Drought Warning or Stage 3 Drought Emergency. During a Stage 3 the surcharges are:
    - For Residential Water Meters:
      - \$1.00 per CCF between 10 CCF and 20 CCF
      - \$2.00 per CCF between 20 CCF and 40 CCF
      - \$4.00 per CCF over 40 CCF
    - For Irrigation Water Meters:
      - \$1.00 per CCF between 0 CCF and 10 CCF
      - \$2.00 per CCF between 10 CCF and 20 CCF
      - \$4.00 per CCF between 20 CCF and 40 CCF
      - \$8.00 per CCF over 40 CCF

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L. STAGE 3: DROUGHT EMERGENCY ACTIONS FOR SHEPPARD AFB ESSENTIAL:

- Mandatory Program for Essential Outdoor Uses
  - If the mandatory restrictions on non-essential uses do not adequately slow the withdrawal, and when the combined capacity of the lakes reaches 30% of the storage or the demand exceeds 120% of design capacity, the following mandatory restrictions will occur:
    - Continue all Stage 1 and Stage 2 actions as supplemented and amplified by the Stage 3 requirements below.
    - Place a total ban on the outdoor use of water for nonessential uses.
    - Continue an aggressive public relations and education campaign.
    - 82 CONS will notify base contractors of the drought condition and the immediate measures SAFB has implemented.
    - Implement above Water Conservation Measures as well as measures listed in Appendix A.

M. STAGE 3: DROUGHT EMERGENCY ACTIONS FOR SHEPPARD AFB NON-ESSENTIAL:

- Mandatory Program for Non-Essential Outdoor Uses
  - When a Drought Emergency is declared, action will be taken to reduce the current net withdrawals from the reservoirs by an additional 20% or more. The following actions will occur:
    - Continue all Stage 1 and 2 actions as supplemented and amplified by the Stage 3 requirements below:
    - 82 CONS will notify base contractors of the drought condition and the immediate measures SAFB has implemented.
    - Irrigate only on Mondays before 11:00 am and after 7:00 pm.
    - Continue an aggressive public relations and education program.
    - Establish a program for Stage 3, which will allow restrictions on essential uses of water and prepare for implementation.
    - Implement above Water Conservation Measures as well as measures listed in Appendix A.

N. STAGE 4: DROUGHT DISASTER

- A Drought Disaster will be declared when:
  - The mandatory restrictions on non-essential uses do not adequately slow the withdrawal, and when the combined capacity of Lake Arrowhead and Kickapoo reaches 30% of the storage.
  - The demand exceeds 120% of design capacity.
  - The water supply system is unable to deliver water due to mechanical failure or damage of major water system components which will require more than 12 hours to repair, if a Drought Emergency is in progress.
  - The water system is contaminated either accidentally or intentionally, or
  - The water system fails from acts of nature (tornadoes, electrical storms, etc.) or man.
- When a Drought Disaster is declared, SAFB will follow the City of Wichita Falls restrictions, which the Director of Public Works shall impose as mandatory restrictions on essential uses of water and take the following actions to include, but not limited to:
  - Total ban on all outdoor irrigation/watering (no matter what type of hose or device).
  - A home foundation may be watered using only soaker hose, from 7:00 pm to 11:00 pm, on the designated day to water for the property.
  - It is unlawful to wash sidewalks, driveways or structures.
  - The surcharge triples for any amount of water used. This charge increases as additional

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units are used.

- All hydrant meters for contractor use will be pulled and service suspended until conditions return to a Drought Emergency status.
- It shall be unlawful to irrigate any and all vegetated areas on golf courses including greens, tee boxes, fairways, roughs, trees, shrubs, etc., using water from the City system.
- Large industries will be required to conduct an internal water audit to see if there are additional water conservation efforts they can undertake and submit a report to City Staff within 60 days. Changes must be implemented by the time combined lake levels reach 20%.
- The City will continue an aggressive public relations and education program.
- All Stage 1, 2 and 3 water restrictions and requirements remain in place unless modified by Stage 4 restrictions and requirements.
- Complete City Ordinance for Stage 4 Drought Disaster Restrictions and Requirements.

O. CATASTROPHE STAGE 5: DROUGHT RESTRICTIONS AND REQUIREMENTS

- All Stage 1, 2, 3 and 4 water restrictions and requirements will remain in place unless modified by Stage 5 restrictions and requirements, when mandatory restrictions on non-essential uses do not adequately slow the withdrawal, or when the combined capacity of Lake Arrowhead and Kickapoo reaches 25% of the storage. Drought Restrictions only apply to City-supplied water. Water supplied from sources other than the City's potable water delivery system, including private water wells, aerobic septic systems, wastewater effluent and potable water imported from other areas, is intended to be exempt from the restrictions of this section. Accordingly, it shall be an affirmative defense to prosecution for violation of any provision of this section that the water used in the alleged violation was not from the City's potable water delivery system. The Complete Ordinance can be found at <http://www.wichitafallstx.gov/1320/Ordinances-Enforced>.
- Irrigation (Watering)
  - Irrigation Prohibited. It shall be unlawful to utilize any type of irrigation using potable water produced by the City of Wichita Falls that is distributed through the City's distribution system on any day, at any time. This restriction includes all forms of irrigation, including spray, bubbler, drip, hand-watering, etc.
  - Public and Private Golf Courses. It shall be unlawful to irrigate any and all vegetated landscape areas on the golf course including greens, tee boxes, fairways, roughs, trees, shrubs, etc. The Golf Course will be allowed to utilize the remaining water within their pond system, as they see fit; but will not be allowed to refill the ponds from the City system while in Stage 5 drought disaster.
  - Nursery Plant Stock. Nursery Plant Stock is exempt from the irrigation and landscape watering restrictions of this subsection.
- Washing Cars
  - Location of washing cars limited to reduce runoff. It shall be unlawful for any person to wash a vehicle at any location other than a commercial car wash, car dealership, detail shop, automotive shop or commercial property that is owned by the owner of a fleet of vehicles.
    - It shall be an affirmative defense to prosecution pursuant to this subsection that a person was washing a vehicle for health and safety reasons, only to an extent sufficient to remove the hazard.
    - It shall be an affirmative defense to prosecution pursuant to this subsection that a car dealer or car rental company was preparing a vehicle for pickup and washed that vehicle on the day of pickup by the customer.
    - Allowable times for washing vehicles limited to reduce evaporation. It shall be unlawful for any person to use potable water to wash a vehicle at any time on Sunday or

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Monday.

- Nozzles. It shall be unlawful for any car wash or detail shop to use a nozzle that discharges more than three gallons per minute.
- Bays. It shall be unlawful for a car wash to wash any of its bays with water except on Fridays.
- Washing vehicles is prohibited when Lake Arrowhead and Kickapoo are below 20%. It shall be unlawful for any person to use potable water to wash a vehicle at any time when the combined capacity of these lakes is of less than 20%.

### P. RESTAURANTS/BARS/CLUBS/SCHOOL CAFETERIAS

- It shall be unlawful to provide drinking water to customers of restaurants, bars or clubs, unless the customer requests such water.
- It shall be unlawful for a food establishment to thaw food with water. Food must be thawed by another legal method, such as refrigeration or cooking process.
- It shall be unlawful for a food establishment to clean kitchen or food handling areas with spray hoses.

### Q. WATERING STRUCTURES

- The watering of home foundations is restricted to once a week, on the day the property was authorized to irrigate in accordance with the Water Rationing Zone Map.
  - Foundations may only be watered between the hours of 7:00 pm and 11:00 pm.
  - Foundations may only be watered with a Soaker Hose.
- It shall be unlawful to wash sidewalks, driveways, concrete slabs, any other structure or any part of a structure.

### R. POOLS

- It shall be unlawful to operate a water feature on any pool, including but not limited to: fountains, waterfalls, descents, arcs and slides.
- It shall be unlawful to fill, refill or add potable water to private or public swimming or wading pools.
- Indoor pools are exempt from the restrictions.

### S. SURCHARGES

- During a Stage 5 drought catastrophe the following surcharges will be applied to all applicable accounts:
  - For Residential Water Meters:
    - \$6.00 per CCF between 10 CCF and 20 CCF
    - \$12.00 per CCF between 20 CCF and 40 CCF
    - \$24.00 per CCF over 40 CCF
  - For Irrigation Water meters
    - \$6.00 per CCF between 0 CCF and 10 CCF
    - \$12.00 per CCF between 10 CCF and 20 CCF
    - \$24.00 per CCF between 20 CCF and 40 CCF

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- \$48.00 per CCF over 40 CCF

- Surcharges will remain in effect until the City Council announces the end to the restrictions. Water utilized by commercial nurseries for plant stock production shall not be subject to the surcharges specified herein.

T. VIOLATIONS/PENALTIES

- Any person, firm, corporation or other entity found in violation of any provision of this section shall be punished by a fine of \$25.00 for the first offense, not more than \$500.00 for the second offense and not more than \$2,000.00 for each offense thereafter. Each day of violation of this section shall constitute a separate offense. Proof of a culpable mental state shall not be required for the first or second offense. In the event that this section is violated by repeated offenses, the Director of Public Works is authorized to order the locking or removal of the customer's meter until all fees and fines are paid.

U. TRIGGERING/TERMINATING

- The Director of Public Works shall declare that each "trigger level" has been reached and that the water use restrictions for each respective stage are in effect. The water restrictions will remain in effect until the lakes rise to a level that, when combined with the long term forecast, assures the City an adequate supply of water.

- When an adequate supply of water is available, the City Council, by majority vote, and after consultation with the Director of Public Works, shall announce the termination of each respective stage of the restrictions that are triggered by lake levels.

- The complete Ordinance Amending Sections 106-185 and 106-186 of the Code of Ordinances of the City of Wichita Falls to Establish Modified Water Conservation Drought Contingency Rules can be accessed <http://www.wichitafallstx.gov/1320/Ordinances-Enforced>.

V. IMPORTANT ANNOUNCEMENT CONCERNING SWIMMING POOLS

- Under Stage 5 water restrictions, swimming pools cannot be filled using City treated water. If you have a swimming pool of any kind and plan to fill it from a well or other source, please read these announcements. The health and safety of those using the pool is at stake.

**4. PUBLIC INFORMATION**

The Sheppard AFB populace must be fully aware of the nature and extent of the reason for water restrictions. All available forms of communication, to include the Sheppard Public Web Page, TSTV-14, gate marquees and base-wide e-mail, will be used to apprise the base populace of impending restrictions and of the implementation of restriction programs. Special effort must be made to advertise the rules of the restriction program. This should be an area of repeated emphasis so the base populace clearly understands when they can use water and for what purposes.

**5. ENFORCEMENT OF RESTRICTIONS**

Representatives from the Military Family Housing privatization contractor shall accomplish the enforcement of water restrictions in Military Family Housing. The contractor shall enforce the restrictions set forth by SAFB. Quality Assurance Evaluators from the Maintenance Engineering Flight of the 82d Civil Engineer Squadron will monitor the base grounds contractor for adherence to base water restrictions. Enforcement should be only as aggressive as necessary to achieve the results sought and must be balanced with base perceptions and responsiveness. Random, unannounced patrols on base will be conducted during water restriction periods.



**6. EXEMPTIONS FROM RESTRICTIONS**

There will be need for exemptions in some cases. The exemptions will be closely controlled and the rules for eligibility for exemption will be clearly identified and publicized. For example, an exemption could be given to individuals with newly planted trees. Exemptions shall be publicized through all base media (Sheppard Public Web Page, TSTV etc.).

**7. REFERENCE INFORMATION**

When drought conditions exist gather information from the City of Wichita Falls at the following websites:

A. SOURCES FOR LAKE CONDITIONS

<http://www.waterdatafortexas.org/reservoirs/municipal/wichita-falls>

B. THE NATIONAL DROUGHT MONITOR WEB PAGE FOR TEXAS:

<http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?TX>

APPENDIX A

**Water Conservation Tips**

**IN THE BATHROOM:**

About 75 percent of the water in the home is used in the bathroom. Put these conservation tips to work:

**Showers:**

- Showers usually use less water than tub baths.
- Most shower heads on Sheppard are low flow. If you see one that is not low flow relative to the others, report it to your building manager.
- Take shorter showers. Turn the water off while soaping and back on again only to rinse.
- Shampoo your hair in the shower. It takes little more water than for the bath, and much less than a separate shampoo will use.
- If you have no shower and must take tub baths, reduce the level of the water you have been using by one or two inches.

**Washing hands, brushing teeth, and shaving:**

- Don't use hot water when cold will do. Save water and energy by washing hands with soap and cold water, add hot water only when hands are especially dirty.
- When brushing your teeth turn off the water until you need to rinse your mouth.
- Even when washing hands, don't let the water run. Wet hands, turn off the water while soaping and scrubbing and turn it on again to rinse.
- When shaving, pour hot water in the basin instead of letting the faucet run.

**Commodes:**

- Your commode could be leaking without you knowing it. If you suspect that it is leaking, report it to your building manager.
- Never use the commode to dispose of cleansing tissues, cigarette butts or other trash. This can waste a great deal of water and also places an unnecessary load on your sewage treatment plant.

**IN THE KITCHEN:**

About 11 percent of in-home water use takes place in the kitchen and much of it wasted. Here are some tips for saving:

**Cooking:**

- When cooking, use a pan of water (or stopper the sink) for rinsing pots and pans and cooking implements rather than turning on the water faucet each time a rinse is needed.
- For cooking most food, use only a little water in the pot and put a lid on it. Not only does this method save water, but food is more nutritious since you don't pour vitamins and minerals down the drain with the extra cooking water.

**Washing dishes:**

- Never run your dishwasher without a full load. In addition to water saving, you'll find that your expensive detergent goes a lot further, and a significant energy saving will show up on the utility bill.
- Use your sink disposal sparingly, and never for just a few scraps.
- If you hand wash dishes, use a pan of water for rinsing rather than a running faucet.

**Drinks and Food:**

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- Keep a container of drinking water in the refrigerator. Running water from the tap until it is cool is a waste. Or better yet, save both water and energy by keeping cold water in a picnic jug on a kitchen counter to avoid opening the refrigerator door needlessly.
- When cleaning vegetables, use a small pan of cold water rather than letting the faucet run.

**AROUND THE HOUSE:**

Of the total household water use, the washing machine constitutes about 14 percent.

**Washing Laundry:**

- When using an automatic washing machine (32 to 59-gallons are required per cycle), wash only a full load.
- If your machine has several load settings, use the one for light loads whenever you can.
- Use cold water as often as possible to save energy and to conserve the hot water for uses which cold water cannot serve. (This is also better for clothing made of today's synthetic fabrics).
- If you are considering purchase of any new appliance that uses water, check water requirements of various models and brands. Some use less water than others.

**Leaks and drips:**

- Check all water line connections and faucets for leaks. Report all leaks to your building manager.

**ANNEX Z TO DROUGHT CONTINGENCY PLAN DISTRIBUTION PAGE**

ORGANIZATION

HQ AETC/CEVC

SHEPPARD AFB AGENCIES

80 FTW/IGX  
82 MSG/CC  
82 TRG/CC  
782 TRG/CC  
982 TRG/CC  
82 TRW/PA  
82 TRW/SE  
82 LRS/LGRR  
82 CES/CEF  
82 CES/CEIV  
82 CES/CEO  
82 CES/CEH  
82 CES/CEX  
82 AMDS/SGP  
82 AMDS/SGPB  
82 MXS/LGMX  
82 AMDS/SGPR  
82 LRS/LGSTR  
82 SFS/SFXP

TENANT AGENCIES

DRMO  
AF OSI Det 411

UNIT ENVIRONMENTAL COORDINATORS

80 FTW  
82 TRG  
82 MDG  
80 MSG  
782 TRG  
982 TRG

This plan will be located on ICED.  
Electronic copies of the plan will be sent to organizations outside of Sheppard AFB.



Air Force Civil  
Engineer Center

U.S. Army Corps of  
Engineers  
Preliminary  
Jurisdictional  
Determination

Sheppard Air Force Base, TX

December 2014





Air Force Civil Engineer Center

**U.S. Army Corps of  
Engineers Preliminary  
Jurisdictional Determination**

Sheppard Air Force Base, TX

December 2014



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**Air Force Civil Engineer Center**

**U.S. Army Corps of Engineers  
Preliminary Jurisdictional  
Determination**

**Sheppard Air Force Base, TX**

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Our Ref.:  
6281044.0000

Date:  
December 2014

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## 1. Introduction

This document provides the United States Army Corps of Engineers (USACE) with a Preliminary Jurisdictional Determination (JD) for Sheppard Air Force Base (SAFB) in Wichita Falls, TX (Figure 1). Potential jurisdictional areas were delineated using the USACE Wetland Delineation Manual (USACE 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region was utilized due to drought conditions (USACE 2010).

### 1.1 Project Description

To comply with Executive Order 11990 (Protection of Wetlands, 24 May 77), PIKA-Pirnie JV LLC, Inc. (PIKA-Pirnie) was contracted by Air Force Installation Contracting Agency (AFICA) to delineate wetlands on SAFB in areas that have not been previously surveyed. Identification of wetlands on site will allow the United States Air Force (USAF) to ensure that their actions do not result in a net loss of wetlands. A wetland delineation to determine potential Waters of the United States (U.S.) was performed within the installation boundaries of SAFB.

### 1.2 Site History and Operations

Construction of SAFB began in the 1940s with runways and associated facilities. Over the years, numerous upgrades and expansions have been made to keep pace with current missions and needs of the military. Prior to construction of the runways, fill material was placed on site within the bounds of several small streams that were tributaries to Bear Creek. Excess water that accumulated in the flight training area now drains through a series of storm drains and culverts before reaching Bear Creek to the east.

The primary missions assigned to SAFB involve the 82<sup>nd</sup> Training Wing conducting technical and field training along with the 80<sup>th</sup> Flying Training Wing conducting flight training.

### 1.3 Site Location

SAFB is located between Red River on the north and Wichita River on the south and is approximately five miles north of Wichita Falls, Wichita County, Texas. Global positioning system (GPS) coordinates for the project site are 33.98453° N and 98.49935° W.

### 1.4 Wetlands

Wetlands are defined by the USACE (33 Code of Federal Regulations (CFR) 328.3, 1986) and the U.S. Environmental Protection Agency (EPA) (40 CFR 230.3, 1980) as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under



normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Many wetlands and other aquatic features, including ephemeral, intermittent, and perennial streams, are considered Waters of the U.S. by the USACE and deemed "jurisdictional" under Section 404 of the Clean Water Act.

Field surveys were completed from September 16 through September 17, 2014. The purpose of the field survey was to identify potential jurisdictional "Waters of the U.S." (as outlined in the USACE Regulatory Program Regulations Section 33 CFR 328.2) that occur within the site. A complete photographic log from the field survey is provided in Appendix A.

### 1.5 Hydrology

Hydrology of the survey area is determined by the position of the wetland within the landscape, as well as anthropogenic manipulation of water flows across the adjacent areas. Hydrologic inputs to each of the delineated wetlands include direct precipitation, flooding from adjacent streams, and surface and shallow subsurface run off from the surrounding roads and runways. There are multiple streams that crisscross the survey area and generally flow northwest to southeast. Plum Creek, to the southeast of SAFB, has tributaries that receive water from the southern portion of the survey area. Tributaries of Bear Creek flow from the west of SAFB, underneath the base and associated developments, and reemerge above ground on the east of SAFB.

### 1.6 Soil Series

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), SAFB is located within several soil series, as follows:

Wheatwood and Port soils, frequently flooded. These soils are located on flood plains with 0-1 percent slope. Annual air temperatures range from 57 – 64 degrees Fahrenheit (F) and annual precipitation is from 22 – 38 inches.

Bluegrove loam, 1 to 3 percent slopes. Found on structural benches and ridges, these loamy soils are well drained down to 80 in. Annual air temperature is 63 – 68 degrees F and annual precipitation is 24 – 38 inches.

Bluegrove-Urban land complex, 1 to 3 percent slopes. These are loamy soils similar in structure to the above series, but which are depleted due to their urban setting.

Deandale silt loam, 0 to 1 percent slopes. These soils have a clayey alluvium parent material and are moderately well drained. Annual air temperature is 63 – 64 degrees F and annual precipitation is 27-30 inches.



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Deandale silt loam, 1 to 3 percent slopes. Found in plains landforms, these soils are moderately well drained and formed of a clayey alluvium parent material. Annual air temperature is 63 – 64 degrees F and annual precipitation is 27 – 30 inches.

Deandale silt loam, loamy substratum, 0 to 1 percent slopes. Similar to the previous two soil series, these soils have a loamy substratum to differentiate them.

Frankirk loam, 1 to 3 percent slopes. These are loam and clay soils found on plains. They are well drained and formed of a clayey alluvium parent material. Annual air temperature is 61 – 66 degrees F and annual precipitation is 21 – 27 inches.

Kamay silt loam, 1 to 3 percent slopes. These are well drained pediments soils derived from clayey shale. Annual air temperature is 59 – 68 degrees F and annual precipitation is 24 – 32 inches.

Kamay-Urban land complex, 0 to 3 percent slopes. Similar to above, but found within urban settings. Annual air temperature is 54 – 73 degrees F and annual precipitation is 8 – 60 inches.

Jolly fine sandy loam, 1 to 5 percent slopes. Found on ridges, these soils are residuum weathered from sandstone. Annual air temperature is 63 – 66 degrees F and annual precipitation is 26 – 30 inches.

Rotan loam, 0 to 1 and 1 to 3 percent slopes. These plains soils come from a mixed clayey alluvium found in plains. These soils are well drained. Annual air temperature is 61 – 64 degrees F and annual precipitation is 18 – 28 inches.



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Sheppard Air Force Base



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Sheppard Air Force Base  
Wichita County, TX

Preliminary Jurisdictional Determination

### Vicinity Map



FIGURE  
**1**



- National Hydrologic Dataset Stream/River
- Installation area



## 2. Methods

### 2.1 Wetland Determination

Prior to conducting field surveys, PIKA-Pirnie conducted a "desktop assessment" of the project corridor using USDA soil surveys, infrared (IR) photography, aerial imagery, U.S. Geological Survey (USGS) topographic maps, and U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) datasets. This desktop review allows for preliminary identification of wetlands and provided an understanding of the ecology, land use, and general setting of the site. The NWI dataset for SAFB indicated the presence of freshwater ponds and freshwater emergent wetlands in the northern portion of SAFB near the underground reach of Bear Creek. Scattered freshwater ponds with potential drainage to unnamed tributaries of Bear Creek were indicated in the southern portion of the site. The NWI showed several emergent wetlands in the northwestern corner of the site near an unnamed tributary of Bear Creek and potentially isolated wetlands in the south central area of the site near the runways (USFWS 2012).

Each wetland was surveyed using the methodology outlined in the USACE Wetland Delineation Manual (USACE 1987). Specifically, the methods outlined in Section D, subsection 2, onsite inspections were used to determine the absence or presence of jurisdictional wetlands. The remediation projects were examined, in general, for indications of wetland (hydric) soils, vegetation, and hydrology. In addition the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region was utilized due to drought conditions (USACE 2010).

Each survey area was traversed and information characterizing vegetation communities was recorded. A representative observation point was selected among the vegetation community. A list of dominant species from the general area surrounding the observation points, as well as the plants' stratum and wetland indicator status, were assessed to determine hydrophytic criteria. Plant wetland indicator status was determined using the USFWS Hydrophytic Plant Index for the Great Plains Region. Wetland hydrologic indicators and soil profile characteristics (15-inch maximum depth) for each observation point were also examined and recorded on the wetland determination forms. Hydric soils were assumed to be present at observation points if:

- All dominant species had an indicator status of Obligate (OBL); and



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Sheppard Air Force Base



- All dominant species had an indicator status of OBL or Facultative Wet (FACW), and the wetland boundary was abrupt, or if mineral soils had a matrix chroma of 2 or less in mottled soils or a matrix chroma of 1 or less in un-mottled soils (WTI 1995).

The Wetland Determination Forms are provided in Appendix B. Stream datasheets are provided in Appendix C.

The jurisdictional status of the wetlands and other features is generally based on the feature being located adjacent to or having an obvious hydrologic connection to a known or traditional jurisdictional waterway or wetland (EPA and USACE 2007). For this analysis, all named waterways and their tributaries were considered jurisdictional. The Preliminary Jurisdictional Determination form is provided in Appendix D.

## 2.2 GPS Data Collection

Wetlands and other water features were mapped in accordance with the USACE Standard Operating Procedures (SOP) for Recording Jurisdictional Determinations Using GPS (USACE 2003). All GPS data were edited for errors and clipped to the site boundary. All wetlands and other water features were recorded using a differential GPS device capable of sub-meter accuracy. Wetland features were demarked by collecting GPS points along the perimeter of the wetland with suitable frequency to represent the wetland within the project corridor. All wetlands and other water features were also photographed. A complete photographic log of the survey area is attached as Appendix A.

## 2.3 Wetland Classification

During the field surveys, wetlands were classified using the Cowardin classification system (Cowardin, et al. 1979). The wetlands identified are palustrine emergent (PEM), palustrine aquatic bed (PAB), palustrine shrub scrub (PSS), and palustrine forested (PFO).

- PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed water bodies.
- PAB wetlands class is characterized by vegetative cover of greater than 30 percent of plants growing on or below the surface of water for the majority of the growing season in almost all years. Most wetlands in this class have a substrate consisting of a mix of silt, clay, and organic matter.



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- PSS wetlands class is dominated by woody vegetation less than 6 meters tall. The vegetation present includes true shrubs, young trees and trees or shrubs that are small or stunted because of environmental conditions. All water regimes are included except subtidal.
- PFO wetlands are characterized by woody vegetation that is six meters tall or taller. All water regimes are included except subtidal. These wetlands contain less than five percent herbaceous vegetation (Cowardin, et al. 1979).

#### 2.4 Preliminary Jurisdictional Determination

The jurisdictional status of wetlands and other water features is generally based on the feature being adjacent—or having an obvious hydrologic connection—to a known or traditional jurisdictional waterway or wetland. For the purposes of this analysis, named waterways and their tributaries exhibit these features, as do all wetlands associated with a navigable waterway. If a wetland was separated from a named waterway or other water feature determined to be jurisdictional by a berm, roadway, railway, or other man-made feature, it was considered adjacent and jurisdictional even if a culvert or other surface connection is not observed. Wetlands and other water features that fell within 1,000 feet of named waterways or tributaries to named waterways were also considered adjacent. If no hydrologic connection (current or historical) was observed or could be identified on topographical maps or from ground truthing, then the wetland is considered non-jurisdictional.

### 3. Field Survey Results

Results of the field survey and the delineated survey area are discussed in this section and presented in Figures 2-1 through 2-5. The wetlands associated with the project site are generally well-defined and included physical characteristics such as a prevalence of hydrophytic vegetation, hydric soil conditions and areas of standing water. Seven wetlands and six streams were delineated during the survey. Four of the seven wetlands were determined to be jurisdictional. All streams were determined to be jurisdictional because they are tributaries of named waterways.

#### 3.1 Wetland Results

Based on the presence of hydric vegetation, hydric soils and hydrology, 12.13 acres of wetlands were delineated. Of these wetlands, 10.08 acres are considered jurisdictional. Wetland location figures are included with their descriptions. The labels “Wet” and “Up” on the figures identify data points collected in the wetland and upland areas of each delineation, respectively. Table 1 provides a summary of the wetland delineation results including the location, area, classification, and whether or not the wetland is jurisdictional.



## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

Sheppard Air Force Base

Table 1 Delineated Wetlands Summary

Wetland ID	Latitude	Longitude	Jurisdictional? (Y/N)	Wetland Classification	Delineated Wetland Area (acres)
Wetland 1	33.960595	-98.498923	N	PEM/PAB	0.74
Wetland 2	33.957189	-98.494019	N	PEM/PAB	0.58
Wetland 3	33.960008	-98.502853	Y	PFO	0.025
	33.960868	-98.50283	Y	PFO	0.036
Wetland 4	33.959171	-98.502163	N	PEM/PAB	0.73
Wetland 5	33.982719	-98.518102	Y	PFO	0.035
Wetland 6	33.989416	-98.515679	Y	PFO	8.38
Wetland 7	33.9971	-98.509158	Y	PSS	1.6
Total Area of Wetlands (acres)					12.13
Area of Jurisdictional Wetlands (acres)					10.08



U.S. Army Corps of Engineers  
Preliminary Jurisdictional Determination

Sheppard Air Force Base

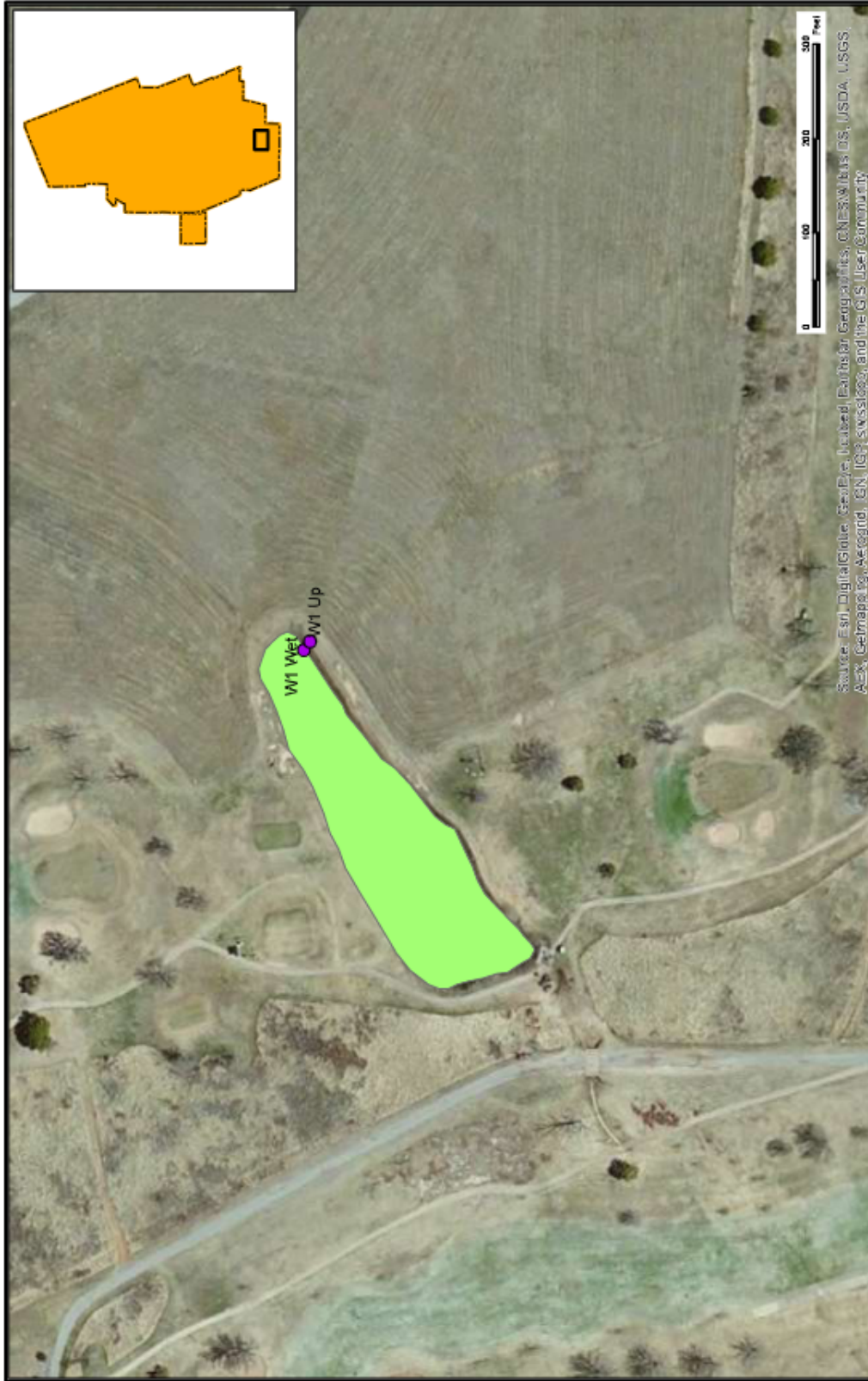
### 3.1.1 Wetland 1


Wetland 1 is a pond located within a golf course in the southern end of the survey area (Figure 2-1). Surface water and saturation were present and inundation was visible on aerial imagery. An algal mat/crust was present along the borders of the water body. A sandy clay soil was identified from 0-6 inches with a matrix of 7.5YR 4/2 and 40 percent redox features of Gley1 3/10Y. The remaining soil profile was clay with a matrix of 5YR 4/3 from 6-17 inches with 20 percent redox features of 7.5YR 4/2. Wetland 1 was dominated by herbaceous vegetation such as buttonbush (*Cephalanthus occidentalis*) and common cattail (*Typha latifolia*). Tree species present included bald cypress (*Taxodium distichum*) and black willow (*Salix nigra*). No defined bed and bank features were identified at this pond that connects it hydrologically to a Water of the U.S.; therefore Wetland 1 is considered isolated and non-jurisdictional.













## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

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<p>Sheppard Air Force Base Wichita County, TX</p> <p>Preliminary Jurisdictional Determination</p>	
<h3>Delineation Results</h3>	
	
<p>FIGURE 2-1</p>	

<ul style="list-style-type: none"> <li> Wetland Data Point</li> <li> Installation area</li> <li> Ordinary High Water Mark</li> </ul>	<ul style="list-style-type: none"> <li> Wetland 1</li> <li> Wetland 2</li> <li> Wetland 3</li> <li> Wetland 4</li> <li> Wetland 5</li> <li> Wetland 6</li> <li> Wetland 7</li> </ul>
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### 3.1.2 Wetland 2

Wetland 2 is a pond located on the golf course on the extreme southeastern edge of the survey area (Figure 2-2). A loamy clay soil was identified from 0-15 inches with a reduced matrix of 7.5YR 4/2 and 30 percent 7.5YR 5/2 redox features. Vegetation at the wetland consisted of black willow, Johnson grass (*Sorghum halepense*), bahia grass (*Paspalum notatum*), and blue flag iris (*Iris virginica*). Vegetation was associated with an adjacent stock pond and the area was under extreme drought conditions during the survey, therefore the wetland had approximately 50 percent bare ground. Surface water, saturation, and an algal crust were present. A small culvert serves as discharge to a roadway ditch adjacent to the pond. No Ordinary High Water Mark (OHWM) was identified outside of the wetland boundary and the roadway ditch lacks a continuous bed and bank; therefore Wetland 2 is non-jurisdictional.



## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

Sheppard Air Force Base





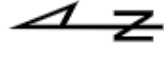
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroX, Getmap, Ig, Aerogrid, IGN, IGP, Swisstopo, and the GIS User Community

Sheppard Air Force Base  
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### Delineation Results

PIKA MALCOLM PIRNIE

FIGURE 2-2



- Wetland Data Point
- Wetland 1
- Wetland 2
- Wetland 3
- Wetland 4
- Wetland 5
- Wetland 6
- Wetland 7
- Installation area
- Ordinary High Water Mark

### 3.1.3 Wetland 3

Two PFO wetland areas—both within the OHWM of Stream 1—were delineated approximately 200 feet apart and are considered together as Wetland 3 (Figure 2-3). These two areas are hierologically linked via Stream 1 and are considered one wetland. The dominant plant species were white ash (*Fraxinus pennsylvanica*), red mulberry (*Morus rubra*), American elm (*Ulmus americana*), water hickory (*Carya aquatica*), screwbean mesquite (*Prosopis pubescens*), black willow, blackfruit spikerush (*Eleocharis melanocarpa*), giant ragweed (*Ambrosia trifida*), and annual ragweed (*Ambrosia artemisiifolia*). The soil was identified from 0-12 inches as sandy clay with a matrix of 7.5YR 3/2 with redox features of 7.5YR 2.5/1. The wetland had surface water and saturation to a depth of about 4 inches. Wetland 3 is located within the OHWM of jurisdictional Stream 1 and is therefore jurisdictional.

### 3.1.4 Wetland 4

Wetland 4 is a pond located adjacent to Stream 1 within the golf course (Figure 2-3). It is classified as PEMPAB. Vegetation consisted of lizard's tail (*Saururus cernuus*) and swamp smartweed (*Persicaria hydropiperoides*). No wetland soil sample was taken; however, the wetland was assumed to have hydric soils due to the presence of surface water with a depth greater than 24 inches. Wetland 4 is less than 100 feet from the banks of Stream 1 and would normally be considered jurisdictional. However, because the pond was excavated from an upland area for use as a golf course pond, it is exempt from jurisdictional status.







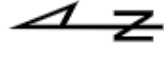
Source: Earth Digital Globe, GeoEye, Inc., Earthstar Geographics, CNR/Swiss GS, USDA, U.SGS, Aerial, GeoEye, Geo, Aergrid, CNR, IGP, Swisstopo, and the GIS User Community

Sheppard Air Force Base  
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Preliminary Jurisdictional Determination

### Delineation Results

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FIGURE 2-3



- Wetland Data Point
- Installation area
- Ordinary High Water Mark
- Wetland 1
- Wetland 2
- Wetland 3
- Wetland 4
- Wetland 5
- Wetland 6
- Wetland 7

### 3.1.5 Wetland 5

Wetland 5 is a PEM wetland that formed within the OHWM of Stream 4 (Figure 2-4). The hydrology of the wetland is controlled by a culvert where water drains underneath a road. Wetland 5 had a variety of plant species including black willow, catclaw acacia (*Acacia greggii*), red milkweed (*Asclepias incarnata*), common cattail, blackfruit spikerush, bahia grass, swamp smartweed, rough banyardgrass (*Echinochloa muricata*), creeping primrose (*Ludwegia repens*), and King Ranch bluestem (*Bothriochloa ischaemum*). The soil consisted of sandy loam from 0-7 inches with a matrix of 10YR 3/3 and no redox features. The remaining soil profile from 7-12 inches consisted of sand with a matrix of 10YR 3/4. Surface water, water marks, and drift deposits were observed. Because the wetland is located within the OHWM of a jurisdictional stream it is considered jurisdictional.



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Sheppard Air Force Base

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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNR/Swiftair, USDA, USGS, AeroX, Getmap, Ig, Aergrid, EN, IGN, Swisstopo, and the GIS User Community

<p>Sheppard Air Force Base Wichita County, TX</p> <p>Preliminary Jurisdictional Determination</p>	
<p><b>Delineation Results</b></p>	
<p>PIKA MALCOLM PIRNIE</p>	
<p>FIGURE 24</p>	

<ul style="list-style-type: none"> <li>● Wetland Data Point</li> <li>□ Installation area</li> <li>▨ Ordinary High Water Mark</li> </ul>	<ul style="list-style-type: none"> <li>Wetland 1</li> <li>Wetland 2</li> <li>Wetland 3</li> <li>Wetland 4</li> <li>Wetland 5</li> <li>Wetland 6</li> <li>Wetland 7</li> </ul>
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### 3.1.6 Wetland 6

Wetland 6 formed in an area where water from Stream 5 drains southeast of the main channel (Figure 2-5). Strong indicators of the wetland included signs of regular flooding, wrack lines, and debris. The wetland is classified as PFO. Vegetation at the site included sugarberry (*Celtis laevigata*), black willow, screwbean mesquite, pricklyash (*Zanthoxylum hirsutum*), trumpet creeper (*Campsis radicans*), giant ragweed, Vasey's grass (*Paspalum urvillei*), round leaf green briar (*Smilax rotundifolia*) and poison ivy (*Toxicodendron radicans*). The soil texture was clayey sand with a matrix of 5YR 3/4 from 0-12 inches. These soils are considered problematic due to the derived red parent material and as such are considered hydric. Wetland 6 is located within the OHWM of a jurisdictional stream and is therefore considered jurisdictional.

### 3.1.7 Wetland 7

Wetland 7 is located in the northwestern corner of the survey area adjacent to an unnamed tributary of Bear Creek (Figure 2-5). The wetland formed immediately upstream of a series of culverts that allow water to flow underneath the airfield of SAFB. The wetland is classified as PSS. Vegetation at the wetland included black willow, buttonbush, giant goldenrod (*Solidago gigantea*), annual ragweed, green ash (*Fraxinus pennsylvanica*), and common cattail. Soils were loamy clay from 1-5 inches with a matrix of 10YR 3/3 and sandy clay from 5-15 inches with a matrix of 5YR 3/4. A one inch deep organic layer was present. These soils are considered problematic due to the derived red parent material and as such are considered hydric. This wetland is associated with a tributary of Bear Creek and is considered jurisdictional.

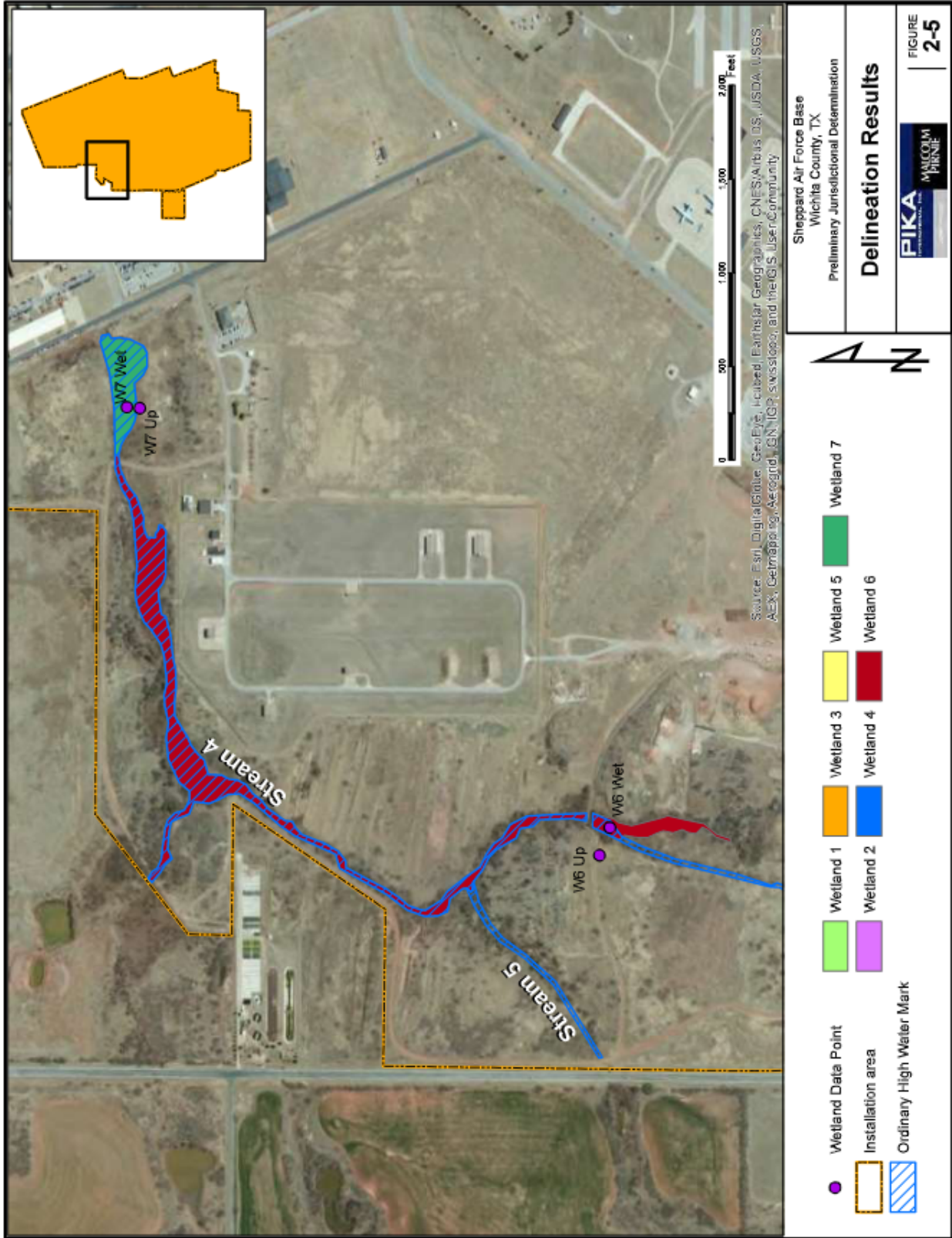


## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

Sheppard Air Force Base

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Source: Esri, DigitalGlobe, GeoEye, iSatellite, Earthstar, GeoGraphics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, Swisstopo, and the GIS User Community

Sheppard Air Force Base  
Wichita County, TX

Preliminary Jurisdictional Determination

### Delineation Results



FIGURE 2-5

Wetland 7

Wetland 5

Wetland 3

Wetland 1

Wetland 2

Wetland 4

Wetland 6

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

Wetland Data Point

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

### 3.2 Stream Results

Table 2 Delineated Streams Summary

Stream ID	Stream Length (Linear ft)	Jurisdictional? (Y/N)	Stream Classification
Stream 1	3,500	Y	Intermittent
Stream 2	180	Y	Perennial
Stream 3	1,700	Y	Perennial
Stream 4	9,950	Y	Perennial
Stream 5	1,050	Y	Intermittent
Stream 6	1,650	Y	Intermittent

#### 3.2.1 Stream 1

Stream 1 is an unnamed intermittent tributary of Plum Creek (Figure 3-1). It is located on the south side of the survey area. Within the developed portions of the base, the stream serves as drainage for overland flows and is highly altered (concrete lining). The water has become impounded where the concrete bed flows into a natural bed. From this location to the edge of SAFB, Stream 1 flows for approximately 3,500 feet. The stream channel is deeply incised and contains water between 13 and 24 inches in depth with a width from bank to bank of approximately 20 feet. The outfall to Stream 1, Outfall 003S, is located at the intersection of Stream 1 and the McKinley Road, just south of the base. Vegetation along the stream included black willow, red mulberry, cottonwood (*Populus deltoides*), and ash trees. Herbaceous vegetation consisted of giant ragweed, Johnson grass, Bermuda grass (*Cynodon dactylon*), and sunflower (*Helianthus sp.*). Stream 1 is a tributary of Plum Creek and is jurisdictional.



## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

Sheppard Air Force Base



### 3.2.2 Stream 2

Stream 2 is a perennial water body that collects water flowing underneath SAFB. Stream 2 is the outfall for both Stream 4 and Stream 6. It is a concrete lined basin that is 150 feet wide and contained approximately 0-6 inches of water at the time of the survey. This outfall, Outfall 001S, is located on the extreme eastern edge of the survey area and functions as the above-ground mouth of Bear Creek (Figure 3-2). Johnson grass and annual ragweed bordered the concrete outfall. Stream 2 is a named waterway and is therefore jurisdictional.

### 3.2.3 Stream 3

Stream 3 is a perennial water basin that serves as an outfall for SAFB. The outfall, Outfall 002S, is located on the southeastern edge of the survey area and drains to an unnamed tributary of the Wichita River (Figure 3-2). Water depth was greater than three feet and the bank to bank width of the basin was approximately 50 feet. Unlike the basin of Stream 2, only a portion of the basin of Stream 3 is concrete, the remainder consists of silt and mud. There was a clear OHWM illustrated by sediment deposits, a natural line impression on the bank, and matted vegetation. Mesquite, Johnson grass, giant ragweed, and annual ragweed were present along the bank of the stream. Stream 3 is hydrologically connected to the Wichita River and is considered jurisdictional.



## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

Sheppard Air Force Base





Sheppard Air Force Base  
Wichita County, TX  
Preliminary Jurisdictional Determination

**Stream Results**

PIKA MALCOLM PIRNIE

FIGURE 3-2

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

#### 3.2.4 Stream 4

Stream 4 is a perennial water way located on the western edge of the survey area (Figure 3-3). The stream enters the site near the center of the western edge of the survey area and flows for approximately 2,100 feet before the confluence with Stream 5. Two tributaries, including a concrete drainage ditch and stream channel entering SAFB from the west, were identified before the stream flows through a culvert under the base. Stream 2 is the outfall location for Stream 4. Water depth was between 13 and 24 inches. The width of the water in the bank was approximately one to three feet; however the bank to bank width was between 15 and 25 feet. Only herbaceous vegetation was present along the banks and consisted of Johnson grass, annual ragweed, Bermuda grass, spikerush, fleabane (*Erigeron* sp.), creeping primrose, and barnyard grass. Stream 4 is a tributary of Bear Creek, and is connected to Stream 2. It is jurisdictional.

#### 3.2.5 Stream 5

Stream 5 is an intermittent drainage with gently sloping banks located on the western edge of the survey area (Figure 3-3). Stream 5 enters the survey area on the western edge and flows for approximately 1,050 feet before joining Stream 4. There was no water in the channel at the time of the survey; however the bank to bank width was approximately 15 feet. The only tree species present along the banks was sugarberry. Herbaceous vegetation included annual ragweed, fleabane, snow-on-the-prairie (*Euphorbia bicolor*), sedges (*Carex* sp.), and a species of sunflower. Stream 5 flows into Stream 4, and is jurisdictional.



## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

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Sheppard Air Force Base  
Wichita County, TX  
Preliminary Jurisdictional Determination

**Stream Results**

PIKA MALCOLM PIRNIE

FIGURE 3-3

Installation area

Ordinary High Water Mark

Wetland 1

Wetland 2

Wetland 3

Wetland 4

Wetland 5

Wetland 6

Wetland 7

### 3.2.6 Stream 6

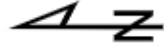
Stream 6 enters the survey area in the northwest corner and flows for approximately 1,650 feet before entering a culvert that directs water flow underneath the airfield (Figure 3-4). Stream 6 joins with Stream 4 underneath the base before emerging at the outfall location identified as Stream 2, an unnamed intermittent tributary to Bear Creek. The channel was dry with minimal ponding at the time of the survey. The stream has shallow banks and a bank to bank width of approximately 10 feet. Vegetation along the stream was primarily black willow, screwbean mesquite, buttonbush, poison ivy, giant ragweed, Johnson grass, and annual ragweed. Stream 6 is hydrologically connected to Bear Creek and is considered jurisdictional.



## U.S. Army Corps of Engineers Preliminary Jurisdictional Determination

Sheppard Air Force Base





- Installation area
- Ordinary High Water Mark
- Wetland 1
- Wetland 2
- Wetland 3
- Wetland 4
- Wetland 5
- Wetland 6
- Wetland 7

### Stream Results



FIGURE 3-4

#### 4. Literature Cited

- Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, FWS/OBS-79/31.
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Sheppard Air Force Base

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**Appendix A**

Photographic Log






### PHOTOGRAPHIC LOG

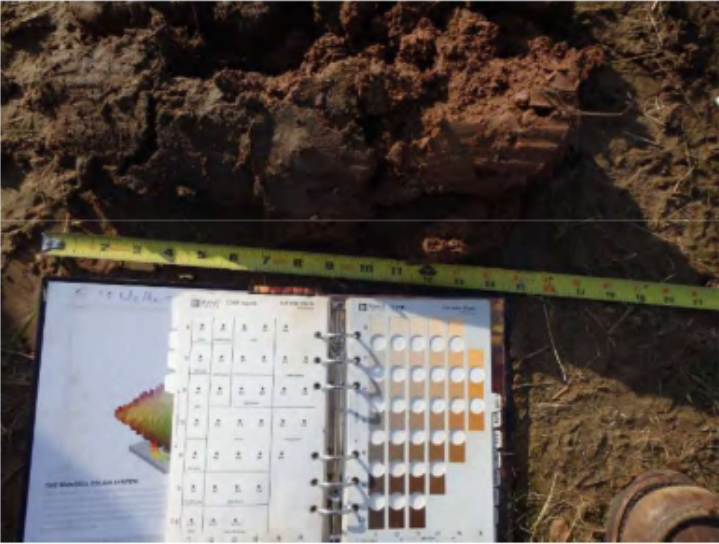
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<b>Direction Photo Taken:</b> North			
<b>Description:</b> W1 wet			



### PHOTOGRAPHIC LOG

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<b>Photo No.</b> 2	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> W1 wet			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>3</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> W1 wet soil sample			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>4</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> Southwest			
<b>Description:</b> W1 overview			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 5	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> Southeast			
<b>Description:</b> Overview of W2			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 6	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> W2 wet			






### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 7	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> W2 wet			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 8	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> W2 wet soil sample			




### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> 9	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> W3 wet			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> 10	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> W3 wet			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>11</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> W3 wet soil sample			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>12</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> Overview of W4			



**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>13</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> Southeast			
<b>Description:</b> W4 bank vegetation			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>14</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> No soil sample for W4 wet was collected, as the site was under water.			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>15</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> Overview of W5			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>16</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> Overview of W5 outflow			






### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 17	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> W5 wet			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 18	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> W5 wet			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>19</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> W5 wet soil sample			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>20</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> W6 overview			

**PHOTOGRAPHIC LOG**


<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>21</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> W6 has no surface water, but shows indications of being regularly inundated			

**PHOTOGRAPHIC LOG**


<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>22</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> Water from W6 flows through a drainage			





**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>23</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> W7 outflow culvert. S6 flows through this wetland and culvert, and beneath the airfield.			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>24</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> Northeast			
<b>Description:</b> Overview of W7			

		<b>PHOTOGRAPHIC LOG</b>	
<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>25</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> N/A			
<b>Description:</b> W7 wet soil sample			

				<b>PHOTOGRAPHIC LOG</b>	
<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX		<b>Project No.:</b> 06261044.0000	
<b>Photo No.:</b> <b>26</b>	<b>Date:</b> 09/16/2014				
<b>Direction Photo Taken:</b> Southwest					
<b>Description:</b> S1 outflow					

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>27</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> Northeast			
<b>Description:</b> Upstream view of S1			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>28</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> Northeast			
<b>Description:</b> S1 upstream. The channel flows through a maintained park that used to be a golf course.			






### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>29</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> S1 upstream drainage			

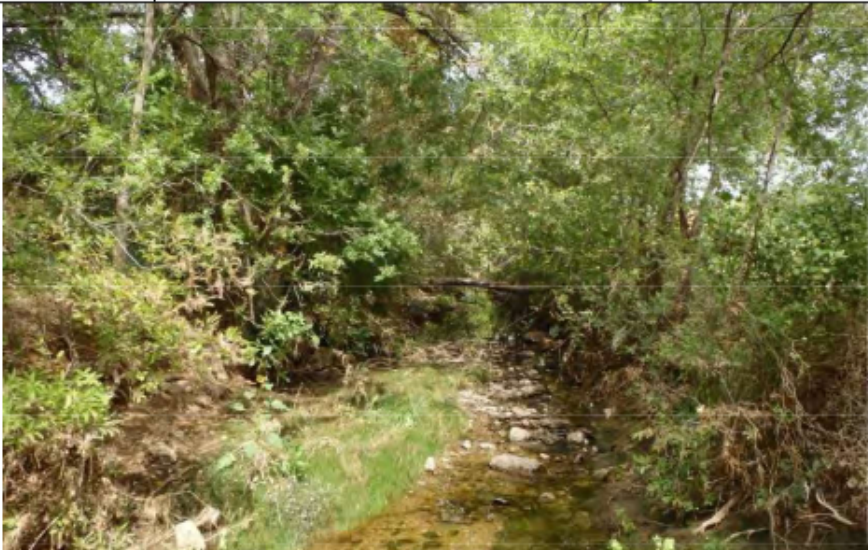


### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>30</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> S1 upstream in non-maintained area. Small patches of forested wetland surrounds parts of the stream here.			




### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 31	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> S1 upstream. Another view of the non-maintained area.			




### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 32	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> S1 near inflow			




**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>33</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> Northwest			
<b>Description:</b> S1 inflow source			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>34</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> S2 outfall overview. The stream itself runs primarily beneath the airfield, to flow out at the eastern edge of the base.			


**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>35</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> S2 outfall			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>36</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> View of S2 downstream of the outfall area, past the boundary fence.			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>37</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> Overview of S3 as it flows beneath and through the airfield to the outfall just off base.			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>38</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> Water in S3 downstream of the outflow from beneath the airfield.			



**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>39</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> S3 flowing from culverts beneath the airfield.			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>40</b>	<b>Date:</b> 09/16/2014		
<b>Direction Photo Taken:</b> Southeast			
<b>Description:</b> S3 as it flows back beneath the airfield to outfall east of the boundary fence (pictured below).			



### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**41**

**Date:**  
09/16/2014

**Direction Photo Taken:**  
Southeast

**Description:**  
Overview of S3 outfall, past the boundary fence of the base. Water ponds just past the inflow culvert, then flows southeast off base.



### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**42**

**Date:**  
09/16/2014

**Direction Photo Taken:**  
North

**Description:**  
Flow of water into S3 pond.







### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**43**

**Date:**  
09/16/2014

**Direction Photo Taken:**  
East

**Description:**  
S3 downstream



### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**44**

**Date:**  
09/17/2014

**Direction Photo Taken:**  
Southeast

**Description:**  
View of S4 drainage culvert.





### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**45**

**Date:**  
09/17/2014

**Direction Photo Taken:**  
South

**Description:**  
Overview of S4 downstream. The southern section runs through an improved area; most of the bank here is maintained.



### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**46**

**Date:**  
09/17/2014


**Direction Photo Taken:**  
North

**Description:**  
S4 overview






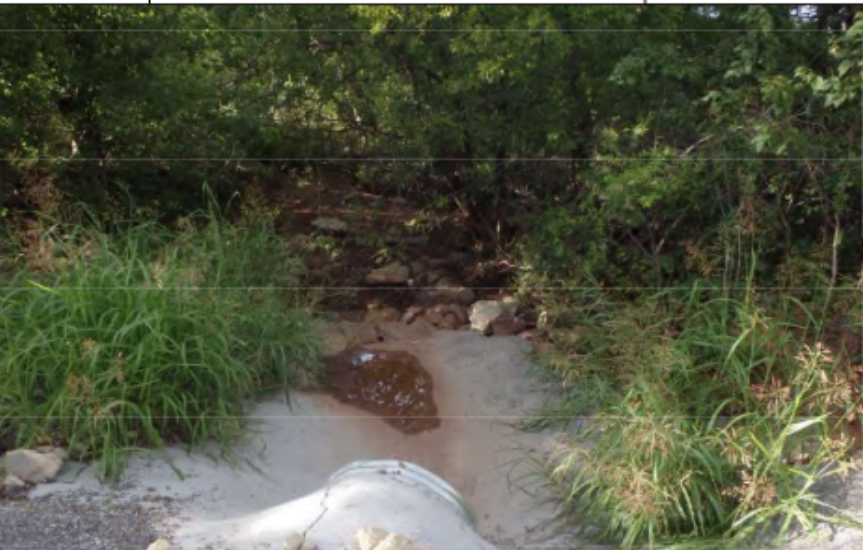
**PHOTOGRAPHIC LOG**


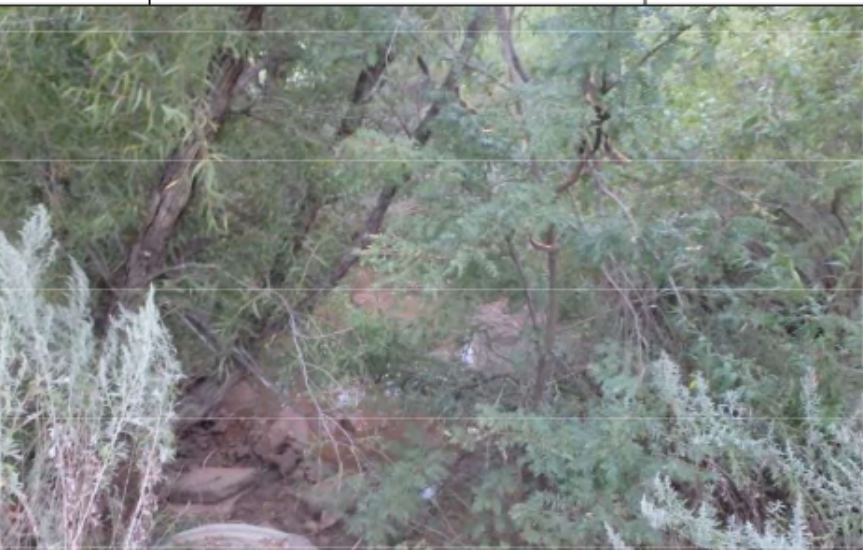
<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>47</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> South			
<b>Description:</b> S4 flows beneath Missile Rd. where ponding has formed W5. View of the culvert south of Missile Rd.			

**PHOTOGRAPHIC LOG**

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>48</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> Farther upstream, S4 flows through unimproved area and is surrounded by wetland and vegetation.			



		<b>PHOTOGRAPHIC LOG</b>	
<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>49</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> S4 drainage, just upstream of W6.			

		<b>PHOTOGRAPHIC LOG</b>	
<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> <b>50</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> S4 inflow from the west side of base. This is the northern branch of S4 that flows from west to east beneath airfield. Previous S4 pictures were taken in the southern branch that flows north.			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 51	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> S4 downstream. It flows through unimproved areas east to the airfield.			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.:</b> 06261044.0000
<b>Photo No.:</b> 52	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> North			
<b>Description:</b> S4 vegetation downstream.			





### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>53</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> West			
<b>Description:</b> S6 inflow from boundary fence to the west.			



### PHOTOGRAPHIC LOG

<b>Project Name:</b> Sheppard AFB Jurisdictional Determination		<b>Location:</b> Wichita County, TX	<b>Project No.</b> 06261044.0000
<b>Photo No.</b> <b>54</b>	<b>Date:</b> 09/17/2014		
<b>Direction Photo Taken:</b> East			
<b>Description:</b> Overview of S6 as it flows east			



### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**55**

**Date:**  
09/17/2014

**Direction Photo Taken:**  
East

**Description:**  
View of drainage culvert into which S6 flows into which S6 flows beneath the airfield.



### PHOTOGRAPHIC LOG

**Project Name:**  
Sheppard AFB Jurisdictional Determination

**Location:**  
Wichita County, TX

**Project No.**  
06261044.0000

**Photo No.**  
**56**

**Date:**  
09/17/2014

**Direction Photo Taken:**  
West

**Description:**  
View of S6 from the eastern culvert that flows beneath the airfield.



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**Appendix B**

Wetland Determination Forms

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**SOIL**

Sampling Point: W1-wet

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	7.5YR 4/2	60	Gley 3/10Y	40	RM	M	sandy clay	
6-17	5YR 4/3	80	7.5YR 4/2	20	RM	M	clay	restrictive layer

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.    <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>3</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)	
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)	
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 & 73 of LRR H)		

Restrictive Layer (if present):  
 Type: Clay underpan  
 Depth (inches): 6"

Hydric Soil Present? Yes  No

Remarks:  
Soil sample has positive indicator of depleted matrix

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	(where tilled)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)	
<input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Water Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)	

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_

Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_

Saturation Present? Yes  No  Depth (inches): \_\_\_\_\_ (includes capillary fringe)

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  
Total precip. observed @ Sheppard AFB is 17.18" (Annual accumulated avg. since Jan 1: 21.33") which is -4.15" for the year

Remarks:  
Extreme drought conditions exist w/in project area, therefore normal surface hydrology evidence (eg: incise line along bank) was considered for delineation boundary.

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/14/2014  
 Applicant/Owner: US Air force State: TX Sampling Point: W1 UP  
 Investigator(s): Alex Mather, Toni Taylor-Galithy Section, Township, Range: N7A  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1-2  
 Subregion (LRR): LRR11 Lat: 33.96082 Long: -98.49835 Datum: WGS84  
 Soil Map Unit Name: KaB - Kamey silt loam, 1 to 3% slopes NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No  (If no, explain in Remarks.)  
 Are Vegetation , Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland?	Yes _____ No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes _____ No <input checked="" type="checkbox"/>		
Wetland Hydrology Present?	Yes _____ No <input checked="" type="checkbox"/>		
Remarks: <u>upland area located outside man-made shallow water golf course pond. Vegetation frequently mowed</u>			

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-):	<u>1</u> (A)
2. _____				Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>50</u> (A/B)
4. _____				Prevalence Index worksheet:	
_____ = Total Cover				Total % Cover of:	Multiply by:
_____ = Total Cover				OBL species _____	x 1 = _____
_____ = Total Cover				FACW species _____	x 2 = _____
_____ = Total Cover				FAC species _____	x 3 = _____
_____ = Total Cover				FACU species _____	x 4 = _____
_____ = Total Cover				UPL species _____	x 5 = _____
_____ = Total Cover				Column Totals:	(A) _____ (B) _____
_____ = Total Cover				Prevalence Index = B/A = _____	
_____ = Total Cover				Hydrophytic Vegetation Indicators:	
_____ = Total Cover				___ 1 - Rapid Test for Hydrophytic Vegetation	
_____ = Total Cover				___ 2 - Dominance Test is >50%	
_____ = Total Cover				___ 3 - Prevalence Index is ≤3.0 <sup>1</sup>	
_____ = Total Cover				___ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
_____ = Total Cover				___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
_____ = Total Cover				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
_____ = Total Cover				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	
Remarks: <u>Vegetation frequently maintained by mowing on golf course</u>					

SOIL

Sampling Point: W1-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-6	7.5YR 3/2	100					Silty loam	
6	10YR 7.5YR 4/4	100					Silty loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:  
 No positive indicators of hydric soils exist

HYDROLOGY

Wetland Hydrology Indicators: None

Primary Indicators (minimum of one required; check all that apply)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> (where tilled)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> (where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

Secondary Indicators (minimum of two required)

Field Observations:

Surface Water Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Water Table Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present? (includes capillary fringe) Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
 Extreme drought conditions exist. However, no primary/secondary indicators present

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls (Wichita) Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W2-wet  
 Investigator(s): AMM, TSS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1-2%  
 Subregion (LRR): LRRH Lat: 33.45733 Long: -98.49924 Datum: WGS84  
 Soil Map Unit Name: KaB - Kamay silt loam, 1 to 3% slopes NWI classification: PAB  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation , Soil , or Hydrology  significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation , Soil , or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:  
 Extreme drought conditions exist. Approx. 1" of rain fell within 72 hours. Surface water elevation is much lower than normal.  
 There is a distinct wetland boundary around man-made shallow water golf course pond. No other exists outside delineated wetland boundary.

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (AB)
1. _____				
2. _____				
3. _____				
_____ = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u> )				
1. <u>Salix nigra</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>	
2. _____				
3. _____				
4. _____				
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u> )				
1. <u>Iris virginica</u>	<u>20</u>	<u>Y</u>	<u>OBL</u>	
2. <u>Sorghum halepense</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	
3. <u>Paspalum notatum</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u> )				
1. _____				
2. _____				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>45</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks:  
 Vegetation is associated with a stock pond that is approximately 6-8" low.  
 High proportion of wetland is unvegetated. Vegetation on edge of normal water line stressed due to drought.

**SOIL**

Sampling Point: W2-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-15	7.5YR 4/2	70	7.5YR 5/2	30	D	M	loamy clay	

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils <sup>2</sup> :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)	
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)	
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>2</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.	
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)		

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:  
 There is a positive indication of hydric soils present

**HYDROLOGY**

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (minimum of two required)	
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input checked="" type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> (where tilled)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> (where not tilled)	<input checked="" type="checkbox"/> Crayfish Burrows (C8)	
<input checked="" type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)	

Field Observations:  
 Surface Water Present? Yes  No  Depth (inches): 24-30"  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes  No  Depth (inches): 10"  
 (includes capillary fringe)

Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
 This is a stock pond that multiple stormwater outfalls discharge into. A small culvert serves as discharge to roadway ditch adjacent to pond. No OHWM exists outside wetland boundary or within roadway ditch.

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W2-UP  
 Investigator(s): Alex Mathes, Toni Taylor-Salisbury Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): CONVEX Slope (%): 1-3%  
 Subregion (LRR): LPL H Lat: 33.95732 Long: -98.49427 Datum: WGS 84  
 Soil Map Unit Name: KaB - Kamay silt loam, 1 to 3% slopes NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation X, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology X naturally problematic? (if needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes _____ No <u>X</u>	
Remarks: <u>located within maintained recreation area (Former Golf Course)</u>		

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
1.				
2.				
3.				
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u> )				
1.				
2.				
3.				
4.				
5.				
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u> )				<b>Hydrophytic Vegetation Indicators:</b> ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0' ___ 4 - Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation' (Explain) 'Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. <b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
1.	<u>Cyperus chertylon (Cyperus chertylon)</u>	<u>100</u>	<u>Y</u> <u>FACU</u>	
2.	<u>Erigeron sp.</u>	<u>5</u>	<u>N</u> <u>FACU</u>	
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>15' r</u> )				
1.				
2.				
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u>	_____ = Total Cover			

Remarks:  
No positive indication of hydrophytic vegetation present

**SOIL**

Sampling Point: WZ-UP

Profile Description: (Describe to the depth needed to document the Indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>				
0-2	7.5YR 2.5/2	100						Silty loam	
2-12	5YR 3/4	60	7.5YR 2.5/1	40	C	M		clayey loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (Inches): \_\_\_\_\_  
 Hydric Soil Present? Yes \_\_\_\_\_ No X

Remarks:  
 no positive identification of hydric soils present

**HYDROLOGY**

Wetland Hydrology Indicators:

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled)	<input type="checkbox"/> (where tilled)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

Field Observations:  
 Surface Water Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)  
 Wetland Hydrology Present? Yes \_\_\_\_\_ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
 no positive indication of hydrology present



**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W3-Wet  
 Investigator(s): Alex Mathes, Toni Taylor-Salsbury Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): flat plain Local relief (concave, convex, none): concave Slope (%): 1-5  
 Subregion (LRR): LRRH Lat: 33.9600 Long: -98.5023 Datum: NAD83  
 Soil Map Unit Name: ObC - Jolly fine sandy loam, 1 to 5% slopes NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is the Sampled Area within a Wetland?	Yes <u>X</u>	No _____	
Hydric Soil Present?	Yes <u>X</u>	No _____		Remarks:	Forested wetland within OHWM of stream 1	
Wetland Hydrology Present?	Yes <u>X</u>	No _____				

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Fraxinus pennsylvanica</u>	90	Y	FAC	Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>6</u> (A)  Total Number of Dominant Species Across All Strata: <u>7</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>86</u> (A/B)
2. <u>Morus rubra</u>	10	n	FACU	
3. <u>Ulmus americana</u>	10	n	FAC	
4. <u>Salix nigra</u>	30	Y	FACW	
<u>140</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B)  Prevalence Index = B/A = _____
<u>10</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u> )				
1. <u>Coryna aquatica</u>	5	Y	OBL	
2. <u>Protopis pubescens</u>	5	Y	FAC	
Herb Stratum (Plot size: <u>5'</u> )				
1. <u>Ambrosia trifida</u>	10	Y	FAC	
2. <u>Eleocharis peltocarpa</u>	10	Y	FACW	
3. <u>Ambrosia artemisiifolia</u>	10	Y	FACU	
<u>30</u> = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
% Bare Ground in Herb Stratum <u>70</u> = Total Cover				

Remarks: mature forested hardwood wetland within the OHWM of stream 1



**SOIL**

Sampling Point: W3-wet

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features			Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%					
0-12	7.5 YR 3/2	60	7.5 YR 2.5/1	40	D	M	sandy clay		

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_  
 Hydric Soil Present? Yes  No

Remarks:  
 Problematic soils since they occur within an active stream channel, redox features saturated ~ 4". Problematic soils with red parent material.

**HYDROLOGY**

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

Field Observations:  
 Surface Water Present? Yes  No  Depth (inches): 0-6  
 Water Table Present? Yes  No  Depth (inches): 4  
 Saturation Present? Yes  No  Depth (inches): 4  
 Wetland Hydrology Present? Yes  No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:  
 Total precip observed at Sheppard AFB airport is 121.8" (Annual accumulated avg since Jan, 1 : 21.35) which is 4.15" for the year

Remarks:  
 Extreme drought conditions exist within project area, therefore normal surface hydrology evidence (e.g. incise line along bank) was considered for delineation boundary.

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W3-4p  
 Investigator(s): Alex Mathes, Toni Taylor-Salisbury Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Upper terrace Local relief (concave, convex, none): convex Slope (%): 1-5  
 Subregion (LRR): LRRH Lat: 33.95994 Long: -98.50290 Datum: WGS84  
 Soil Map Unit Name: Chc - Jolly fine sandy loam, 1 to 5% slopes NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: <u>Sample location located within a mature bottomland hardwood riparian area, outside the stream corridor, Extreme drought conditions exist.</u>	

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Celtis laevigata</u>	<u>10</u>	<u>Y</u>	<u>OAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>10</u> = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<u>30</u> = Total Cover				
<u>10</u> = Total Cover				
<u>40</u> = Total Cover				
<u>95</u> = Total Cover				
<u>5</u> = Total Cover				<b>Hydrophytic Vegetation Indicators:</b> ___ 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% ___ 3 - Prevalence Index is $\leq 3.0^1$ ___ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
<u>30</u> = Total Cover				
<u>10</u> = Total Cover				
<u>40</u> = Total Cover				
<u>95</u> = Total Cover				
<u>5</u> = Total Cover				
<u>5</u> = Total Cover				
<u>5</u> = Total Cover				
<u>5</u> = Total Cover				
<u>5</u> = Total Cover				

Remarks: Mature bottomland hardwood riparian corridor associated with stream 1

**SOIL**

Sampling Point: *W3-up*

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-15	7.5 YR	3/3	100				sandy clay	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.    <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:** (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>2</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:  
*No positive indication of hydric soils present*

**HYDROLOGY**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> (where tilled)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> (where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)	

Field Observations:  
 Surface Water Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
*No positive indication of hydrology present*

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W4-wet  
 Investigator(s): AMM, JES Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1-5  
 Subregion (LRR): LRR14 Lat: 33.95940 Long: -98.50247 Datum: WGS84  
 Soil Map Unit Name: OcC-Jolly fine sandy loam, 1 to 5% slopes NWI classification: PA1B  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation , Soil , or Hydrology  significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation , Soil , or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: man made shallow water golf course pond. NO OHWM exists outside delineated wetland boundary. Due to extreme drought conditions, normal surface hydrology boundary (eg incised line on bank) has been drawn down.	

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>2</u> (A)  Total Number of Dominant Species Across All Strata: <u>2</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (AB)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B)  Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum (Plot size: _____)</b>				
1. _____				
2. _____				
3. _____				
_____ = Total Cover				
<b>Herb Stratum (Plot size: <u>5'</u>)</b>				
1. <u>Saururus cernuus</u>	<u>5</u>	<u>Y</u>	<u>OBL</u>	<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is <3.0 <sup>1</sup> <input type="checkbox"/> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Pectisaria hydropiperoides</u>	<u>15</u>	<u>Y</u>	<u>OBL</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
<u>20</u> = Total Cover				
<b>Woody Vine Stratum (Plot size: _____)</b>				
1. _____				
2. _____				
<b>% Bare Ground in Herb Stratum <u>80</u></b> _____ = Total Cover				

Remarks:  
 Deep water habitat with herbaceous vegetation fringe wetland along boundary margin.



**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Swapped AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W444  
 Investigator(s): AMM, JIS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): Convex Slope (%): 1-5  
 Subregion (LRR): LRR1H Lat: 33.9541 Long: -98.5249 Datum: WGS84  
 Soil Map Unit Name: obc - Jolly fine sandy loamy 1 to 5% slopes NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No  (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>	Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>		
Remarks: <u>Sample location associated with a maintained, frequently mowed golf course</u>		

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A)
2. _____				Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____				
4. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
_____ = Total Cover				<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ <b>Column Totals:</b> _____ (A) _____ (B) Prevalence Index = B/A = _____
<b>Sapling/Shrub Stratum (Plot size: _____)</b> 1. _____ 2. _____ 3. _____ 4. _____ 5. _____				
_____ = Total Cover				
<b>Herb Stratum (Plot size: <u>5'</u>)</b> 1. <u>Cynodon dactylon</u> 100 Y <u>FACU</u> 2. <u>Dandelion (Taraxacum officinale)</u> 10 N <u>FACU</u> 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____				
_____ = Total Cover				
<b>Woody Vine Stratum (Plot size: _____)</b> 1. _____ 2. _____				*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.  Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>
_____ = Total Cover				
% Bare Ground in Herb Stratum <u>0</u> _____ = Total Cover				
Remarks: <u>Maintained, frequently mowed vegetation associated with an active golf course</u>				



**SOIL**

Sampling Point: W4-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%				
0-12	7.5YR 4/2	95	7.5YR 4/6	5	C	cl	Sandy clay	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Loamy Mucky Mineral (F1)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:

Previously disturbed likely due to the construction of the pond bank. Large gravel interspersed. NO positive indication of hydric soils present

**HYDROLOGY**

Wetland Hydrology Indicators:	Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B6)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)
<input type="checkbox"/> Water-Stained Leaves (B9)		

Field Observations:

Surface Water Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
Water Table Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
Saturation Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
(includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of hydrology present

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: WS-wet  
 Investigator(s): AMM, TSS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): stream w/in floodway Local relief (concave, convex, none): convex Slope (%): 0-1  
 Subregion (LRR): LRAH Lat: 33.98284 Long: -98.51810 Datum: WGS84  
 Soil Map Unit Name: Aw - wheatland and Port soils, frequently flooded NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation X, Soil \_\_\_\_\_, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks:  
 Sample location w/in an OTHM of stream that occurs at a confluence of a flowing drainage ditch and a blue-line stream. Due to extreme drought conditions, normal stream hydrology has been reduced. As such, upland vegetation was found to be invading typical aquatic habitat

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>4</u> (A)	Total Number of Dominant Species Across All Strata: <u>6</u> (B)
2. _____					
3. _____					
4. _____					
= Total Cover				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)	
Sapling/Shrub Stratum (Plot size: <u>15'</u> )				Prevalence Index worksheet:	
1. <u>Salix nigra</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	Total % Cover of:	Multiply by:
2. <u>Acacia gregii</u>	<u>5</u>	<u>Y</u>	<u>UPL</u>	OBL species _____ x 1 = _____	
3. _____				FACW species _____ x 2 = _____	
4. _____				FAC species _____ x 3 = _____	
5. _____				FACU species _____ x 4 = _____	
= Total Cover <u>20</u>				UPL species _____ x 5 = _____	
				Column Totals: _____ (A) _____ (B)	
				Prevalence Index = B/A = _____	
Herb Stratum (Plot size: <u>5'</u> )				Hydrophytic Vegetation Indicators:	
1. <u>Asclepias incarnata</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	1 - Rapid Test for Hydrophytic Vegetation	
2. <u>Paspalum rotatum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	<u>X</u> 2 - Dominance Test is >50%	
3. <u>Typha latifolia</u>	<u>40</u>	<u>Y</u>	<u>OBL</u>	3 - Prevalence Index is >3.0 <sup>1</sup>	
4. <u>Echinochloa spuriata</u>	<u>10</u>	<u>N</u>	<u>FACW</u>	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
5. <u>Eleocharis speltanocarpa</u>	<u>10</u>	<u>Y</u>	<u>UPL</u>	<u>X</u> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
6. <u>Bothriochloa ischaemum</u>	<u>20</u>	<u>Y</u>	<u>UPL</u>		
7. <u>Ludwigia linearis</u>	<u>10</u>	<u>N</u>	<u>OBL</u>		
8. <u>Panicum capillare</u>	<u>15</u>	<u>N</u>	<u>OBL</u>		
9. _____					
10. _____					
= Total Cover <u>130</u>				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (Plot size: _____)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
1. _____					
2. _____					
= Total Cover _____					
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:  
 Upland plant spp were likely "invading" wetland habitat due to extreme drought conditions that have been experienced in the area for multiple years



**SOIL**

Sampling Point: WS-wet

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 3/3	100					sandy loam	
7-12	10YR 3/4	100					sand	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils <sup>3</sup> :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input checked="" type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:  
 Due to extreme drought conditions, problematic soils are assumed to be hydric under normal conditions.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>3</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>7</u>	
Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0</u>	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Total precip observed @ Sheppard AFB airport is 17.12" (annual accumulated average since Jan 1: 21.33") which is - 4.15" for the year

Remarks:  
 Extreme drought conditions exist within project area. Therefore, normal surface hydrology evidence (eg: incise line along bank) was considered for delineation boundary.

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: 125 WP  
 Investigator(s): AMM, TTS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Outside stream floodway Local relief (concave, convex, none): CONCAVE Slope (%): 0-1  
 Subregion (LRR): LRR11 Lat: 33.98284 Long: -98.518034 Datum: WGS84  
 Soil Map Unit Name: A1 - Wheatwood and Port soils, frequently flooded NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_ or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_ or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present? Yes _____ No <u>X</u>	
Wetland Hydrology Present? Yes _____ No <u>X</u>	
Remarks: <u>Data point located immediately outside of the OBLW/wetland boundary of the blue-line stream w/in a periodically maintained old field.</u>	

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A)
2. _____				
3. _____				
4. _____				
_____ = Total Cover				Total Number of Dominant Species Across All Strata: <u>2</u> (B)
Shrub/Straw Shrub Stratum (Plot size: _____)				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (AB)
1. _____				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u> )				
1. <u>Johnson grass (Sorghum halepense)</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is $\leq 3.0^1$ ___ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Annual Ragweed (Ambrosia artemisiifolia)</u>	<u>15</u>	<u>N</u>	<u>FACU</u>	
3. <u>Bermuda grass (Cynodon dactylon)</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>	
4. <u>Waxy grass (Paspalum urvillei)</u>	<u>10</u>	<u>N</u>	<u>FACW</u>	
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
<u>105</u> = Total Cover				
Woody/Vine Stratum (Plot size: _____)				
1. _____				Hydrophytic Vegetation Present? Yes _____ No <u>X</u>
2. _____				
% Bare Ground in Herb Stratum <u>0</u> _____ = Total Cover				
Remarks: <u>upland vegetation associated with a periodically maintained oldfield</u>				

**SOIL**

Sampling Point: WS-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	Color (moist)	%	Color (moist)	%				
0-15	7.5YR 3/4	85	5YR 4/6	15	C	m	loamy clay	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.    <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils<sup>3</sup>:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5) (LRR F)
- 1 cm Muck (A9) (LRR F, G, H)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- 5 cm Mucky Peat or Peat (S3) (LRR F)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Loamy Mucky Mineral (F1)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

- 1 cm Muck (A9) (LRR I, J)
- Coast Prairie Redox (A16) (LRR F, G, H)
- Dark Surface (S7) (LRR G)
- High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- Reduced Vertic (F18)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:

No positive indication of hydric soils present.

**HYDROLOGY**

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (minimum of two required)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Water-Stained Leaves (B9)
- Salt Crust (B11)
- Aquatic Invertebrates (B13)
- Hydrogen Sulfide Odor (C1)
- Dry-Season Water Table (C2)
- Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- Presence of Reduced Iron (C4)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

- Surface Soil Cracks (B6)
- Sparsely Vegetated Concave Surface (B8)
- Drainage Patterns (B10)
- Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- FAC-Neutral Test (D5)
- Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_ (includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No positive indication of hydrology present

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: WG-wet  
 Investigator(s): AMM, TSS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): \_\_\_\_\_  
 Subregion (LRR): LRRH Lat: 33.99999 Long: -98.51569 Datum: UGCS84  
 Soil Map Unit Name: Aw-wheatwood and hort soils, frequently flooded NWI classification: PEM1F  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	

Remarks:  
 Point is in the middle of a stream channel that shows signs of regular flooding/backup. No water is currently present, but soil is well drained and problematic. Strong hydrology indicators - heavy woode lines + debris. Extreme drought conditions exist; therefore normal stream hydrology has been reduced.

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>4</u> (A)
1. <u>Celtis laevigata</u>	<u>50</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Salix nigra</u>	<u>45</u>	<u>Y</u>	<u>FACW</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)
3. <u>Prosopis pubescens</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
4. _____	_____	_____	_____	OBL species _____ x 1 = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u> )				FACW species _____ x 2 = _____
1. <u>Zanthoxylum clavoherculis</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	FAC species _____ x 3 = _____
2. _____	_____	_____	_____	FACU species _____ x 4 = _____
3. _____	_____	_____	_____	UPL species _____ x 5 = _____
4. _____	_____	_____	_____	Column Totals: _____ (A) _____ (B)
5. _____	_____	_____	_____	Prevalence Index = B/A = _____
Herb Stratum (Plot size: <u>5'</u> )				Hydrophytic Vegetation Indicators:
1. <u>Aspeltum virgilei</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	<u>X</u> 1 - Rapid Test for Hydrophytic Vegetation
2. <u>Compositis radicans</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	2 - Dominance Test is >50%
3. <u>Ambrosia trifida</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	3 - Prevalence Index is ≤3.0 <sup>1</sup>
4. <u>Parthenocissus quinquefolia</u>	<u>5</u>	<u>N</u>	<u>FACU</u>	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
5. _____	_____	_____	_____	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
6. _____	_____	_____	_____	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <u>X</u> No _____
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
Woody Vine Stratum (Plot size: <u>30'</u> )				
1. <u>Smilax rotundifolia</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Toxicodendron radicans</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>	
% Bare Ground in Herb Stratum <u>70</u>				
Total Cover = <u>30</u>				
Total Cover = <u>20</u>				

Remarks:  
 Vegetation associated w/ mature bottomland hardwood wetland that is frequently disturbed by flooding

**SOIL**

Sampling Point: WG-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-12	SYR	3/4					clayey sand	Bright red parent material

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input checked="" type="checkbox"/> Rod Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:  
 Area is frequently scarred and gets heavy deposits so red parent material masks redox features

**HYDROLOGY**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where filled)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not filled)	<input type="checkbox"/> Crayfish Burrows (C8)
<input checked="" type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)
<input type="checkbox"/> Water-Stained Leaves (B9)		

**Field Observations:**

Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present? Yes <input type="checkbox"/> No <input type="checkbox"/>	Depth (inches): _____	
Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Total precipitation observed at Sheppard AFB airport is 17.18" (annual accumulated average since Jan 1: 21.37") which is -4.15" for the year.

Remarks:  
 Extreme drought conditions exist within project area. Therefore, normal surface hydrology evidence (Eg: incise. line along bank) was considered for delineation boundary

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Shannon AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W6 UP  
 Investigator(s): AMM, TTS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): oldfield Local relief (concave, convex, none): concave Slope (%): 0-1  
 Subregion (LRR): LRRH Lat: 33.99013 Long: -98.51696 Datum: WGS 84  
 Soil Map Unit Name: Uk - Urban land NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No  (If no, explain in Remarks.)  
 Are Vegetation  Soil  or Hydrology  significantly disturbed? Are "Normal Circumstances" present? Yes  No   
 Are Vegetation  Soil  or Hydrology  naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Remarks: <u>Data point located in an abandoned oldfield, outside the riparian wetland associated with stream 4</u>		

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>0</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)
2. _____				
3. _____				
4. _____				
= Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B)  Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
= Total Cover				
Herb Stratum (Plot size: <u>5'</u> )				
1. <u>Johnsongrass (Sorghum halepense)</u>	<u>100</u>	<u>Y</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 <sup>1</sup> ___ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Giant sunflower (Helianthus giganteus)</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
= Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
= Total Cover				
% Bare Ground in Herb Stratum <u>0</u>				
Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>				
Remarks: <u>Vegetation associated with an abandoned oldfield</u>				

**SOIL**

Sampling Point: W6-UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-12	5YR 3/4						Sandy loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pipe Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (SS)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:  
 No positive indication of hydric soils present

**HYDROLOGY**

Wetland Hydrology Indicators:

<u>Primary Indicators (minimum of one required; check all that apply)</u>		<u>Secondary Indicators (minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> (where tilled)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Water Table Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present? Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
 No positive indication of hydrology present



**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W7-Wee  
 Investigator(s): AMM, TSS Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): Stream floodplain Local relief (concave, convex, none): Concave Slope (%): 0-1  
 Subregion (LRR): LPRH Lat: 33.99705 Long: -98.50952 Datum: WGS84  
 Soil Map Unit Name: Ua - Urban land NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation X, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland?	Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____		
Wetland Hydrology Present?	Yes <u>X</u> No _____		
Remarks: <u>Wetland associated with Stream 4 that is frequently flooded due to the impoundment of water channelized into the underground stormwater conveyance that flows under the air field. Extreme drought conditions exist, therefore surface water elevation is much lower than normal.</u>			

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>Salix nigra</u>	<u>5</u>	<u>Y</u>	<u>FACW</u>	
2. <u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
3. _____				
4. _____				
<u>10</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
1. <u>Cephalanthus occidentalis</u>	<u>5</u>	<u>Y</u>	<u>OBL</u>	
2. _____				
3. _____				
4. _____				
5. _____				
<u>5</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: ____ 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% ____ 3 - Prevalence Index is ≤3.0' ____ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ____ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Salidara gigantea</u>	<u>5</u>	<u>N</u>	<u>FAC</u>	
2. <u>Ambrosia artemisiifolia</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	
3. <u>Typha latifolia</u>	<u>50</u>	<u>Y</u>	<u>OBL</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
<u>65</u> = Total Cover				
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present? Yes <u>X</u> No _____
1. _____				
2. _____				
% Bare Ground in Herb Stratum <u>40</u> = Total Cover				

Remarks:  
Vegetation associated with the impoundment of Stream 4. upland plant species were observed to be invading the aquatic habitat due to extreme drought conditions.



**SOIL**

Sampling Point: W7-wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-1								organic
1-5	10YR 3/3							loamy clay
5-15	5YR 3/4							sandy clay bright red parent material

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input checked="" type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>2</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes  No

Remarks:  
 Red parent material masks redox features

**HYDROLOGY**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)	<input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where tilled)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	<input checked="" type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) (where not tilled)	<input checked="" type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)		
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Thin Muck Surface (C7)		
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Water-Stained Leaves (B9)			

**Field Observations:**

Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	
Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches): _____	

(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Total precip observed @ Sheppard AFB is 7.18" (annual accumulated avg. since Jun 1 2003) which is -4.15" for the year

Remarks: Extreme drought conditions exist w/in the project area. Therefore, primary surface hydrology indicators were problematic. Secondary indicators were evident.

**WETLAND DETERMINATION DATA FORM – Great Plains Region**

Project/Site: Sheppard AFB City/County: Wichita Falls/Wichita Sampling Date: 9/17/14  
 Applicant/Owner: US Air Force State: TX Sampling Point: W7-UP  
 Investigator(s): Alex Mathes, Toni Taylor - Salisbury Section, Township, Range: N/A  
 Landform (hillslope, terrace, etc.): stream boundary Local relief (concave, convex, none): Convex Slope (%): 0-1  
 Subregion (LRR): LRAH Lat: 33.9065 Long: -98.5084 Datum: WGS84  
 Soil Map Unit Name: Ua - Urban land NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No X (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes X No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Remarks: <u>Data point located outside OTWM boundary of Stream 4</u>			

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: <u>30'</u> )	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Tamoxix chinensis</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
4. _____	_____	_____	_____	<b>Prevalence Index worksheet:</b> Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<u>15</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u> )				
1. <u>Panicum dicotomiflorum</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	<b>Hydrophytic Vegetation Indicators:</b> ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 <sup>1</sup> ___ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. <b>Hydrophytic Vegetation Present?</b> Yes _____ No <u>X</u>
2. <u>Ambrosia artemisiifolia</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>	
3. <u>Cynodon dactylon</u>	<u>20</u>	<u>N</u>	<u>FACU</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>120</u> = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
% Bare Ground in Herb Stratum <u>0</u> _____ = Total Cover				
Remarks: <u>vegetation currently being invaded by exotic invasive plant species; tamarisk</u>				

**SOIL**

Sampling Point: W-7-UP

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-12	7.5 YR 3/4	100					clayey loam	

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.      <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> 1 cm Muck (A9) (LRR I, J)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Coast Prairie Redox (A16) (LRR F, G, H)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Dark Surface (S7) (LRR G)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> High Plains Depressions (F16)
<input type="checkbox"/> Stratified Layers (A5) (LRR F)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> (LRR H outside of MLRA 72 & 73)
<input type="checkbox"/> 1 cm Muck (A9) (LRR F, G, H)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Reduced Vertic (F18)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)	<input type="checkbox"/> High Plains Depressions (F16)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> 5 cm Mucky Peat or Peat (S3) (LRR F)	<input type="checkbox"/> (MLRA 72 & 73 of LRR H)	

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:  
*No positive indication of hydric soils present*

**HYDROLOGY**

**Wetland Hydrology Indicators:**

<b>Primary Indicators (minimum of one required; check all that apply)</b>		<b>Secondary Indicators (minimum of two required)</b>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> (where tilled)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> (where not tilled)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Frost-Heave Hummocks (D7) (LRR F)

**Field Observations:**

Surface Water Present? Yes _____ No _____	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Water Table Present? Yes _____ No _____	Depth (inches): _____	
Saturation Present? Yes _____ No _____	Depth (inches): _____	

(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:  
*No positive indication of hydrology present*



## Appendix C

### Stream Data Sheets

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Water Resources Field Data Form		Data Sheet No.	
Project Name: Sheppard AFB Date: 9/11/2014 Surveyors: A. Mathes; T. Taylor-Salisbury Photo: Roll _____ Frames _____		State/County: Wichita County, Texas Aerial Sheet No.: GPS Point No.(s): Associated Data Sheet No(s):	
Stream <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Water Well <input type="checkbox"/>		<b>Stream Information</b>	
Name: S1 Perceptible Flow Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Direction of Flow: SW		Stream Width: water <del>11</del> 9 ft. bank to bank 20 ft. Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/>	
<b>Probed Stream Depth</b>	<b>Bottom Substrate</b>	<b>Observed Water Quality</b>	
<input type="checkbox"/> 0-6"	<input type="checkbox"/> Shale	<input checked="" type="checkbox"/> Clear	
<input type="checkbox"/> 7-12"	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Slightly Turbid	
<input checked="" type="checkbox"/> 13-24"	<input checked="" type="checkbox"/> Cobble/Gravel	<input type="checkbox"/> Turbid	
<input type="checkbox"/> 25-36"	<input type="checkbox"/> Sand	<input type="checkbox"/> Very Turbid	
<input type="checkbox"/> >36"	<input checked="" type="checkbox"/> Silt/Clay		
	<input type="checkbox"/> Organic		
<b>Aquatic Habitat</b>	<b>Wildlife Observed (species)</b>	<b>Observed Use</b>	
<input type="checkbox"/> Sand Bar	<input type="checkbox"/> Waterfowl _____	<input type="checkbox"/> Drinking	
<input type="checkbox"/> Sand/Gravel Beach Bar	<input checked="" type="checkbox"/> Fish _____	<input type="checkbox"/> Irrigation	
<input type="checkbox"/> Mud Bar	<input type="checkbox"/> Turtles _____	<input type="checkbox"/> Swimming	
<input checked="" type="checkbox"/> Overhanging Trees/Shrubs	<input type="checkbox"/> Frogs _____	<input type="checkbox"/> Fishing	
<input type="checkbox"/> Cobble Riffles	<input type="checkbox"/> Invertebrates _____	<input checked="" type="checkbox"/> Drainage	
<input type="checkbox"/> Deep Ponds/Holes	<input type="checkbox"/> Salamanders _____	<input type="checkbox"/> Boating	
<input type="checkbox"/> Aquatic Vegetation	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Other: _____			
<b>Left Bank* Height and Slope</b>		<b>Right Bank* Height and Slope</b>	
<input type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)
<input checked="" type="checkbox"/> 3-6'	<input checked="" type="checkbox"/> 21-50% (12-27°)	<input checked="" type="checkbox"/> 3-6'	<input checked="" type="checkbox"/> 21-50% (12-27°)
<input type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)	<input checked="" type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)
* Direction when facing downstream			
<b>Bank Substrate</b>		<b>Erosion Potential</b>	<b>Channel Meander</b>
<input type="checkbox"/> Shale	<input type="checkbox"/> Sand	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Low
<input type="checkbox"/> Bedrock	<input type="checkbox"/> Silt/Clay	<input type="checkbox"/> Moderate	<input checked="" type="checkbox"/> Medium
<input type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Organic	<input type="checkbox"/> High	<input type="checkbox"/> High
<b>OHWL Criteria – Ordinary High Water Mark</b>			
<input checked="" type="checkbox"/> clear, natural line impressed on bank <input checked="" type="checkbox"/> changes in character of soil <input type="checkbox"/> shelving <input checked="" type="checkbox"/> vegetation matted down, bent or absent <input checked="" type="checkbox"/> leaf litter disturbed or washed away <input checked="" type="checkbox"/> sediment deposition <input checked="" type="checkbox"/> water staining <input checked="" type="checkbox"/> presence of litter and debris		<input type="checkbox"/> destruction of terrestrial vegetation <input checked="" type="checkbox"/> presence of wrack line <input type="checkbox"/> sediment sorting <input type="checkbox"/> scour <input type="checkbox"/> abrupt change in plant community <input type="checkbox"/> other (list) _____ _____ _____	

(over)

**Stream Info Cont'd**

Adjacent Vegetation Type: Johnson grass, Bermuda grass, Coastal; maintained

Dominant Vegetative Species:

Trees: Black willow, Pecan, Red willow, Cottonwood, Ash

Shrubs: \_\_\_\_\_

Herbs: Giant ragweed, Johnson Grass, Bermuda grass, Helianthus spp, Iron Asteris (?)

Estimated % of canopy closure over stream channel:

10-25%  26-50%  51-75%  76-100%

Presence of threatened/endangered species (fish, reptiles, or amphibians)?

Unknown  No  Yes (identify) \_\_\_\_\_

**Spring Information**

Approximate distance and direction from centerline: \_\_\_\_\_

Associated Wetland  Yes: Data Form No. \_\_\_\_\_

No

Surrounding Land Use: \_\_\_\_\_

Associated Vegetation Type: \_\_\_\_\_

**Water Well Information**

Type:  Private

Community

Municipal/Public

Unknown

Surrounding Land Use: golf course

Approximate distance and direction from centerline: \_\_\_\_\_

Notes: Deeply incised water way; intermittent stream w/in maintained golf course

- Currently inundated due to recent precip events. An impoundment of stream channel along fence line due to concrete stream bed

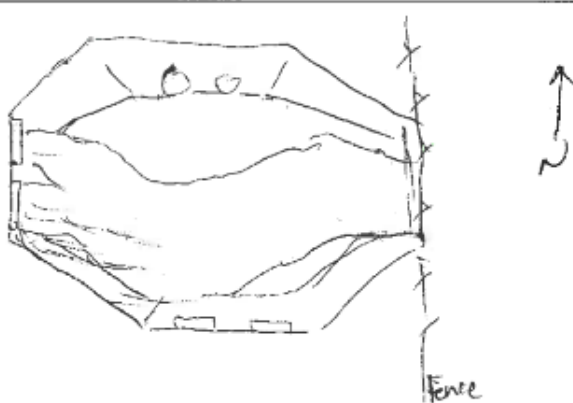
Sketch:



Water Resources Field Data Form		Data Sheet No.	
Project Name: Sheppard AFB Date: 9/16/2014 Surveyors: A. Mathes; T. Taylor-Salisbury Photo: Roll _____ Frames _____		State/County: Wichita County, Texas Aerial Sheet No.: GPS Point No.(s): Associated Data Sheet No(s):	
Stream <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Water Well <input type="checkbox"/>		<b>Stream Information</b>	
Name: S2 outfall Perceptible Flow Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Direction of Flow: East		Stream Width: water 50 ft. in basin bank to bank 150 ft. of basin <del>30 ft. in natural stream</del> Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/>	
<b>Probed Stream Depth</b>	<b>Bottom Substrate</b>	<b>Observed Water Quality</b>	
<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Shale	<input type="checkbox"/> Clear	
<input type="checkbox"/> 7-12"	<input type="checkbox"/> Bedrock	<input checked="" type="checkbox"/> Slightly Turbid	
<input type="checkbox"/> 13-24"	<input type="checkbox"/> Cobble/Gravel	<input type="checkbox"/> Turbid	
<input type="checkbox"/> 25-36"	<input type="checkbox"/> Sand	<input type="checkbox"/> Very Turbid	
<input type="checkbox"/> >36"	<input type="checkbox"/> Silt/Clay <input checked="" type="checkbox"/> cement		
<input type="checkbox"/> Organic			
<b>Aquatic Habitat</b>	<b>Wildlife Observed (species)</b>	<b>Observed Use</b>	
<input type="checkbox"/> Sand Bar	<input type="checkbox"/> Waterfowl _____	<input type="checkbox"/> Drinking	
<input type="checkbox"/> Sand/Gravel Beach Bar	<input type="checkbox"/> Fish _____	<input type="checkbox"/> Irrigation	
<input type="checkbox"/> Mud Bar	<input type="checkbox"/> Turtles _____	<input type="checkbox"/> Swimming	
<input type="checkbox"/> Overhanging Trees/Shrubs	<input type="checkbox"/> Frogs _____	<input type="checkbox"/> Fishing	
<input type="checkbox"/> Cobble Riffles	<input type="checkbox"/> Invertebrates _____	<input checked="" type="checkbox"/> Drainage	
<input type="checkbox"/> Deep Ponds/Holes	<input type="checkbox"/> Salamanders _____	<input type="checkbox"/> Boating	
<input type="checkbox"/> Aquatic Vegetation	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	
<input checked="" type="checkbox"/> Other: cement			
<b>Left Bank* Height and Slope</b>		<b>Right Bank* Height and Slope</b>	
<input type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)
<input type="checkbox"/> 3-6'	<input checked="" type="checkbox"/> 21-50% (12-27°)	<input type="checkbox"/> 3-6'	<input checked="" type="checkbox"/> 21-50% (12-27°)
<input checked="" type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)	<input checked="" type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)
* Direction when facing downstream			
<b>Bank Substrate</b>	<b>Erosion Potential</b>	<b>Channel Meander</b>	
<input type="checkbox"/> Shale	<input type="checkbox"/> Sand	<input checked="" type="checkbox"/> Low	
<input type="checkbox"/> Bedrock	<input type="checkbox"/> Silt/Clay	<input type="checkbox"/> Medium	
<input type="checkbox"/> Cobble	<input type="checkbox"/> Organic <input checked="" type="checkbox"/> cement	<input type="checkbox"/> High	
<b>OHWM Criteria - Ordinary High Water Mark</b>			
<input type="checkbox"/> clear, natural line impressed on bank <input type="checkbox"/> changes in character of soil <input type="checkbox"/> shelving <input checked="" type="checkbox"/> vegetation matted down, bent or absent <input type="checkbox"/> leaf litter disturbed or washed away <input checked="" type="checkbox"/> sediment deposition <input checked="" type="checkbox"/> water staining <input type="checkbox"/> presence of litter and debris		<input type="checkbox"/> destruction of terrestrial vegetation <input type="checkbox"/> presence of wrack line <input type="checkbox"/> sediment sorting <input type="checkbox"/> scour <input type="checkbox"/> abrupt change in plant community <input type="checkbox"/> other (list) _____ _____ _____	

(over)



<b>Stream Info Cont'd</b>	
Adjacent Vegetation Type:	<u>T. grass, annual ragweed</u>
Dominant Vegetative Species:	
Trees:	
Shrubs:	
Herbs:	<u>Johnson grass, annual ragweed</u>
Estimated % of canopy closure over stream channel: <input type="checkbox"/> 10-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-100%	
Presence of threatened/endangered species (fish, reptiles, or amphibians)? <input type="checkbox"/> Unknown <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (identify) _____	
<b>Spring Information</b>	
Approximate distance and direction from centerline: _____	
Associated Wetland <input type="checkbox"/> Yes: Data Form No. _____ <input type="checkbox"/> No	
Surrounding Land Use: _____	
Associated Vegetation Type: _____	
<b>Water Well Information</b>	
Type: <input type="checkbox"/> Private <input type="checkbox"/> Community <input type="checkbox"/> Municipal/Public <input type="checkbox"/> Unknown	
Surrounding Land Use: _____	
Approximate distance and direction from centerline: _____	
Notes: <u>Concrete basins right at the edges of the cement banks.</u>	
Sketch: 	

Water Resources Field Data Form		Data Sheet No.	
Project Name: Sheppard AFB Date: 9/16/2014 Surveyors: A. Mathes; T. Taylor-Salisbury Photo: Roll _____ Frames _____		State/County: Wichita County, Texas Aerial Sheet No.: GPS Point No.(s): Associated Data Sheet No(s): _____	
Stream <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Water Well <input type="checkbox"/>		<b>Stream Information</b>	
Name: S3 Perceptible Flow Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Direction of Flow: SE		Stream Width: water 35 ft. bank to bank 50 ft. Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/>	
<b>Probed Stream Depth</b>	<b>Bottom Substrate</b>	<b>Observed Water Quality</b>	
<input type="checkbox"/> 0-6"	<input type="checkbox"/> Shale	<input checked="" type="checkbox"/> Clear	
<input type="checkbox"/> 7-12"	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Slightly Turbid	
<input type="checkbox"/> 13-24"	<input type="checkbox"/> Cobble/Gravel	<input type="checkbox"/> Turbid	
<input type="checkbox"/> 25-36"	<input type="checkbox"/> Sand	<input type="checkbox"/> Very Turbid	
<input checked="" type="checkbox"/> >36"	<input checked="" type="checkbox"/> Silt/Clay <i>[x] current into</i>		
<input type="checkbox"/> Organic			
<b>Aquatic Habitat</b>	<b>Wildlife Observed (species)</b>	<b>Observed Use</b>	
<input type="checkbox"/> Sand Bar	<input type="checkbox"/> Waterfowl _____	<input type="checkbox"/> Drinking	
<input type="checkbox"/> Sand/Gravel Beach Bar	<input type="checkbox"/> Fish _____	<input type="checkbox"/> Irrigation	
<input type="checkbox"/> Mud Bar	<input type="checkbox"/> Turtles _____	<input type="checkbox"/> Swimming	
<input checked="" type="checkbox"/> Overhanging Trees/Shrubs	<input type="checkbox"/> Frogs _____	<input type="checkbox"/> Fishing	
<input type="checkbox"/> Cobble Riffles	<input checked="" type="checkbox"/> Invertebrates <i>Crawdads</i>	<input checked="" type="checkbox"/> Drainage	
<input type="checkbox"/> Deep Ponds/Holes	<input type="checkbox"/> Salamanders _____	<input type="checkbox"/> Boating	
<input checked="" type="checkbox"/> Aquatic Vegetation	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Other: _____			
<b>Left Bank* Height and Slope</b>		<b>Right Bank* Height and Slope</b>	
<input type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)
<input checked="" type="checkbox"/> 3-6'	<input checked="" type="checkbox"/> 21-50% (12-27°)	<input checked="" type="checkbox"/> 3-6'	<input type="checkbox"/> 21-50% (12-27°)
<input type="checkbox"/> 6'+	<input checked="" type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/> 6'+	<input checked="" type="checkbox"/> 51-100% (28-45°)
* Direction when facing downstream			
<b>Bank Substrate</b>	<b>Erosion Potential</b>	<b>Channel Meander</b>	
<input type="checkbox"/> Shale	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Low	
<input type="checkbox"/> Bedrock	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Medium	
<input type="checkbox"/> Cobble	<input type="checkbox"/> High	<input type="checkbox"/> High	
<input type="checkbox"/> Sand			
<input checked="" type="checkbox"/> Silt/Clay			
<input type="checkbox"/> Organic			
<b>OHWL Criteria - Ordinary High Water Mark</b>			
<input checked="" type="checkbox"/> clear, natural line impressed on bank		<input type="checkbox"/> destruction of terrestrial vegetation	
<input type="checkbox"/> changes in character of soil		<input type="checkbox"/> presence of wrack line	
<input type="checkbox"/> shelving		<input type="checkbox"/> sediment sorting	
<input checked="" type="checkbox"/> vegetation matted down, bent or absent		<input type="checkbox"/> scour	
<input type="checkbox"/> leaf litter disturbed or washed away		<input type="checkbox"/> abrupt change in plant community	
<input checked="" type="checkbox"/> sediment deposition		<input type="checkbox"/> other (list) _____	
<input type="checkbox"/> water staining			
<input type="checkbox"/> presence of litter and debris			

(over)

**Stream Info Cont'd**

Adjacent Vegetation Type: Johnson grass

Dominant Vegetative Species:

Trees: Maqui

Shrubs:

Herbs: Johnson grass, giant ragweed, annual ragweed

Estimated % of canopy closure over stream channel:  
 0-25%    26-50%    51-75%    76-100%

Presence of threatened/endangered species (fish, reptiles, or amphibians)?  
 Unknown    No    Yes (identify)

**Spring Information**

Approximate distance and direction from centerline: \_\_\_\_\_

Associated Wetland  Yes: Data Form No. \_\_\_\_\_  
 No

Surrounding Land Use: \_\_\_\_\_

Associated Vegetation Type: \_\_\_\_\_

**Water Well Information**

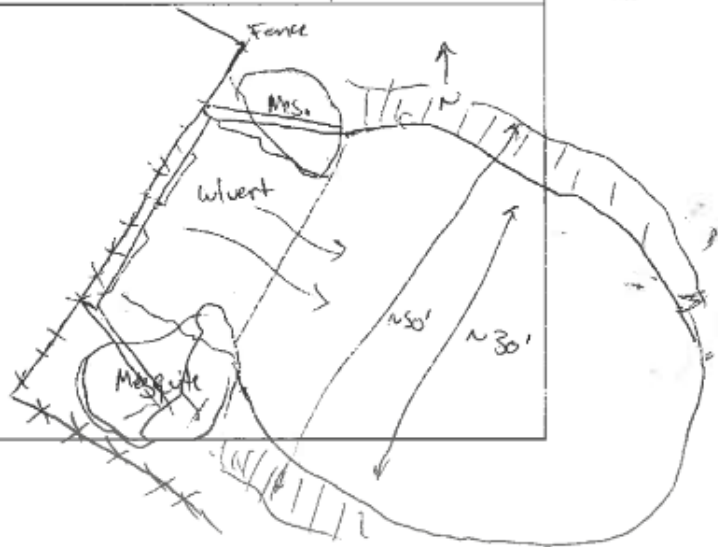
Type:  Private  
 Community  
 Municipal/Public  
 Unknown

Surrounding Land Use: \_\_\_\_\_

Approximate distance and direction from centerline: \_\_\_\_\_

Notes: Outside of fence line; will need to digitize the waterway, since we had no access to it

**Sketch:**



Water Resources Field Data Form		Data Sheet No.	
Project Name: Sheppard AFB Date: 9/17/14 Surveyors: A. Mathes; T. Taylor-Salisbury Photo: Roll _____ Frames _____		State/County: Wichita County, Texas Aerial Sheet No.: GPS Point No.(s): Associated Data Sheet No(s):	
Stream <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Water Well <input type="checkbox"/>		<b>Stream Information</b>	
Name: <del>XXXX</del> <del>XXXX</del> S4 Perceptible Flow Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Direction of Flow: <u>NE</u>		Stream Width: water <u>1-3</u> ft. bank to bank <u>15-25</u> ft. Perennial <input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral <input type="checkbox"/>	
<b>Probed Stream Depth</b>	<b>Bottom Substrate</b>	<b>Observed Water Quality</b>	
<input checked="" type="checkbox"/> 0-6"	<input type="checkbox"/> Shale	<input checked="" type="checkbox"/> Clear	
<input type="checkbox"/> 7-12"	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Slightly Turbid	
<input checked="" type="checkbox"/> 13-24"	<input checked="" type="checkbox"/> Cobble/Gravel	<input type="checkbox"/> Turbid	
<input type="checkbox"/> 25-36"	<input type="checkbox"/> Sand	<input type="checkbox"/> Very Turbid	
<input type="checkbox"/> >36"	<input type="checkbox"/> Silt/Clay		
	<input type="checkbox"/> Organic		
<b>Aquatic Habitat</b>	<b>Wildlife Observed (species)</b>	<b>Observed Use</b>	
<input type="checkbox"/> Sand Bar	<input type="checkbox"/> Waterfowl _____	<input type="checkbox"/> Drinking	
<input type="checkbox"/> Sand/Gravel Beach Bar	<input checked="" type="checkbox"/> Fish _____	<input type="checkbox"/> Irrigation	
<input type="checkbox"/> Mud Bar	<input type="checkbox"/> Turtles _____	<input type="checkbox"/> Swimming	
<input type="checkbox"/> Overhanging Trees/Shrubs	<input type="checkbox"/> Frogs _____	<input type="checkbox"/> Fishing	
<input type="checkbox"/> Cobble Riffles	<input type="checkbox"/> Invertebrates _____	<input checked="" type="checkbox"/> Drainage	
<input type="checkbox"/> Deep Ponds/Holes	<input type="checkbox"/> Salamanders _____	<input type="checkbox"/> Boating	
<input type="checkbox"/> Aquatic Vegetation	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Other: _____			
<b>Left Bank* Height and Slope</b>		<b>Right Bank* Height and Slope</b>	
<input checked="" type="checkbox"/> 0-3'	<input type="checkbox"/> 0-20% (0-11°)	<input type="checkbox"/> 0-3'	<input checked="" type="checkbox"/> 0-20% (0-11°)
<input type="checkbox"/> 3-6'	<input type="checkbox"/> 21-50% (12-27°)	<input checked="" type="checkbox"/> 3-6'	<input type="checkbox"/> 21-50% (12-27°)
<input type="checkbox"/> 6'+	<input checked="" type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)
* Direction when facing downstream			
<b>Bank Substrate</b>		<b>Erosion Potential</b>	<b>Channel Meander</b>
<input type="checkbox"/> Shale	<input type="checkbox"/> Sand	<input checked="" type="checkbox"/> Low	<input checked="" type="checkbox"/> Low
<input type="checkbox"/> Bedrock	<input type="checkbox"/> Silt/Clay	<input type="checkbox"/> Moderate	<input type="checkbox"/> Medium
<input type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Organic	<input type="checkbox"/> High	<input type="checkbox"/> High
<b>OHWB Criteria - Ordinary High Water Mark</b>			
<input checked="" type="checkbox"/> clear, natural line impressed on bank <input type="checkbox"/> changes in character of soil <input checked="" type="checkbox"/> shelving <input type="checkbox"/> vegetation matted down, bent or absent <input type="checkbox"/> leaf litter disturbed or washed away <input type="checkbox"/> sediment deposition <input type="checkbox"/> water staining <input checked="" type="checkbox"/> presence of litter and debris		<input checked="" type="checkbox"/> destruction of terrestrial vegetation <input type="checkbox"/> presence of wrack line <input type="checkbox"/> sediment sorting <input checked="" type="checkbox"/> scour <input type="checkbox"/> abrupt change in plant community <input type="checkbox"/> other (list) _____ _____ _____	

(over)

<b>Stream Info Cont'd</b>	
Adjacent Vegetation Type:	_____
Dominant Vegetative Species:	_____
Trees:	_____
Shrubs:	_____
Herbs:	<i>Stimyrongrass, annual ragweed, fleabane, Ludwigia, Bermuda grass, Barn grass, Sagittarius, Spikerush, echinacea sp</i>
Estimated % of canopy closure over stream channel:	_____
	<input type="checkbox"/> 0-25% <input type="checkbox"/> 26-50% <input type="checkbox"/> 51-75% <input type="checkbox"/> 76-100%
Presence of threatened/endangered species (fish, reptiles, or amphibians)?	_____
	<input checked="" type="checkbox"/> Unknown <input type="checkbox"/> No <input type="checkbox"/> Yes (identify) _____
<b>Spring Information</b>	
Approximate distance and direction from centerline:	_____
Associated Wetland	<input type="checkbox"/> Yes: Data Form No. _____
	<input type="checkbox"/> No
Surrounding Land Use:	_____
Associated Vegetation Type:	_____
<b>Water Well Information</b>	
Type:	<input type="checkbox"/> Private
	<input type="checkbox"/> Community
	<input type="checkbox"/> Municipal/Public
	<input type="checkbox"/> Unknown
Surrounding Land Use:	_____
Approximate distance and direction from centerline:	_____
Notes:	_____
	_____
	_____
	_____
<b>Sketch:</b>	

Water Resources Field Data Form		Data Sheet No.	
Project Name: Sheppard AFB Date: 9/17/14 Surveyors: A. Mathes; T. Taylor-Salisbury Photo: Roll _____ Frames _____		State/County: Wichita County, Texas Aerial Sheet No.: GPS Point No.(s): Associated Data Sheet No(s):	
Stream <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Water Well <input type="checkbox"/>		<b>Stream Information</b>	
Name: 55 Perceptible Flow Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Direction of Flow: E		Stream Width: water _____ ft. bank to bank 15 ft. Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/>	
<b>Probed Stream Depth</b>	<b>Bottom Substrate</b>	<b>Observed Water Quality</b>	
<input type="checkbox"/> 0-6"	<input type="checkbox"/> Shale	<input type="checkbox"/> Clear	
<input type="checkbox"/> 7-12"	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Slightly Turbid	
<input type="checkbox"/> 13-24"	<input checked="" type="checkbox"/> Cobble/Gravel	<input type="checkbox"/> Turbid	
<input type="checkbox"/> 25-36"	<input type="checkbox"/> Sand	<input type="checkbox"/> Very Turbid	
<input type="checkbox"/> >36"	<input checked="" type="checkbox"/> Silt/Clay		
<input type="checkbox"/> Organic			
<b>Aquatic Habitat</b>	<b>Wildlife Observed (species)</b>	<b>Observed Use</b>	
<input type="checkbox"/> Sand Bar	<input type="checkbox"/> Waterfowl _____	<input type="checkbox"/> Drinking	
<input type="checkbox"/> Sand/Gravel Beach Bar	<input type="checkbox"/> Fish _____	<input type="checkbox"/> Irrigation	
<input type="checkbox"/> Mud Bar	<input type="checkbox"/> Turtles _____	<input type="checkbox"/> Swimming	
<input type="checkbox"/> Overhanging Trees/Shrubs	<input type="checkbox"/> Frogs _____	<input type="checkbox"/> Fishing	
<input type="checkbox"/> Cobble Riffles	<input type="checkbox"/> Invertebrates _____	<input checked="" type="checkbox"/> Drainage	
<input type="checkbox"/> Deep Ponds/Holes	<input type="checkbox"/> Salamanders _____	<input type="checkbox"/> Boating	
<input type="checkbox"/> Aquatic Vegetation	<input type="checkbox"/> Other: _____	<input type="checkbox"/> Other: _____	
<input type="checkbox"/> Other: _____			
<b>Left Bank* Height and Slope</b>		<b>Right Bank* Height and Slope</b>	
<input checked="" type="checkbox"/> 0-3'	<input checked="" type="checkbox"/> 0-20% (0-11°)	<input checked="" type="checkbox"/> 0-3'	<input checked="" type="checkbox"/> 0-20% (0-11°)
<input type="checkbox"/> 3-6'	<input type="checkbox"/> 21-50% (12-27°)	<input type="checkbox"/> 3-6'	<input type="checkbox"/> 21-50% (12-27°)
<input type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)	<input type="checkbox"/> 6'+	<input type="checkbox"/> 51-100% (28-45°)
* Direction when facing downstream			
<b>Bank Substrate</b>	<b>Erosion Potential</b>	<b>Channel Meander</b>	
<input type="checkbox"/> Shale	<input type="checkbox"/> Sand	<input checked="" type="checkbox"/> Low	
<input type="checkbox"/> Bedrock	<input checked="" type="checkbox"/> Silt/Clay	<input type="checkbox"/> Medium	
<input type="checkbox"/> Cobble	<input checked="" type="checkbox"/> Organic	<input type="checkbox"/> High	
<b>OHWM Criteria - Ordinary High Water Mark</b>			
<input type="checkbox"/> clear, natural line impressed on bank <input checked="" type="checkbox"/> changes in character of soil <input type="checkbox"/> shelving <input checked="" type="checkbox"/> vegetation matted down, bent or absent <input type="checkbox"/> leaf litter disturbed or washed away <input checked="" type="checkbox"/> sediment deposition <input type="checkbox"/> water staining <input type="checkbox"/> presence of litter and debris		<input type="checkbox"/> destruction of terrestrial vegetation <input type="checkbox"/> presence of wrack line <input type="checkbox"/> sediment sorting <input type="checkbox"/> scour <input type="checkbox"/> abrupt change in plant community <input type="checkbox"/> other (list) _____	

(over)





**Appendix D**

Jurisdictional Determination Form



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**PRELIMINARY JURISDICTIONAL DETERMINATION FORM**

**BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD):** 10/17/14

**B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:**

AF Civil Engineer Center (AFCEC) Contracting Officer's Representative (COR)  
Mr. Kim Walton  
Joint Base San Antonio Installation Support Team (JBSA IST)  
AFCEC/CZO  
1651 5th Street West  
Hangar 62, Rm 201  
Randolph AFB, TX 78150  
(210) 652-1547  
Email: [kim.walton@us.af.mil](mailto:kim.walton@us.af.mil)

**C. DISTRICT OFFICE, FILE NAME, AND NUMBER:** Tulsa District

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:** \_\_\_\_\_  
**(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)**

State: TX County: Wichita City: Wichita Falls  
Center coordinates of site (lat/long in degree decimal format):  
Lat. 33.98453° N, Long. 98.49935° W  
Universal Transverse Mercator: \_\_\_\_\_m Easting (x) \_\_\_\_\_m Northing (y)  
Name of nearest waterbody: Tributaries of Bear Creek flow from the west of SAFB, underneath the base and associated developments, and reemerge above ground to the east of the base. Plum Creek flows south of the base from west to east.

Identify (estimate) amount of waters in the review area:  
(See attached table for each water body)

Non-wetland waters: \_\_\_\_\_ linear feet: \_\_\_\_\_ width (ft) and/or \_\_\_\_\_ acres.  
Cowardin Class: \_\_\_\_\_  
Stream Flow: 18,040 linear feet  
Wetlands: 12.13 acres  
Cowardin Class: PEM/PAB, PFO, PSS

Name of any water bodies on the site that have been identified as Section 10 waters:

Tidal: N/A  
Non-Tidal: N/A

**E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

Office (Desk) Determination. Date: 10/13/14  
 Field Determination. Date(s): 9/16/14 - 9/17/14

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

**SUPPORTING DATA: Data reviewed for preliminary JD** (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report. \_\_\_\_\_
  - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps: \_\_\_\_\_
- Corps navigable waters' study: \_\_\_\_\_
- U.S. Geological Survey Hydrologic Atlas: Last updated 2010.
  - USGS NHD data.
  - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite scale & quad name: \_\_\_\_\_
- USDA Natural Resources Conservation Service Soil Survey. Citation: \_\_\_\_\_
- National wetlands inventory map(s). Cite name: \_\_\_\_\_
- State/Local wetland inventory map(s): USFWS 2014.
- FEMA/FIRM maps: \_\_\_\_\_
- 100-year Floodplain Elevation is: \_\_\_\_\_ (National Geodetic Vertical Datum of 1929)
- Photographs:  Aerial (Name & Date): Bing Maps 2013.  
 Other (Name & Date): \_\_\_\_\_
- Previous determination(s). File no. and date of response letter: \_\_\_\_\_
- Other information (please specify): Connectivity to other water bodies for each wetland is attached.

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

\_\_\_\_\_  
Signature and date of  
Regulatory Project Manager  
(REQUIRED)

\_\_\_\_\_  
Signature and date of  
person requesting preliminary JD  
(REQUIRED, unless obtaining the  
signature is impracticable)

Site number	Latitude	Longitude	Cowardin Class	Estimated (impacted) amount of aquatic resource in review area	Class of aquatic resource	Jurisdictional? Y/N
Wetland 1	33.960595	-98.498923	PEM/PAB	0.74	Pond	N
Wetland 2	33.957189	-98.494019	PEM/PAB	0.58	Pond	N
Wetland 3	33.960008	-98.502853	PFO	0.025	Wetland	Y
	33.960868	-98.50283	PFO	0.036	Wetland	Y
Wetland 4	33.959171	-98.502163	PEM/PAB	0.73	Pond	N
Wetland 5	33.982719	-98.518102	PFO	0.035	Wetland	Y
Wetland 6	33.989416	-98.515679	PFO	8.38	Wetland	Y
Wetland 7	33.9971	-98.509158	PSS	1.6	Wetland	Y

Stream ID	Stream Length (Linear ft)	Jurisdictional? (Y/N)	Stream Classification
Stream 1	3,500	Y	Intermittent
Stream 2	190	Y	Perennial
Stream 3	1,700	Y	Perennial
Stream 4	9,950	Y	Perennial
Stream 5	1,050	Y	Intermittent
Stream 6	1,650	Y	Intermittent

Connectivity:

Connectivity, maps and field data forms are supplied in the Preliminary Jurisdictional Determination report.

**M ADDITIONAL GROUNDS MAINTENANCE PLAN**

Performance work statement for grounds maintenance:

PERFORMANCE WORK STATEMENT (PWS)

FOR

GROUNDS MAINTENANCE



Original: 29 May 2018

Last Revised: 20 May 2019

SHEPPARD AIR FORCE BASE (SAFB), TEXAS (TX)

FREDERICK AUXILIARY AIRFIELD, OKLAHOMA (OK)

SHEPPARD AFB ANNEX AT LAKE TEXOMA, TX

**1. DESCRIPTION OF SERVICES.** The Service Provider shall provide non-personal services, to include all personnel, equipment, tools, quality control, supervision, and other items and services necessary to ensure that grounds maintenance is performed at SAFB, TX, and Frederick Auxiliary Airfield, OK, located approximately 65 miles Northwest of SAFB, Texas and SAFB Annex at Lake Texoma in Grayson County, TX, located approximately 118 miles Northeast of SAFB and 8 miles North of Sandusky, Texas in a manner that shall promote the growth of healthy grass, trees, shrubs, and plants and present a clean, neat, and professional appearance. The Service Provider's performance will be based on the Contracting Officer's (CO) and Contracting Officer's Representative (COR) evaluation of the results required by the Service Summary (SS) and not the method of performance. It is at the Service Provider's discretion to determine the levels of frequencies to attain the level of service at the best value. The evaluation of results will be based on COR performance assessment, tenant satisfaction, and customer complaints. Final results of the evaluations will be the determining factor for the success or failure of this contract. The Service Provider shall comply with applicable federal, regional, state, and local laws and commercial standards.

Wherever the term "grass" is used in this document it shall be interpreted to mean grasses, weeds, and other vegetation. The term includes all parts of the plant.

Grounds maintenance services are designated as "Growing" and "Non-growing" seasons. The growing season months are March – October with November – February identified as non-growing season.

**1.1. IMPROVED GROUNDS.** Improved grounds are identified in Appendices A and B. Improved grounds are areas that require more maintenance such as parade grounds, drill field, schools, athletic areas, dormitory facilities and heavily populated locations. **THE SERVICE PROVIDER SHALL:**

**1.1.1. Mow.** The Service Provider shall mow all improved grounds to look well-manicured, with a neat and professional appearance at all times. Maintain grass height between 2 and 4 inches uniform in appearance, free of skips, gaps, rutting, or scalping. The Service Provider shall be required to pick up debris, natural and manmade, prior to mowing any area. The Service Provider shall remove or mulch grass clippings when visible after mowing, before leaving work area.

**1.1.1.1. Mow Athletic Grounds, Parade Field and Specialized Areas.** The Service Provider shall maintain athletic grounds, parade field and specialized areas to 2 through 4 inches in height and will look well-manicured, with a neat and professional appearance, uniform in appearance, free of skips, gaps, rutting, or scalping. The Service Provider shall alternate mowing direction every mowing cycle. For example, Service Provider shall provide mowing service in a North – South direction with alternate direction of East – West for each mowing cycle. During periods of youth activities, portable-sporting equipment, such as soccer goals may be temporarily installed in field areas which the Service Provider will have to accommodate and perform tasks around these items. In the event, portable bleachers are raised for mowing accessibility, the Service Provider is responsible for returning bleachers to their original location.

**1.1.2. Edge.** Edge sidewalks, driveways, street edges, curbs, and other hard surfaced areas located within the improved grounds during mowing operations. Grass height shall match surrounding area grass height. Remove

grass from expansion joints and cracks in sidewalks, driveways, curbs and other hard surfaces. Grass shall be cut back no more than ½ inch from the surface being edged, maintaining an even contour with the edged surface, uniform in appearance and free of scalping, rutting, and uneven or rough cutting. Grass shall not extend over the edge of the paved areas by more than 2 inches.

**1.1.3. Trim.** Trim grass around trees, shrubs, buildings, fences, poles, fire hydrants, parking lot bumper blocks, boulders, and other fixed obstacles and temporary obstacles/objects on improved grounds. Trimming height shall match surrounding area grass height. All areas shall be trimmed concurrent with mowing. Remove or mulch grass clippings, when visible after trimming, before leaving work area.

**1.1.4. Irrigation.** The Service Provider shall maintain, adjust, and repair existing lawn irrigation systems during the growing season.

**1.1.4.1. Operation of Irrigation Systems.** The Service Provider shall irrigate improved grounds to maintain the health of the turf ensuring no ponding of water and excessive runoff of water. This includes lawns, plants, flowers, landscaped areas, and all areas requiring manual watering (see Appendix F). Service Provider shall provide and position hoses or other applicable water devices for manual watering and then remove/store hoses or alternate devices between watering to ensure neat, clean appearance of areas. Service Provider shall practice water conservation measures whenever possible and shall position all watering systems to avoid overspray onto pavements, sidewalks, roadways or non-vegetative areas. If daytime watering is necessary, Service Provider shall notify the COR of the reason for daytime watering, and the duration daytime watering shall be in progress. Irrigation responsibilities also include setup, monitoring and adjusting of irrigation system computer, clocks/timers, controllers and pumps. Service Provider shall be responsible for day-to-day operation of the base-wide automated irrigation system.

**1.1.4.1.1 Irrigation Frequency.** The Service Provider shall be responsible for determining duration and frequency of operating irrigation systems required to maintain the grounds.

**1.1.4.1.2. Irrigation System Start up.** The Service Provider shall complete an irrigation system start up operational check of 100% of all automatic and manual systems. The Service Provider shall notify the COR of any discrepancies and inoperative systems prior to 15 April (with the exception of unusually late freezing temperatures) and shall continue to identify inoperative systems to include specific location(s) and problem(s) in writing to the COR daily as noted via email.

**1.1.4.1.3. Irrigation Times.** Irrigation watering is prohibited between 10:00 a.m. to 7:00 p.m. except as instructed by the CO or COR. Newly sodded areas are exempt from watering restrictions and may be watered during non-watering times. Special requirements for irrigation times may be required and shall be given to the Service Provider by COR. These special requirements for irrigation times shall be incorporated within 24 hours of notification. The Service Provider shall not water when temperatures are such that the water shall freeze on lawns, trees, shrubs, sidewalks, and streets. The base populace is under a mandatory water conservation policy, which prohibits all lawn watering between the hours of 10:00 am and 7:00 pm, seven days a week, all year long. All base agencies and Service Providers are prohibited from watering, unless a hand held hose (equipped with a shut off nozzle), bucket, timed irrigation systems or watering can is used. The Service Provider shall maintain a current detailed watering schedule to include start and duration times of automatic, portable, and manual systems.



**1.1.4.2. Maintenance of Irrigation Systems.** Maintain irrigation systems. Maintenance includes, but is not limited to draining and charging systems, replacing damaged or broken control devices and sprinkler heads, and repairing ruptured pipes. Maintain equipment and systems to be efficient and in good operational working order. Replacement of pumps, controllers (if applicable), clocks/timers, or backflow prevention devices is not included in routine maintenance of irrigation systems; replacement of these items will be on a case-by-case, reimbursable basis through appropriate contract line (CLIN) item as directed by the CO or COR.

**1.1.4.2.1. Timeliness of Irrigation Repairs.** Repairs to heads, valve boxes, timers, and lines shall be completed within 7 calendar days from notification. If repairs are not completed within the specified time the government shall withhold payment in weekly increments. The COR shall calculate irrigation deductions and submit to CO for final approval. When approved, COR shall deduct amount from irrigation maintenance contract line item from monthly invoice. Amount to be withheld shall be computed as follows:

**Monthly price per acres x system coverage / number of weeks per billing cycle = Weekly Deduction Cost**

**1.1.4.2.2. Winterizing Irrigation.** The Base Civil Engineering service provider shall be responsible for winterizing and de-winterizing all systems up to the double check valve. The average start up time is 1 April and the average time for winterizing is 1 November.

**1.1.4.2.3. Irrigation Line Marking.** The Service Provider shall mark irrigation for work requests.

**1.1.4.3. Backflow Prevention.** The Service Provider shall be responsible for furnishing, installing, testing, maintenance, repair, and operation of each backflow prevention device on portable/manual irrigation systems connected to a fire hydrant. The use of fire hydrants for watering shall be coordinated with the base Fire Department prior to usage. Never attach a backflow prevention device to a fire hydrant if any kind of device is already attached to the hydrant. Check remaining nozzle caps to assure they are snug on the nozzles and shall not blow off under pressure. Hydrants open by turning the operating mechanism in a clock-wise manner. Check the direction of the arrow stamped on the bonnet. The hydrant must be fully open when in use, and fully closed when not in use. If the fire hydrant is opened less than full open, there is a danger that the fire hydrant could blow off the end of the lateral because the weep holes shall not be completely closed which shall allow water under pressure to erode the area around the fire hydrant. Only operate with an approved fire hydrant wrench. The operating nut on the top of the fire hydrant is a brass five-sided nut (1-1/4 inches pentagon) and damage will result if operated with anything other than a fire hydrant wrench. If the nut is damaged, the Service Provider shall be responsible for the cost to repair. In no case shall hydrant hoses be allowed to traverse areas exposed to vehicular traffic. All hoses connected directly to fire hydrants shall have only been used on potable water sources. The Service Provider shall not adjust or remove the backflow prevention device on any permanent in-ground irrigation system. The Service Provider shall be responsible for any loss or damage to the backflow prevention devices.

**1.1.4.3.1. Backflow Prevention Assembly.** The Service Provider shall provide a reduced pressure principle backflow prevention device (RPD), which is approved by the International Association of Plumbing and Mechanical Officials (IAPMO), when connecting portable irrigation systems to a fire hydrant. The RPD device shall be a minimum of 2 inches in diameter. The RPD device shall contain two independently acting check

valves with a hydraulically operating, mechanically independent pressure-differential relief valve located between the check valves and at the same time below the first check valve. The backflow prevention assembly must include properly located test cocks and tightly closing shutoff valves at each end of the assembly.

**1.1.4.3.2. Certified Tester.** An individual person who has proven his/her competency to test, repair and overhaul backflow prevention assemblies and to prepare reports on such assemblies as evidenced by the successful completion of a training program, and receipt of certification and license. The Service Provider shall provide the backflow prevention assembly tester's license number issued by the Texas Commission on Environmental Quality (TCEQ) and any local city license numbers as applicable, to the CO, for acceptance.

**1.1.4.3.3. Testing and Reporting (Appendix G).** All backflow prevention assemblies shall be installed and tested in accordance with (IAW) the manufacturer's instructions. All backflow prevention assemblies shall be tested upon initial installation, at the beginning of each watering season, by a licensed backflow prevention assembly tester and certified to be operational. Assemblies shall be maintained, repaired, or replaced at the expense of the Service Provider whenever assemblies are found to be defective. Original reports of all tests, repairs, and maintenance of each backflow prevention assembly shall be submitted to the COR within 5 working days. Test gauges used for backflow prevention assembly testing shall be calibrated at least annually IAW The American Water Works Association's Recommended Practice for Backflow Prevention and Cross-Connection Control (Manual M14), current addition. The original calibration report must be submitted to the COR within 5 working days after calibration. The Service Provider shall submit a separate report for each device tested.

**1.1.5. Remove Debris.** Prior to and during mowing operations, Service Provider shall pick up debris and litter to prevent any shredding and spreading of debris after mowing. Gather, remove, and dispose of debris and litter (tree limbs, dry brush, leaves, food wrappers, plastic bottles, cans, etc.) IAW base solid waste and recycling procedures.

**1.1.5.1. Dead Animals.** RESERVED AND NOT PERFORMED BY GROUNDS MAINTENANCE SERVICE PROVIDER. THIS REQUIREMENT PROVIDED BY BASE CIVIL ENGINEER SERVICE PROVIDER.

**1.1. 5.2. Leaf Removal.** RESERVED. Leaf removal will consist of mulching during normal mowing operations.

**1.1.6. Fertilization.** Maintain a pH adjustment and fertilizer application program. Perform a laboratory test of the soil in improved and athletic/parade field grounds and apply fertilizer and soil amendments using procedures appropriate for the soil conditions found, type of grass, and season. Provide soil test results to COR prior to fertilizer application.

**1.1.6.1. Test Locations and Timeframes.** Service Provider shall gather soil samples in February during the ordering period (FY20) and ordering period (FY22) for laboratory testing from the locations identified in Figure 2.0.

SOIL SAMPLE COLLECTION LOCATIONS
Bldg 2320 Pilot Training – Southwest side
Bldg 2333 80 <sup>th</sup> FTW Commander – Northeast corner
Bldg 2113 Group Commander / Supply – East side
Bldg 1917 Group Commander – West side
Bldg 882 Dormitory – North side
Bldg 540 Gym – South side
Bldg 370 Lodging – East side
D & E island (1 <sup>st</sup> Ave to 2 <sup>nd</sup> Ave)
D & E island (5 <sup>th</sup> Ave to 1 <sup>st</sup> troop walk)
South Athletic Complex
North Athletic Complex – West of Bldg 1403
Parade Field

Figure 2.0

**1.1.6.2 Aeration and Fertilization:** Improved grounds (IRRIGATED AREAS ONLY) shall be aerated and fertilized in April and October. Irrigated athletic grounds, parade field and specialized areas shall be aerated and fertilized in January, April, July, and October. Aeration shall be accomplished with a core aerifier to depth of 4 to 6 inches with a hole diameter of 1 inch and a 2 – 4 inch spacing.

**1.1.7. Herbicides.** Comply with current federal, state, local, Department of Defense (DoD), and Air Force regulations, plans, and policies with regard to herbicide handling, storage, and application. Comply with all applicable parts of 29 Code of Federal Regulations (CFR) 1910, Labor, Occupational Safety and Health Standards, 29 CFR 1925, Labor, Safety and Health Standards for Federal Service Contracts, and 49 CFR 171, Transportation, General Information, Regulations, and Definitions. Ensure that all workers applying herbicide have current state certification for the herbicide services being performed. Control weeds through execution of a weed control program appropriate for the area to maintain a professional appearance. Maintain grounds made barren where weeds are removed to the level of care of the surrounding area. Service Provider must submit all intended herbicides to the COR. Service Provider must receive specific approval from base authorities for herbicides submitted prior to use. The Service Provider shall use reasonable care to avoid releasing herbicides which may cause environmental damage to Government structures, Government equipment, public land, water, or other natural resources. If the Service Provider causes damage to any of this property, the Service Provider shall replace or repair the damage at no expense to the Government.

**NOTE:** Weed control will be limited to noxious or invasive vegetation.

**1.1.8. Pest Control.** RESERVED AND NOT PERFORMED BY GROUNDS MAINTENANCE SERVICE PROVIDER. THIS REQUIREMENT PROVIDED BY BASE CIVIL ENGINEER SERVICE PROVIDER.

**1.1.9. Lawn Renovation.** The Service Provider shall renovate lawns in improved grounds as identified by the CO or COR. This work will be issued via a separate work order. Renovate deteriorated lawn area to match surrounding areas. Service Provider shall use the following materials for lawn renovation: Sod (Buffalo,

Bermuda and Zoysia) or seeds will be used at Sheppard AFB for lawn renovation. Lawn Renovation will be limited to correcting vehicle rutting, as needed for erosion. Work order will be issued using Lawn Renovation contract line item.

**1.1.9.1. Grounds Damages.** The Service Provider shall be responsible for repairing damaged turf, filling and leveling of all depressions, replacing trees, shrubs, hedges, damaged during grounds maintenance operations. When damage to grounds occurs by the Service Provider, the contract manager shall submit a plan for correction and estimated time frame for completion of repairs within 24 hours from time of damage. Replacement trees, shrubs, and hedges shall be as close to the same type and size as possible.

**1.1.10. Prune Shrubs, Hedges and Other Plants.** Prune/trim shrubs and other plants to maintain their natural growth characteristics, and enhance the beauty and health of the plant. Maintain hedges to their natural mature height and shape. Shrubs, plants, hedges, and ground cover/vines shall be pruned/trimmed 3 inches away from buildings, fences, curbing, sidewalks, and other fixed obstacles. Shrubs and hedges located on street corners, curb easements, etc. shall be pruned/trimmed to keep from obstructing view of oncoming traffic. Areas beneath shrubs and hedges shall be kept free (clean) of all grass, weeds, and debris.

**1.1.10.1.** Shrubs, hedges, and other plants that are located in a vegetative bed, inert bed already identified in Appendix B, Plant Bed and Shrub Maintenance will already be accomplished under the maintenance of the beds, and invoiced with Line Item XX21. If no work orders are issued, then Service Provider will not invoice for prune shrubs, hedges, and other plants. Pruning will be limited to prevent infrastructure damage, pest infestation, comply with Anti-Terrorism Force Protection (AT/FP) standards.

**1.1.11. Wildflower Maintenance Area.** The Service Provider shall maintain 4.35 acre of wildflowers located in Zone 39 between Moates Street / Ave C and 5th Street to 8th Street. The Service Provider shall mow the area to a height of 2 – 2 ½ inches no more than two (2) times per year in October and March.

**1.2. SEMI-IMPROVED GROUNDS.** Semi-improved grounds are identified in Appendices A and B.

**1.2.1. Mow.** The Service Provider shall maintain grass height between 4 and 10 inches in all semi- improved grounds areas except in airfield areas designated as Bird Aircraft Strike Hazard (BASH) areas. Maintain grass height between 7 and 14 inches in BASH areas. Maintain a uniform appearance in all areas. Where possible, maintain adjacent areas at or near the same grass heights.

**1.2.1.1.** Prior to and during mowing operations, Service Provider shall pick up debris and litter to prevent any shredding and spreading of debris after mowing. Remove or mulch grass clippings, when visible after mowing, before leaving work area.

**1.2.1.2. Semi-Improved Zones along perimeter fence.** The Service Provider shall mow a 10 foot path at 4 to 4½ inches along the inside of the perimeter fence line to meet Anti-Terrorism/Force Protection (AT/FP) requirements. This mowing operation includes trimming fence line.

**1.2.2. Trim.** Trim to prevent infiltration of grates, equipment, other infrastructure or potential safety hazards.

Trim grass, grass around trees, shrubs, buildings, fences, poles, fire hydrants, parking lot bumper blocks, boulders, and other fixed and temporary obstacles/objects on grounds. Trimming height shall match surrounding area grass height. All areas shall be trimmed concurrent with mowing. Mulch or remove grass clippings when visible after trimming before leaving work area.

**1.2.3. Airfield Mow.** Maintain grass height between 7 and 14 inches in Bird Aircraft Strike Hazard (BASH) areas as shown in Appendices A and B. Maintain a uniform appearance in all areas.

**1.2.3.1. Airfield Coordination.** Coordinate all activities on the airfield by contacting Airfield Management office. Work will be accomplished only after Airfield Management has approved the requested dates/times.

**1.2.3.2. Airfield Drivers Training.** Training must be completed prior to operating vehicles or mowers on the airfield. All employees working on airfield grounds shall be required to have an AF Form 483, Certificate of Competency (airfield driver's license) with them at all times. Vehicles must have a valid Personally Owned Vehicle (POV) pass issued by Airfield Management prior to operating on the airfield. No equipment will be left unattended while working in these areas. Ensure all foreign objects and debris produced by grounds maintenance is cleared off of all taxiways, runways, and aircraft parking aprons before leaving the work area.

**1.2.3.2.1. Airfield Trainer.** Initial and annual refresher airfield training shall be provided by the Base Civil Engineer Service Provider (SP) at no expense to the Service Provider. However, Service Provider labor hour cost will be the responsibility of the Service Provider. Airfield driving is critical to the safe operations of vehicles, aircraft, and pedestrian movement on and around the airfield environment IAW AFI 13-213, Airfield Driving.

**1.2.3.3. Airfield Tower Communications.** Maintain constant two-way radio contact with the control tower and Airfield Management when on airfield to include near runways, overruns, and taxiways. The Service Provider shall maintain contact with the control tower when operating on or within 150 feet of the runway. The Service Provider shall respond immediately to all directions from airfield personnel. The Service Provider shall provide all communication equipment required for this contract. The Government shall provide the transceiver frequency to the Service Provider. All equipment shall be Very High Frequency (VHF) type with a minimum 5-mile range and shall have private line capability. Comply with all changes to radio types that the base makes in the course of this contract, i.e. frequency changes.

**1.2.3.3.1. Communication Specifics.** The service provider shall be responsible for providing radios. The radios must be compatible with Motorola's trunked Smartnet digital radio system which operates in DoD ultra-high frequency (UHF) 400 megahertz (MHz) range. The radios must be programmed with SAFB radio system key and assigned a radio identification number. Coordination with SAFB Communications Squadron should be made prior to radio purchase to ensure system compatibility. Upon termination of contract, Service Provider shall ensure un-programming requirements of all approved airfield radio frequencies with Communications Squadron are accomplished prior to acceptance of final invoicing payment.

**1.2.3.4. Airfield Fixed Objects.** Trim grass around airfield fixed and temporary objects such as runway/taxiway lights, signs, structures, etc. between 4 and 6 inches. Grass shall not extend over the edge of the paved areas by

more than 2 inches. All areas shall be trimmed concurrent with mowing or when height exceeds 6 inches. Mulch or remove clippings when visible after trimming before leaving work area. A 10-foot circle or half circle shall be maintained around taxiway/runway lights, distance remaining markers and airfield identification signs.

**1.2.4. Airfield Areas.** In airfield areas designated as BASH areas grass height shall be between 7 and 14 inches including seed heads. When requested by the 80th FTW Safety Office and directed by CO, all or some airfield zones shall be maintained between height of 4 and 14 inches during mowing season (Mar – Oct) or other heights as deemed necessary according to Air Force Safety Center waiver(s). Additionally, the Service Provider may be directed by the CO to maintain isolated areas at a minimum of 4 inches for weed control and vegetative reasons. Mowing height requirements and duration of adjusted heights will be submitted by the 80th FTW and directed by CO. The Service Provider-furnished mowers used for operation in the airfield areas shall have an operable yellow beacon or light, which can be seen, at a distance of 100 feet, and an Air Force Visual Aid (AFVA) 11-240, *USAF Airport Signs and Markings*, decal furnished by the Government. Maintain a uniform appearance in all areas. Where possible, maintain adjacent areas at or near the same grass height. The Service Provider may be required to work other than daylight hours.

**1.2.4.1.** Grounds maintenance work within 150 feet of the edge of runways and runway overruns shall be done when there is no flying activity. During periods when there is no flying and the control tower is manned, the control tower shall alert the Service Provider to temporarily stop mowing operations if an aircraft is using a runway or taxiway in the vicinity of the mowing operations. This is normally at a time other than normal duty hours or working days for the base and shall be at no additional cost to the Government. The Service Provider may be required to work other than daylight hours. The Service Provider can obtain a weekly flying schedule from 80th FTW Scheduling Office.

**1.2.4.2. Airfield Seeding Project.** The airfield management team has planned a seeding project that is not a part of this contract on the base proper airfield. The project is planned to limited undesirable grasses and deters unwanted wildlife. The project is designed in phases as funding allows. The seeding project will affect various zones on the airfield which will need to be removed from monthly height based maintenance and to a mow or no mow as directed by the CO or COR. This will take place through written communication such as email, and typically will come from COR. The seeding project mowing is solely based on how well the new seeds take root and weather. The Service Provider will be coordinating heavily with key personnel such as airfield manager, airfield safety, USDA wildlife personnel and COR as to the direction of the project to include determining boundaries and border lines of the project. The Service Provider will invoice for these zones only if directed by CO, at the price already established on the bid schedule per acre.

**1.3. UNIMPROVED GROUNDS.** Unimproved grounds are identified in Appendices A and B. THE SERVICE PROVIDER SHALL: Maintain grass in unimproved grounds to prevent woody encroachment. The Service Provider shall mow unimproved grounds when directed by either CO or COR by work order. This service may or may not be used in any particular year. Service Provider shall not invoice if not used.

**1.3.1. Unimproved Grounds.** SAFB unimproved grounds are divided into two categories: Unimproved – Maintained and Unimproved – Not Maintained. The Service Provider shall mow unimproved – maintained grounds not to exceed 14 inches completing required mowing operations. The COR will identify the unimproved

areas to be mowed. All required work shall be completed within 20 calendar days of issuance of a work order. Unimproved areas are areas where maintenance is required once annually (during peak growing seasons) to control grass to prevent fire hazards, and for safety, security, and wildlife control reasons.

**1.3.2. Unimproved Zones along perimeter fence.** The Service Provider shall mow a 10 foot path at 7 inches along the inside of the perimeter fence line to meet AT/FP requirements. This mowing operation includes trimming fence line.

**1.4. MAINTAIN VEGETATIVE BEDS, INERT BEDS AND RELATED AREAS. THE SERVICE PROVIDER SHALL:** Maintain vegetative beds, inert beds, and related areas as identified in Appendix B, Plant Bed and Shrub Maintenance to present a neat and professional appearance once every 14 days with a minimum of 10 days in between services. A related area consists of around the facility and does not have to be in established beds. Maintenance activities may include, but are not limited to; fertilizing, edging, policing, watering, weeding, replenishing mulch, removal/trimming/pruning of shrubs, plants, hedges, repairing/replacing of damaged plants and shrubs. Service Provider shall remove natural or man-made debris. Mulch shall be cultivated and maintained to a depth of 2 to 3 inches. Fresh mulch may need to be added due to irrigation or rainfall runoff. At the Service Provider's discretion, the mulch can be changed to a different type after a sample of proposed mulch/chips has been submitted to the COR for acceptance prior to use. When replacing plants, shrubs, and performing repairs, conform to good Xeriscaping practices for the area. The Service Provider shall prune/trim shrubs to their natural growth characteristics and sizes as specified for each type using commercial industry standards. As directed and required, remove damaged, diseased and dead limbs. The Service Provider shall notify the COR if 50% or more of the shrub/hedge is dead. The COR shall decide if complete removal is required after approval from the natural resource program manager. Acceptable growth on continuous plant bed, shrub, and hedge maintenance is 3 inches. All ground cover and plants shall be kept within the bed borders. Several beds use river rock as ground cover. All plants around landscape and ground lights shall be pruned or trimmed to allow light usage for its intended purpose.

**1.5. MAINTAIN SURFACE DRAINAGE DITCHES. THE SERVICE PROVIDER SHALL:** Maintain surface drainage ditches to be free of shrubs, trees, silt, and trash to prevent erosion and ensure continuous flow of water. Maintenance activities shall be based on requirement to keep the ditches free-flowing.

**1.5.1. Drainage Ditch Standards.** The Service Provider shall maintain and police the drainage ditches located in Appendix E. The Service Provider shall trim and remove grass to ensure the debris does not impede the flow of water. The ditch shall be maintained between 4 and 10 inches from the water line up to 1 foot above crest of bank along each side. Policing of these areas includes but is not limited to man-made debris such as trash as well as natural debris. Dredging is outside the scope of this contract and if necessary shall be accomplished by other means.

**1.6. PERFORM SNOW AND ICE REMOVAL. RESERVED AND NOT PERFORMED BY GROUNDS MAINTENANCE SERVICE PROVIDER. THIS REQUIREMENT PROVIDED BY BASE CIVIL ENGINEER SERVICE PROVIDER.**

## 1.7. SPECIAL REQUIREMENTS.

**1.7.1. Trees.** Pruning will be only as required for safety or AT/FP. Prune or trim trees as identified by the COR. Pruning or trimming shall be accomplished IAW the American National Standards Institute ANSI A300 Part 1 industry standards. Pruning shall be required to lift, remove, and/or cutback branches that conflict with normal traffic or safety. In addition, the Service Provider shall prune or trim trees from storm damage and that pose public safety hazards. Minimum safety clearances are: 14 feet over streets, 12 feet over driveways, 8 feet over walk areas, 4 feet over buildings, and 1 foot from buildings. Topping and de-horning are not permitted. Trimming or pruning of trees that touch or hang over energized utility poles or power lines is not the responsibility of the Service Provider. Minimum clearance from primary lines (over 600 volts) shall be 8 feet. Minimum clearance from secondary lines (under 600 volts, i.e. electric service drops, telephone, and cable television) shall be 4 feet. Service Provider shall be responsible for removing all debris generated from trimming or pruning operations. Once work order is received the work must be completed within 5 workdays from notification unless otherwise agreed date.

**1.7.1.1. Crepe Myrtles and Trees (Base Proper only).** The Service Provider shall remove sucker growth from trees and formally-shaped Crepe Myrtles located directly below the canopy of the tree to the ground. The pricing should be included in "Tree Care" on the price exhibits and billed each month during growing and non-growing seasons. There are approximately 500-600 formally-shaped Crepe Myrtles. Sucker growth shall not exceed 4 inches in growth below the canopy of the tree or Crepe Myrtle.

**1.7.1.1.1. Tree Care.** The Service Provider shall brace, cable, guy (to keep tree vertical), and deep water all damaged trees after identification. The Service Provider shall remove all guy wires, cables, straps, and stakes when the trees remain vertical (normally, after one growing season). The Service Provider shall adjust wires, cables, and straps as required, to prevent girdling. This work will only be performed after receiving specific direction from CO or COR.

**1.7.2. Tree Standards.** The Service Provider shall perform all tree work IAW contract PWS and the following tree care standards, latest addition, unless otherwise directed by the CO.

ANSI A300 – Standards [Including referenced Combined Federal Regulations (Utility Pruning and Emergency Service Restoration)]

ANSI A300 (Part 1) – 2008 Pruning

ANSI A300 (Part 3) – 2013 Supplemental Support Systems (Includes cabling, bracing, guying, and propping)

ANSI Z60.1 – American Standard for Nursery Stock

ANSI Z133.1 – Safety Requirements

**1.7.3. Tree, Shrub, and Stump Removal.** Tree, shrub, and stump removal shall only be accomplished when directed by COR unless it is located in a vegetative bed, inert bed, or related area identified in Appendix B. Tree removal due to diseased, storm damage, or other reason shall be issued to be removed once the COR receives approval from the Natural and Cultural Resource Manager. Perform stump and perimeter root removal by cutting and grinding all growth to a minimum of 8 inches below grade, and removing all debris. Stumps shall be ground



within two (2) working days of the tree removal date. Stump-grinding debris shall be removed and the hole filled with topsoil to match existing grade the same day grinding is performed. Trees identified for removal shall be considered within the following categories, Large, Medium, Small and Sapling, as based on their diameter. The diameter of the tree shall be determined by measuring 4.5 feet above the ground. Trees with multiple trunks shall be measured as follows: All trunk diameters shall be measured. The largest trunk diameter shall be recorded. Each remaining trunk diameter shall be halved. All values will then be added together to obtain the final tree diameter.

**Large Trees:** Diameter 36" and above, remove within ten (10) working days from the date directed to perform the work.

**Medium Trees:** Diameter 24" to less than 36", remove within ten (10) working days from the date directed to perform the work.

**Small Trees:** Diameter 3" to less than 24", remove within ten (10) working days from the date directed to perform the work.

**Saplings:** Diameter 3" and smaller, remove within ten (10) working days from the date directed to perform the work.

**Shrubs:** For shrubs that do not fall under other area in the PWS, remove within ten (10) working days from the date directed to perform the work.

**1.7.4. Emergency Tree and Stump Removal Timeframes.** Perform emergency tree and stump removal only after being directed by the CO or COR.

**Large Trees:** Remove within two (2) working days from the date directed to perform the work.

**Medium Trees:** Remove within two (2) working days from the date directed to perform the work.

**Small Trees:** Remove within two (2) working days from the date directed to perform the work.

**Saplings:** Not required.

**1.7.5. Emergency and Special Event Services.** The Service Provider shall upon notification by the CO or COR, through the issuance of an oral or written work order, perform emergency or special event grounds maintenance service. Upon notification of an emergency, the contract manager shall respond within one (1) hour to meet with the CO and COR. Upon receiving direction by the CO or COR, Service Provider personnel shall begin emergency work within two hours. Oral work orders for emergency services to minimize damages or mitigate hazardous conditions will be confirmed with written work orders. The contracting officer will notify the Service Provider as soon as a special event requirement is known, but no less than 24 hours prior to the event. The CO or COR will notify the Service Provider as soon as a special event requirement is known. Special event services include but not limited to; basewide events such as Freedom Fest, Hotter than Hell bike race, air shows, picnics, distinguished visitors, open houses, grand openings, and parades.

**1.7.6. Separately Priced Mowing.** The Service Provider shall upon issuance of a work order by the COR complete additional mowing of a particular location. The same standards shall apply to separately price mowing requirements as with regular grounds maintenance standards (including mowing, trimming, and edging). The

Service Provider shall initiate work and continuously work toward completion contingent upon scope / size of area. The Service Provider will invoice using the firm fixed price per land status times the acreage issued. (See price exhibit)

**1.7.7. Fenced Areas around Heating, Ventilating and Cooling (HVAC).** Service Provider shall mow grass and volunteer trees or shrubs inside fenced HVAC areas to match surrounding land category by using mechanical or herbicide method in all fenced areas containing chillers, direct expansion (DX) refrigeration units and cooling towers.

**1.7.8. Munitions Storage Area (MSA) (Zone 29).** MSA is a fence-enclosed area with controlled entry and escort requirements. When access is required into the MSA, the Service Provider shall coordinate 48 hours prior to required access, excluding Tuesdays, with the Munitions Section per SAFBP 31-101, paragraph 17, by calling 940-676-2002. The Service Provider shall submit a letter to the CO listing individuals who require admittance to this area. Service Provider shall update access list as necessary. When area is found to be out of compliance with PWS, Service Provider shall coordinate access and correct discrepancies within 72 hours, excluding weekends. All cell phone usage and smoking is strictly prohibited within the MSA. Failure to comply with MSA rules and escort requirement will result in immediate removal from area and the COR and CO will be notified. The Service Provider shall cut a 30-foot path along the inside of the MSA perimeter fence and 15-foot path along the outside of the perimeter fence at seven (7) inches high.

**1.7.8.1 MSA Igloos.** There are two igloos, Bldg 2212 and Bldg 2214 with grass located on an angled roof top and will require trimming. The igloos consist of .75 AC each and shall be cut no lower than four (4) inches in height upon notification by the COR. The Service Provider will invoice using the firm fixed price per land status times the acreage issued as "Separately Priced Mowing" issued work ordered. (See price exhibit)

**1.7.9. Pool Area (Zone 63).** The Service Provider shall be responsible for mowing a small area of grass located inside the pool fence area located at Bldg 471. All clippings shall be bagged during mowing operations to prevent clippings from going into the pool.

**1.7.10. Crash Damage or Disabled Aircraft Recovery (CDDAR)/Explosive Ordnance Disposal (EOD) Training - Zone 17.** The CDDAR and EOD training area includes an obstacle course, tents, and communication equipment, which may be temporarily installed between 3 and 6 months. The area will consist of improved, semi-improved and unimproved. The Service Provider shall maintain a 5-foot wide path between 3-5 inches from fuel tanks to fire extinguishers affixed to telephone poles. Service Provider shall mow grounds as close to the thick mesquite tree line as possible. Service Provider shall coordinate with site management prior to mowing grounds around loose gravel parking areas to ensure vehicles are moved to allow Service Provider to perform grounds maintenance operations and minimize possible vehicle damage.

## **1.8. Daily, Monthly, Quarterly Reports.**

**1.8.1. Work Plan Report.** The Service Provider shall submit, by email, a daily completed work plan to the COR by 9:00 am the next working day identifying all completed work from the day prior. The daily work plan will contain the following, but not limited to:

- a. Completed zones by number and land category
  - Improved grounds
  - Athletic / parade field grounds

- Semi-improved grounds (if used)
- Airfield grounds
- b. Completed plant bed / shrub maintenance locations (if used)
- c. Irrigated areas including operating and maintenance (if used)
- d. Completed work orders (if used)
- e. Quality control inspected zones by land category
- f. Plan of action for incomplete work
- g. Additional comments or notes such as weather conditions, equipment issues

**1.8.2. Green Waste Disposal Report.** The Service Provider shall submit a monthly report to the COR by the end of the third (3rd) working day of the following month with the total green waste, i.e., tree and shrub trimmings, leaves, limbs and other vegetation debris, estimated weight removed from SAFB.

**1.8.3. Pesticide and Herbicide Usage Report.** The Service Provider shall submit a report to the COR by the end of the third (3rd) working days following each month listing all pesticide applications made to include pesticide name, use concentration, amount applied, date, and detailed location of use. A Department of Defense (DD) Form 1532, Pest Management Report, or locally designed form shall be provided on request to facilitate record keeping. Pesticide and Herbicide usage will be IAW AFI 32-1053, Integrated Pest Management Program.

**1.8.3.1. Chemical Usage Report.** The Service Provider shall submit the chemical usage report via email to the COR within three (3) working days of the end of each month. The Service Provider shall be provided the locally developed/approved report for tracking approved chemicals and authorized usage levels.

**2. SERVICES SUMMARY (SS).** The contract service requirements are summarized in performance objectives that relate directly to mission essential items. The performance threshold briefly describes the minimally acceptable levels of service required for each requirement. The SS and the Service Provider's Quality Control Plan (QCP) provide information on contract requirements, the expected level of Service Provider performance and the expected method of Government validation and confirmation of services provided. These thresholds are critical to mission success. Procedures as set forth in the Federal Acquisition Regulation (FAR) 52.212-4 (a), Contract Terms and Conditions - Commercial Items, Inspection/Acceptance, will be used to remedy all deficiencies. During the first 30 days of the contract, two additional errors on each Performance Objective shall be allowed in an effort to identify normal phase-in problems, unless the incumbent Service Provider wins new contract.

**Table 1 – Services Summary**

Performance Objective	PWS Para	Performance Threshold	Method of Assessment
SS-1 Maintain Improved, athletic, parade field and specialized Grounds	1.1, inclusive	No more than five (5) valid defects per month	Periodic surveillance or valid customer complaint.
a. Mow			
b. Edge			
c. Trim			
d. Irrigation systems			
e. Aerate and fertilize			
f. Lawn renovation			
SS-2 Maintain Semi-Improved Grounds	1.2, inclusive	No more than five (5) valid defects per month	Periodic surveillance or valid customer complaint.
a. Mow non-airfield semi-improved grounds			
b. Trim non-airfield semi-improved grounds			
c. Maintain 10-ft path inside non-airfield perimeter fence			
d. Mow airfield semi-improved grounds			
e. Trim airfield semi-improved grounds			
f. Mow taxiway, runway edge lights, signs and fixed objects.			

SS-3 Maintain Unimproved Grounds	1.3, inclusive	No more than three (3) valid defects per year	Periodic surveillance or valid customer complaint.
a. Maintain 10-ft path inside unimproved perimeter fence			
SS-4 Maintain Vegetative Beds, Inert Beds and Related Areas	1.4	No more than three (3) valid defects per month.	Periodic surveillance or valid customer complaint.
SS-5 Police Debris, Trash and Litter	1.1, inclusive	No more than three (3) valid defects per month.	Periodic surveillance or valid customer complaint.
SS-6 Prune Trees	1.7.1, inclusive	No more than three (3) valid defects per month.	Periodic surveillance or valid customer complaint.
SS-7 Service Provider maintains and adheres to accepted Quality Control Plan (QCP)	2.1	No more than three (3) valid defects per month.	Periodic surveillance or valid customer complaint.
SS-8 Complete Work orders within Designated timeframe	1.1.9, 1.1.10, 1.3, 1.7.1, 1.7.5, 1.7.6, and 1.7.8.1	No more than four (4) valid defects per month.	Periodic surveillance or valid customer complaint.

**NOTE:** Each improved, semi-improved, unimproved, airfield and plant bed zone or location will be assessed independently from each other. In the event a discrepancy is found, one (1) corrective action report will be generated for each zone or location. See PWS paragraph 2.3.1.1 for calculating contract deductions for each CAR exceeding SS “VALID” thresholds.

**2.1. QUALITY CONTROL. THE SERVICE PROVIDER SHALL.** Provide a written description of the quality control system to include identification of the commercial practices and procedures to be used, such as those of the Professional Grounds Management Society (PGMS), Tree Care Industry Association, American Society of Landscape Architects (ANSI), and local Extension Offices of the Federal Cooperative Extension Service. Include the inspection system requirements of FAR 52.246-4 Inspection of Services-Fixed Price, in

this document. Develop a plan, implement and follow procedures to identify, prevent, and ensure non-performance and repeat of defective service does not occur. A written Quality Control Plan shall be submitted to the CO for acceptance. The plan shall be submitted no later than the pre-performance conference or within the first 30 days of award as determined by the CO. The plan shall specifically address the requirements of the PWS, the Service Provider's strategy to provide quality workmanship and continual process improvement, and for correcting deficiencies as required.

**2.2. QUALITY ASSURANCE.** The government may inspect and evaluate the Service Provider's performance to ensure services are received IAW requirements set forth in this contract. The CO or Government may inspect by validating actual work performance, physically checking an attribute of the completed task, checking a management information report, investigating customer complaints, conferring with facility managers, or otherwise inspecting the task or its results to determine whether or not performance meets the standards contained in this PWS. The COR will use the Service Provider's work schedule to conduct surveillance. Results of the surveillance then become the official Air Force record of the Service Provider's performance. When a performance threshold has not been met or Service Provider performance has not been accomplished, a Corrective Action Report (CAR) or a Contract Discrepancy Report (CDR). The Service Provider shall respond to the COR IAW instructions provided.

### **2.3. PERFORMANCE ASSESSMENT.**

**2.3.1. Periodic Assessments.** This method requires the COR to employ a "spot check" style of evaluation based on the Service Provider's schedule. **Periodic assessments will be conducted on a scheduled basis (daily, weekly, monthly, quarterly, semi-annual or annually) and may be adjusted, based on quality trends.** Any unsatisfactory inspection (defect) result shall be recorded, and the Service Provider shall re-perform the service after notification by the CO or COR. Failing to meet the performance threshold as outlined in the SS for any of these Performance Objectives in any one month period shall result in a warning or letter of concern from the CO. Failing to meet the Performance Threshold as outlined in the SS of these Performance Objectives in any combination for any two, or more consecutive or non-consecutive months during a contract period shall constitute an immediate Progress Meeting with the Multi-functional Team. All remedies shall be IAW the FAR 52.212-4 (a), Contract Terms and Conditions - Commercial Items, Inspection/Acceptance.

**2.3.1.1. Periodic Assessment Failure and Contract Reduction.** Reperformance is the preferred corrective action, however, in the event the Service Provider fails to re-perform within the allotted time or at the discretion of the CO, exceeds a SS "VALID" threshold, the COR shall calculate a monthly contract deduction for each CAR exceeding the threshold and submit to CO for final approval. When approved, COR shall deduct amount from applicable contract line item from monthly invoice. Amount to be withheld shall be computed as follows:

$$\text{Price per acre} \times \text{Zone acreage} = \text{Monthly Deduction Cost}$$

**2.4. MULTI-FUNCTIONAL TEAM (MFT) MEETINGS.** The CO may call mandatory meetings to include contracting, the Functional Commander/Director, COR, the Service Provider, and any other government personnel as appropriate to discuss the Service Provider's performance. Typical issues to be discussed include:

opportunities to improve the contract, any modifications required of the contract, unsatisfactory inspections and trends against each Performance Objective observed, positive performance and steps taken by the Service Provider to prevent unsatisfactory occurrences in the future. The Service Provider shall be required by the CO to provide insight into any identified adverse trends and corrective actions. The minutes of these meetings will be reduced to writing, signed by the CO and any other signatures as deemed appropriate, distributed to the functional area and the Service Provider. Should the Service Provider not concur with the minutes, the Service Provider shall provide a written notification to the CO identifying areas of non-concurrence for resolution.

### **3. GOVERNMENT FURNISHED PROPERTY AND SERVICES**

#### **3.1. FACILITIES AND FLOOR SPACE.** None

**3.1.1. Exterior Space.** Service Provider shall submit a written request and wait for acceptance from CO prior to any storage or staging any equipment on SAFB exterior space. Request shall include dates, locations, and justification.

#### **3.2. UTILITIES, TELEPHONE, AND MATERIALS.** None

**3.3. SECURITY, FIRE, AND MEDICAL SERVICES.** The Government will provide police and fire protection. In the event of a medical emergency, base ambulance service for transporting an injured employee to a local hospital is available on a cost reimbursement basis.

**3.4. SOLID WASTE COLLECTION AND DISPOSAL.** The Service Provider shall dispose of trash, refuse or debris, to include yard/green waste, generated while executing the services detailed in this PWS at an off-base landfill, recycling or composting center. See paragraph 1.8.2 for green waste requirements.

### **4. GENERAL INFORMATION**

**4.1. MISSION.** The overall civil engineer mission at SAFB is to plan, maintain, operate, and protect the infrastructure, facilities, and environment for assigned airmen, families, and civilian employees.

**4.2. BACKGROUND.** Climatic data for Wichita County indicates that the county lies in the transitional zone between the humid subtropical climate of east Texas and the continental climate to the north and east. The climate is characterized by rapid changes in temperature and wind. For more information, contact the National Weather Service.

**4.3. DAMAGES TO GOVERNMENT BUILDINGS, EQUIPMENT, OR VEGETATION.** Damages to Government buildings, equipment, or vegetation are addressed in FAR 52.237-2 – “Protection of Government Buildings, Equipment, and Vegetation”.

**4.3.1. Notification.** The Service Provider shall immediately report any damage to Government property caused by Service Provider employees to the COR and CO. If the security of a facility, or the safety of personnel, is in jeopardy due to damages, the Service Provider will be required to provide immediate corrective action, e.g. window replacement.

**4.4. ENVIRONMENTAL REQUIREMENTS.** The Service Provider is subject to inspection by federal, state, or local agencies. For more environmental requirements refer to Appendix H. In addition to all applicable Federal, State and local environmental codes and regulations, the following specific guidance is provided:

**4.4.1. Hazardous Materials.** The Service Provider shall receive prior approval before bringing any hazardous materials on base. The Service Provider shall submit their request for hazardous materials to the CO or COR IAW installation's procedures (Appendix H, para 5.3). The COR will assist the Service Provider with the procedures. If a material is denied, an approved substitute may be recommended; however, the Service Provider shall retain responsibility for finding an acceptable substitute. The Service Provider shall follow all federal, state, and local laws and regulations in the transport, storage, use, and disposal of hazardous materials they use. The Service Provider shall take appropriate actions IAW base procedures to comply with waste minimization and pollution prevention practices and policies.

**4.4.1.1. Chemical Usage Report.** The Service Provider shall submit the chemical usage report via email to the COR within three (3) working days of the end of each month. The Service Provider shall be provided the locally developed/approved report for tracking approved chemicals and authorized usage levels. The Service Provider shall submit a final inventory, not later than ten (10) working days following termination/completion of this contract, of all hazardous materials used since the last hazardous usage report to the CO or COR. The final inventory will list all hazardous materials used, total amount of each used, and a description of the disposition of any remaining hazardous material.

**4.4.1.2. Hazardous Materials Inventory.** The Service Provider shall maintain an up-to-date hazardous material inventory with copies of Safety Data Sheet (SDS) for all materials used on the job site. The Service Provider shall maintain a complete copy of all approved SDSs and AF Form 3952s (or locally approved form).

**4.4.1.3. Hazardous Materials Management.** The Service Provider shall remove all hazardous materials by the end of each workday. Service Provider shall not conduct process treatments (e.g. paint thinner solvent recycling) on base.

**4.4.2. Spill Control.** The Service Provider shall maintain spill control material on hand at all times sufficient to contain a worst-case spill, both volume and hazard level.

**4.4.3. Herbicides.** All herbicides must be approved prior to use by the installation. Submit proposed list of herbicides, with intended uses, and SDS for each herbicide IAW installation procedures. The COR will assist Service Provider with the submission. The Service Provider shall use reasonable care to avoid releasing herbicides in a manner which may cause environmental damage to Government structures, equipment, land, water, or other natural resources. If the Service Provider's failure to use reasonable care causes damage to any of this property, the Service Provider shall replace or repair the damage at no expense to the Government as the CO directs. Service Provider shall not apply any herbicides without receiving specific permission from the base, routed through COR, for each application. Service Provider requests for herbicide application will be IAW local base procedures.



**4.4.3.1. Herbicide Storage and Mixing.** Perform herbicide storage and mixing operations off base.

**4.4.3.2. Monthly reports.** The Service Provider shall submit a report to the COR within three (3) working days of the end of each month listing all herbicide applications made. Include herbicide name, use concentration, amount applied, date, and detailed location of use. A form will be provided on request to facilitate record keeping.

**4.5. PERMITS, LICENSES AND CERTIFICATIONS.** Unless otherwise specified in this contract, obtain necessary permits, licenses, and certifications; give all required notices; and comply with applicable Federal, State, and local laws, codes, and regulations in performance of the requirements of this contract. Maintain records of such requirements and make the documentation available to the Government for review.

**4.5.1 Environmental Management System Training Requirements.** IAW SAF/AQ and AF/A4/7 Memo, Conformance with AF Environmental Management System (EMS) Requirements AF Installations, Service Provider personnel working on an Air Force installation where the Air Force has implemented its EMS must complete Air Force-provided initial EMS awareness-level training through The Environmental Awareness Course Hub (TEACH). Only Service Provider supervisory personnel shall be required to complete the awareness-level training portion. Prior to beginning any work on SAFB, the Service Provider shall ensure, and certify to the CO, that all on-site supervisory personnel have completed any Environment, Safety, and Occupational Health Management System (ESOHMS) training as required and contained within the following. This certification shall include certification that all on-site employees have been briefed as outlined below:

Following completion of all applicable training modules, the Service Provider shall ensure the on-site supervisory personnel have provided an awareness briefing to all on-site personnel to ensure every employee is aware of the SAFB ESOHMS requirements. These training and certifications shall be completed before beginning any work on SAFB. The Service Provider shall provide training documentation to the COR before the contract start date. The COR shall forward this information to Environmental, Safety and Occupational Health Management System program manager at 82 CES/CEIV, Bldg 1402, phone 940-676-2001 or the civil engineering service provider.

**4.5.1.1. EMS training procedures.** The contractor shall following the below procedures:

- a. Register at <https://usaf.learningbuilder.com>
- b. Complete the following training modules:
  1. Environmental Management System (EMS) General Awareness
  2. GPP/Sustainable Procurement Awareness
  3. Storm Water Management Awareness
  4. General Environmental Compliance Awareness
  5. Asbestos Management Awareness

**4.6. HOURS OF OPERATION.** Normal working hours are 7:30 a.m. through 4:30 p.m., Monday through Friday, excluding federal holidays. There may be situations that require the Service Provider to work at times other than normal working hours. Do not perform services in residential areas, housing and dormitories, before 7:30 a.m. When the Service Provider's work schedule conflicts with an Air Force mission requirement, advise the CO and COR in writing and reschedule the work to minimize disruption.

**4.7. RECOGNIZED HOLIDAYS.** The Service Provider is not required to provide service on federal holidays, except in emergency situations. If these holidays fall on Saturday, the preceding Friday will be observed. If these holidays fall on Sunday, the following Monday will be observed. If a holiday falls on a scheduled service day, the Service Provider will be responsible for rescheduling services for the first day past the holiday observance. The holidays are:

New Year's Day - 1 January  
Martin Luther King Day - 3rd Monday in January  
President's Day - 3rd Monday in February  
Memorial Day - last Monday in May  
Independence Day - 4 July  
Labor Day - 1st Monday in September  
Columbus Day - 2nd Monday in October  
Veteran's Day - 11 November  
Thanksgiving Day - 4th Thursday in November  
Christmas Day - 25 December

**4.7.1. Base Closures.** Work scheduled, but not accomplished, because of base closure due to weather, exercises, or actual alert, will be accomplished as soon as possible after reopening the base.

## **4.8. SECURITY REQUIREMENT**

### **4.8.1. INFORMATION PROTECTION**

**4.8.1.1. Service Provider Notification Responsibilities.** The Service Provider shall notify the sponsoring unit's Security Manager no later than 30 days before on-base performance of the contract. The notification shall be sent in writing on company letterhead to the CO or COR who will in-turn forward to the sponsoring unit's Security Manager, and shall include:

- a. Name, address, and telephone number of company representatives.
- b. The contract number and contracting agency.
- c. The reason for the contract (i.e., work to be performed).
- d. The location(s) of contract performance and future performance, if known.
- e. The date contract performance begins.
- f. Any change to information previously provided under this paragraph.

**4.8.1.2. Listing of Employees.** The Service Provider shall maintain a current listing of employees. The list shall include employee's name, and date of investigation if contract work involves unescorted entry to AF restricted

or other sensitive areas designated by the installation commander. The list shall be validated and signed by the company program manager or representative and provided to the CO, COR and sponsoring unit's Security Manager prior to the contract-start date. Updated listings shall be provided to the sponsoring unit's Security Manager within 7 working days when an employee's status or information changes.

#### **4.8.1.3. TRAFFIC LAWS**

4.8.1.6.1. The Service Provider and its employees shall comply with Sheppard Air Force Base Motor Vehicle Traffic Supervision, SAFBI 31-218.

4.8.1.6.2. Driver Distractions: In accordance with AFI 31-218(T), Paragraph 4-2c(3), vehicle operators on a Department of Defense (DoD) installation and operators of Government owned vehicles will not use cell phones unless the vehicle is safely parked or unless they are using a hands-free device. The wearing of any other portable headphones, earphones, or other listening devices (except for hands-free cellular phones) while operating a motor vehicle is prohibited. Use of those devices impairs driving and masks or prevents recognition of emergency signals, alarms, announcements, the approach of vehicles, and human speech. The potential for driver distractions such as eating and drinking, operating radios, compact disc players, global positioning equipment, and so on should only be done when the vehicle is safely parked, when possible.

#### **4.8.1.4. WEAPONS, FIREARMS, AND AMMUNITION**

4.8.1.4.1. Service Provider employees are prohibited from possessing weapons, firearms, or ammunition on themselves or within their Service Provider-owned or privately owned vehicle while on SAFB.

### **4.8.2. PHYSICAL SECURITY**

**4.8.2.1. Service Provider Access Requirements.** The Service Provider shall comply with all requirements and procedures IAW AFFAR 5352.242-9000, Service Provider Access to Air Force Installations, and local clause, Security Requirements. Service Provider employees shall comply with SAFB security requirements imposed by the Installation Commander at all times while on premises. The Service Provider shall obtain all necessary passes, decals, badges, or other items required for access to perform contract services. The Service Provider is responsible for accountability of all such media, which shall be surrendered to the issuing office or sponsoring organization upon completion or termination of the contract or upon termination of an individual's employment for the Service Provider. The sponsoring organization will immediately notify the Security Forces, Pass & Registration section if an update in Defense Biometric Identification System (DBIDS) is required for a Service Provider refusing to return issued media. The Service Provider or sponsoring organization must immediately report a lost or stolen access credential to the local SF and issuance office. If all identification is not provided, a portion of the final payment (to be determined by the Contracting Officer) will be withheld pending its submission. The Service Provider shall comply with all SAFB policies regarding entry to the installation, rules of the road, contingency operations compliance, and photography prohibitions. Service Provider employees are authorized entry to the installation for the purpose of work under this contract only, and are not authorized in other facilities or areas without prior Government authorization.

**4.8.2.2. Pass and Identification Items.** IAW AFMAN31-113, *Installation Perimeter Access Control*, All perspective employees (Non-Appropriated Funds, Civilian Services, Appropriated Funds, etc.), including personnel already in possession of an access credential, must be proofed and vetted by SF during in-processing to ensure proper fitness determination prior to allowing access and issuance of employment access credentials.

- A Defense Biometric Identification System (DBIDS) card is required for employees of contracts over six months in length. To receive a DBIDS card, the employee must provide a Sheppard AFB Form 151 to the 82 CES Security Manager and an unexpired, valid picture identification card or other credential, and accomplish an Installation Access Application with favorable results on the Criminal History Check.

**4.8.2.3. Reporting Requirements.** The Service Provider shall comply with AFI 71-101, Volume-1, Criminal Investigations Program, and Volume-2, Protective Service Matters, requirements. Service Provider personnel shall report to an appropriate authority, any information or circumstances of which they are aware may pose a threat to the security of DOD personnel, Service Provider personnel, resources, and classified or unclassified defense information. Service Provider employees shall be briefed by their immediate supervisor upon initial on-base assignment and as required thereafter.

**4.8.2.4. Physical Security.** If applicable, areas controlled by Service Provider employees shall comply with base Operations Plans/instructions for Force Protection Condition (FPCON) procedures, Random Antiterrorism Measures (RAMS) and local search/identification requirements. The Service Provider shall safeguard all Government property, including controlled forms, provided for Service Provider use. At the close of each work period, Government training equipment, ground aerospace vehicles, facilities, support equipment, and other valuable materials shall be secured.

**4.8.2.5. Entry Procedures to Controlled / Restricted Areas.** The Service Provider shall comply and implement local base procedures for entry to AF controlled and restricted areas. Service Providers will be responsible for procuring Controlled Area Training from the assigned restricted/controlled area monitors.

**4.8.2.5.1. Key control.** The Service Provider shall establish and implement key control procedures to ensure keys issued to the Service Provider by the Government are properly safeguarded and not used by unauthorized personnel. The Service Provider shall not duplicate keys issued by the Government. Service Provider employees shall not use keys to open work areas for personnel other than Service Provider employees engaged in performance of their duties, unless authorized by the CO.

**4.8.2.5.2. Lost Keys.** Lost keys shall be reported immediately to the COR. The Government replaces lost keys or performs re-keying. The total cost of lost keys, re-keying or lock replacement shall be deducted from the monthly payment due the Service Provider.

**4.8.2.5.3. Government Authorization.** The Service Provider shall ensure its employees do not allow government issued keys to be used by personnel other than current authorized Service Provider employees. Service Provider employees shall not use keys to open work areas for personnel other than Service Provider employees engaged in performance of their duties, unless authorized by the government functional area chief.

**4.8.2.5.4. Lock Combinations.** The Service Provider shall establish procedures ensuring lock combinations are not revealed to unauthorized persons. The Service Provider Program Manager will approve these procedures and ensure the procedures are implemented.

**4.8.2.6. Anti-Terrorism.** SAFB has an anti-terrorism program that is responsible for helping secure and protect the base and its personnel from terrorist attacks. As a Service Provider working on SAFB, you and your sub-Service Providers are required to obey all orders from Security Forces, and adhere to all security measures implemented as a result of Force Protection Condition changes (security posture changes). Additionally, you and your sub-Service Providers are expected to report to base security forces any suspicious activities, packages, or items you see while conducting work on SAFB. Suspicious activities could include personnel conducting surveillance of the installation, unauthorized personnel requesting access to the installation, or somebody asking

a lot of questions about the base. In an effort to help familiarize you, your employees, and sub- Service Providers about antiterrorism, SAFB has an antiterrorism binder with all of the pertinent information for awareness training available for mandatory review at the Pass and Registration Office located at the Visitor Control Center (VCC) at the Sheppard Main Gate (bldg 1127) and/or Missile Road Gate (bldg 1405) of SAFB, Texas. Also, if needed contact the installation Antiterrorism Officer (ATO) at 940-676-3460.

**4.8.3. PERFORMANCE OF SERVICE DURING CRISIS OR HEIGHTENED SECURITY.** In the event of crisis or heightened security continue performance as directed by the CO or COR. The contract price and delivery schedule may be adjusted to reflect any change of work that may be directed.

**4.9. SPECIAL QUALIFICATIONS.** The contract manager and alternate(s) must be able to read, write, speak and understand English, or an interpreter must be provided to work alongside the contract manager or alternate(s) at no additional cost to the Government.

#### **4.10. INTERFACES**

**4.10.1. Contact Information.** The Service Provider shall provide the names and telephone numbers of the Service Provider's on-site primary and alternate managers responsible for all requirements of the PWS to the CO and COR. The telephone numbers shall be for contact both during and after duty-hours.

**4.10.2. Interference of Government Activity.** Do not unduly interfere with regularly scheduled Government operational activities in the performance of contract requirements. In the event a Government supervisor so requests, temporarily cease work in the area and report the instructions, to include name of the Government person involved, to the CO or COR immediately by the most expedient means. Notify the CO or COR verbally of disputes with customers or other base Service Providers and follow- up in writing.

**4.12. CONTRACTING OFFICER (CO) AND CONTRACTING OFFICER'S REPRESENTATIVE (COR).** The CO will appoint a primary and alternate COR for management of the day to day activities of the contract. The identity, title, and authority of this representative will be provided in writing to the Service Provider after contract award.

**4.13. WORK CLEARANCE REQUESTS.** The Service Provider shall obtain an approved Work Clearance Request for all work which involves excavation including minor digging. Digging permits are available upon request. Other approvals may be required. COR will provide training at beginning of the contract on the procedure to submit the various base approval requests. Service Provider shall inform COR of any proposed excavation or welding work prior to beginning the permit process.

**4.14. SAFETY REQUIREMENTS AND REPORTS.** The Service Provider shall perform work and maintain equipment in a safe manner as required by Occupational Safety and Health Administration (OSHA) requirements. Provide a verbal report to the CO or COR as soon as possible of each occurrence of damage to Government property or an accident resulting in death, injury, occupational disease, or adverse environmental impact. Provide a completed copy of required Accident Investigation Reports to the CO or COR within five (5) calendar days of each occurrence.

**4.15. CHANGES IN SCOPE OF WORK / MODIFICATIONS.** Periodically, during the contract

performance period, the Government may have construction, renovation, demolition work, increase or decrease of quantities on contract or needs to be added to contract to be performed or omitted. If this occurs, the CO shall notify the Service Provider to cease performance within those areas. A modification to the contract shall be initiated to incorporate changes to requirements into the contract if warranted. Changes in landscaping in continuous maintenance areas may occur throughout the life of this contract, such as removal and/or placement of trees and shrubs.

**4.16. SERVICE PROVIDER REPORTING OF LABOR HOURS.** Section 2330a of title 10, United States Code (10 USC 2330a), requires the Secretary of Defense to submit to Congress an annual inventory of contracts for services performed during the prior fiscal year for or on behalf of the Department of Defense (DoD). Section 8108 of Public Law 112-10 provides for Air Force implementation of this requirement. The inventory must include the number of Service Provider employees using direct labor hours and associated cost data collected from Service Providers.

**4.16.1. Labor Hours Collection Site.** The Service Provider shall report ALL Service Provider labor hours (including subcontractor(s) labor hours) required for performance of services provided under this contract for Grounds Maintenance Services via a secure data collection site. The Service Provider is required to completely fill in all required data fields at <http://www.ecmra.mil> (Electronic Contractor Manpower Reporting Application).

**4.16.2. Reporting Schedule.** Reporting inputs will be for the labor executed during the period of performance for each Government fiscal year (FY), which runs 1 October through 30 September. While inputs may be reported any time during the FY, all data shall be reported no later than 31 October \* of each calendar year. Service Providers may direct questions to the CMRA help desk.

**4.17. Tobacco Use:** Executive Order 13058 and 41 CFR 102-74 establishes that it is the policy of the executive branch to establish a smoke-free environment for Federal employees and members of the public visiting or using Federal facilities. IAW AFI 40-102, tobacco use is prohibited on AF installations, except in Designated Tobacco Areas Tobacco includes, but is not limited to, cigars, cigarettes, electronic-cigarettes (e-cigarettes), stem pipes, water pipes, hookahs, and smokeless products that are chewed, dipped, or sniffed.

**4.18. Use of Facilities:** Service Provider employees are not authorized to use base service establishments such as the Shoppettes or Base Service Station, Base Exchange, Bowling Alleys, Golf Course, Base Pools, Theaters, or Base Commissary.

**4.18.1.** Service Provider employees are authorized to eat at any exchange food activity with the exception of government dining hall facilities.

**4.18.2.** Service Provider employees who are retired military, a military dependent or Guard/Reserves and in possession of a valid military identification card may use base services as authorized.

**4.18.3.** If an unauthorized individual is found to be wrongfully using base service establishments, their name will be forwarded to the Wing Commander for appropriate action. Actions can include, but are not limited to, being barred from base, etc.

**APPENDIX A – GROUNDS DESCRIPTION / WORKLOAD ESTIMATES**

PE ITEM #	DESCRIPTION	ESTIMATED QUANTITIES		ESTIMATED WORKLOAD (# TIMES ANNUALLY)	
		QUANTITY	UNIT	Growing Season (Mar – Oct)	Non- Growing Season (Nov – Feb)
1	Maintain Improved / Athletic Grounds - Base Proper	447.99	Acres	26-34	0-6
2	Maintain improved / Athletic Grounds - Lake Texoma	68.74	Acres	26-34	0-6
3	Mark irrigation for work requests	50.00	Acres	12 months	
4	Maintain / Operate portable irrigation systems	3.43	Acres	7 Months	
5	Maintain / Operate automatic and manual irrigation systems	83.05	Acres	7 Months	
6	Debris removal and policing - Base Proper	447.99	Acres	26-34	0-6
7	Debris removal and policing - Lake Texoma	68.74	Acres	26-34	0-6
8	Fertilize and aerate irrigated improved - Base Proper	83.05	Acres	2 months (Oct / Apr)	NA
9	Fertilize and aerate athletic, parade field and special needs grounds - Base Proper - Irrigated areas ONLY	19.42	Acres	4 times (Oct / Jan / Apr / Jul)	
10	Renovate lawns - Base Proper	3.00	Acres	3 acres	NA
11	Prune shrubs - Base Proper	2,000	Each	As needed by work order	
12	Maintain semi-improved grounds - Base Proper	184.34	Acres	26-34	0-6
13	Maintain semi-improved grounds - Lake Texoma	60.72	Acres	26-34	0-6
14	Maintain airfield grounds (BASH) - Base Proper	2197.84	Acres	(8 months) As needed to meet BASH standards	(4 months) As needed to meet BASH standards

15	Maintain airfield grounds (BASH) - Frederick Auxiliary Airfield	17.87	Acres	(8 months) As needed to meet BASH standards	(4 months) As needed to meet BASH standards
16	Unimproved grounds - Maintained - Base Proper	190.30	Acres	As needed by work order (Approx. 1 per year)	
17	Maintain flower/rock beds and related areas	17,544	Square Feet	12 months @ X2 per month	
18	Drainage Ditches	35,329	Linear Feet	12 months	
19	Prune trees - Base Proper	175	Each	As needed by work order	
20	Prune trees - Lake Texoma	10	Each	As needed by work order	
21	Remove trees - Base Proper	100	Each	As needed by work order	
22	Remove trees - Lake Texoma	10	Each	As needed by work order	
23	Remove shrubs - Base Proper	150	Each	As needed by work order	
24	Additional priced mowing - Base Proper and Lake Texoma	As needed	As needed	As needed by work order	



**APPENDIX B – AREA MAPS OR SITE PLANS**

<b>IMPROVED GROUNDS</b>				
<b>ZONE</b>	<b>ACRES</b>		<b>ZONE</b>	<b>ACRES</b>
14	4.48		56	4.02
16	2.49		57	3.34
17	3.34		58	3.76
19A	4.15		59	4.08
20	7.59		60	9.74
21	2.66		61	3.50
23	7.56		62	6.33
24	2.68		63	9.42
25	7.75		64	2.47
26	0.29		65	2.18
27	3.43		66	1.94
28	3.89		67	4.03
29	7.42		68	4.75
30	11.09		69	1.53
31	3.83		70	2.53
32	2.80		71	2.85
33	3.74		72	5.29
34	4.65		73	4.30
35	7.27		74	1.97
36	7.57		75	4.86
37	8.51		76	5.46
38	8.67		77	7.93
39	1.44		78	8.01
40	6.21		79	9.87
41	2.13		80	3.15
42	6.30		81	3.58
43	0.77		82	3.91
44	9.78		83	42.81
45	5.47		84	12.42
46	3.35		85	48.42
47	3.71		LT #1	9.34
48	13.51		LT #2	6.39
49	14.78		LT #3	3.98
50	4.03		LT #4	11.11
51	7.76		LT #5	8.92
52	13.66		LT #6	3.58
53	15.88		LT #7	7.56
54	4.95		LT #8	16.87
55	4.35		LT #10	0.99
<b>Total - Improved - Base Proper</b>				<b>447.99</b>
<b>Total - Improved - Lake Texoma</b>				<b>68.74</b>

<b>Grand Total - Improved - Base Proper &amp; Texoma</b>	<b>516.73</b>
All highlighted zones had changes in AC + or -. Zone changes identified in parenthesis	

**APPENDIX B – AREA MAPS OR SITE PLANS (CONTINUED)**

<b>ATHLETIC GROUNDS, PARADE FIELD AND SPECIALIZED AREAS</b>			
<b>ZONE</b>	<b>ACRES</b>	<b>ZONE</b>	<b>ACRES</b>
30 Athletic	2.99	76 Athletic	0.81
45 Athletic	3.23	84 Athletic	3.47
Lake Texoma #9	3.60	75 Athletic	1.13
<b>Athletic, Parade Fld, Specialized Areas - Base Proper - Irrigated</b>			<b>11.63</b>
<b>Athletic - Lake Texoma - Non-Irrigated</b>			<b>3.60</b>
<b>Grand Total - Athletic, Parade Fld, Specialized Area - Base &amp; Texoma</b>			<b>15.23</b>
All highlighted zones had changes in AC + or -. Zone changes identified in parenthesis			

**APPENDIX B – AREA MAPS OR SITE PLANS (CONTINUED)**

<b>SEMI-IMPROVED GROUNDS</b>				
<b>ZONE</b>	<b>ACRES</b>		<b>ZONE</b>	<b>ACRES</b>
17	12.26		45	12.33
19A	8.5		47	6.35
20	7.59		62	1.87
21	8.49		68	0.69
28	0.16		69	8.15
29	35.04		70	11.74
30	25.60		77	4.77
31	3.89		84	1.92
32	23.07		LT #1	8.45
33	7.02		LT #3	0.25
35	2.11		LT #6	1.86
36	6.24		LT #8	5.31
43	6.91		LT #9	44.85
44	5.73			
<b>Total - Semi Improved - Base Proper</b>				<b>184.34</b>
<b>Total - Semi Improved - Lake Texoma</b>				<b>60.72</b>
<b>Grand Total - Semi Improved - Base Proper &amp; Texoma</b>				<b>245.06</b>
All highlighted zones had changes in AC + or -. Zone changes identified in parenthesis				

**APPENDIX B – AREA MAPS OR SITE PLANS (CONTINUED)**

<b>AIRFIELD GROUNDS</b>				
<b>ZONE</b>	<b>ACRES</b>		<b>ZONE</b>	<b>ACRES</b>
1A	48.26		17A	46.13
2A	60.12		18	7.91
3A	51.48		18A	107.81
4A	83.84		19	15.25
5A	31.25		19A	125.62
6A	4.02		20A	58.69
6B	16.87		21A	61.32
6C	4.01		22	17.47
7A	126.91		22A	65.58
8	9.72		23A	55.48
8A	68.28		24	17.54
9A	52.68		24A	68.98
10A	76.88		25A	83.16
11A	34.10		26	19.51
12	6.39		26A	156.71
12A	45.73		27A	59.55
13A	34.12		28A	83.56
14	29.25		29A	74.22
14A	10.02		30A	61.52
14B	11.93		34	4.60
14C	10.15		39	2.80
15A	38.40		83	4.96
16	28.08		85	75.99
16A	40.99		Frederick Airfield	17.87
<b>Airfield - Base Proper</b>				<b>2197.84</b>
<b>Airfield - Frederick Airfield</b>				<b>17.87</b>
<b>Grand Total - Airfield - Base Proper &amp; Frederick Airfield</b>				<b>2215.71</b>
All highlighted zones had changes in AC + or -. Zone changes identified in parenthesis				

**APPENDIX B – AREA MAPS OR SITE PLANS (CONTINUED)**

<b>UN-IMPROVED GROUNDS - MAINTAINED</b>			
<b>ZONE</b>	<b>ACRES</b>		<b>ZONE</b>
25	29.58		33
27	27.36		36
28	69.20		37
31	29.27		84
<b>Un-Improved - Maintained - Base Proper</b>			<b>190.30</b>
<b>UN-IMPROVED GROUNDS - NOT MAINTAINED</b>			
<b>ZONE</b>	<b>ACRES</b>		<b>ZONE</b>
17	18.39		LT #1
21	172.26		LT #2
29	77.15		LT #3
30	58.81		LT #7
			LT #8
			LT #10
<b>Un-Improved - NOT - Maintained - Base Proper</b>			<b>326.61</b>
<b>Un-Improved - NOT - Maintained - Lake Texoma</b>			<b>291.43</b>
<b>Total - Un-Improved - Not Maintained</b>			<b>618.04</b>
<b>GRAND Total: Un-Improved-Base Proper &amp; Lake Texoma</b>			<b>808.34</b>
All highlighted zones had changes in AC + or -. Zone changes identified in parenthesis			

**APPENDIX B – AREA MAPS OR SITE PLANS (CONTINUED)**

<b>PLANT BED AND SHRUB MAINTENANCE</b>		
<b>LOCATION</b>	<b>SHRUB QUANTITY</b>	<b>SQUARE FOOTAGE</b>
Bldg 120 parking lot islands only	50	3239
Bldg 202	75	521
Bldg 204	45	445
Bldg 239 parking lot islands only	60	1200
Bldg 340	275	405
Bldg 400	426	2980
Bldg 740	125	1094
Bldg 840	225	1209
Bldg 1035	215	0
Bldg 1320	50	395
Bldg 1360 East side ramp	30	195
Bldg 1368	80	0
Bldg 1902 AOC and 1903 Tower	150	465
Bldg 2322 and Bldg 2320 South entrance by flags	125	2479
Main gate	294	2025
Missile gate / Bldg 1405 visitor center	282	530
Hospital gate	66	322
D Ave / 5th Street by plane	0	40
<b>TOTAL</b>	<b>2573</b>	<b>17544</b>

<b>SUMMARY OF GROUNDS CATEGORIES AND ACREAGE</b>		
<b>Category</b>	<b>Location</b>	<b>Acreage</b>
Improved Grounds	Base Proper	447.99
Improved Grounds	Lake Texoma	68.74
Athletic, Parade Field and Special Needs Grounds	Base Proper	11.63
Athletic Grounds	Lake Texoma	3.60
Semi-Improved Grounds	Base Proper	184.34
Semi-Improved Grounds	Lake Texoma	60.72
Airfield Grounds	Base Proper	2197.84
Airfield Grounds	Frederick Airfield	17.87
Un-improved Maintained Grounds	Base Proper	190.30
<b>GRAND TOTAL</b>		<b>3183.03</b>

### APPENDIX C – DATA REQUIREMENTS

The Service Provider is required to provide the data as indicated below to the COR. All reports, submittals, logs, and information provided to the Government shall be electronic and compatible with Microsoft Office such as Excel, Word, and others. “Compatible” means the document can be opened using the appropriate Microsoft Office component without any discernible effect on the text (e.g., loss of data) or the formatting of the document:

ITEM	DESCRIPTION	FORMAT	FREQUENCY
1	Service Provider’s Quality Control Plan	Service Provider Format	Original and changes as occurring
2	Work Performed/completed previous day	Mutually agreed upon format	Daily by 9:00 a.m. the following working day
3	Damage and Injury Reports	As required by law	Each Occurrence, within 5 days of incident
4	Irrigation System Maintenance and Repair Report	Service Provider Format	Included on work performed report
5	Hazardous Materials/Herbicides Inventory and Usage Report	Service Provider Format	Monthly within three (3) working days
6	Soils Report	Testing Laboratory Documentation	Samples collected in February and results due prior to approval and application of fertilizer
7	Employee Listing	Service Provider Format	Prior to contract start; W/I 7 working days upon employee status & information change
8	Contract Labor hours	Secure data collection site	For each fiscal year no later than 31 Oct
9	Green Waste Disposal Report	Service Provider Format	Monthly, within three (3) working days of the following month
10	ESOHMS Training	Certificate	Contract start date



## APPENDIX D – DEFINITIONS AND ABBREVIATIONS

### DEFINITIONS:

1. **Scalping** – Areas where the vegetation is mowed too close to the ground because of uneven ground underneath. When vegetation is mowed too close to the ground it frequently appears as an unsightly yellow scar. Typically scalping occurs when mowing on hill sides and around obstacles on uneven terrain.
2. **Xeriscaping** - A landscaping method that employs drought-resistant plants in an effort to conserve resources, especially water, and reduce yard trimmings.
3. **Pocket Urban Forests** – A landscaping technique of planting indigenous local trees and shrubs in clusters to cut down on large open areas of vegetation that are regularly maintained. This method would be practical on bases that receive a large amount of rainfall, and as a result do not irrigate.
4. **Seed Head Inhibitor** – An agent or combination of agents applied to vegetation areas prone to the production of seed heads to suppress the seed heads and reduce the frequency of mowing required.
5. **Rutting** – Visible marks left on the grounds from the wheels of mowing and edging equipment.
6. **Topping** – The reduction of a tree’s size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not an acceptable pruning practice.
7. **Lion’s Tailing** – The removal of an excessive number of inner, lateral branches from parent branches. Lion’s tailing is not an acceptable pruning practice.
8. **Types of Pruning:**
  - a. **Cleaning** – Selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches.
  - b. **Thinning** – Selective pruning to reduce density of live branches.
  - c. **Raising** – Selective pruning to provide vertical clearance.
  - d. **Reduction** – Selective pruning to decrease the height and/or spread.
9. **Branch Bark Ridge** – The raised area of bark in the branch crotch that marks where the branch and parent meet.
10. **Caliper** – The diameter of a tree measured at a point 6 inches above the ground line if the resulting measurement is no more than 4 inches. If the resulting measurement is more than 4 inches, the measurement is made at a point 12 inches above the ground line.

**11. Diameter Breast Height (DBH)** – The diameter of a tree measured at a point 4.5 feet above the ground line.

**12. Trimming** – Cutting of grass and other vegetation around grounds obstacles that prevent mowing.

**13. Grass/Vegetation** – the term “grass” as it relates to mowing, trimming, edging, and other grounds maintenance activities indicated in Appendices A and B includes grasses and/or other vegetation (such as weeds, etc.). There may be occasions when actual grasses are dormant or dead, yet weeds or other vegetation are still growing in the areas which necessitates mowing, trimming, edging, etc. of those non-grass vegetation types.

**14. Irrigation System** – consists of both the plumbing and electrical systems to irrigate vegetation. The plumbing system begins at, but does not include, the backflow prevention device and includes all components and piping downstream of the backflow prevention device. If no backflow preventer is present, then the plumbing system begins at, but does not include, the main supply valve and includes all components and piping downstream of the main supply valve. The electrical system begins at and includes the electrical controller and electrical controller enclosure, all wiring, solenoids, and any other electric components required for the plumbing portion of the system to operate as intended.

**ABBREVIATIONS:**

**AETC** – Air Education and Training Command

**AF** – Air Force

**AFI** – Air Force Instruction

**ANSI** – American National Standards Institute

**BASH** – Bird Aircraft Strike Hazard

**CDR** – Contract Discrepancy Report

**CFR** – Code of Federal Regulations

**CLIN** – Contract Line Item Number

**CO** – Contracting Officer

**COR** – Contracting Officer’s Representative

**DBH** – Diameter Breast Height

**DoD/DD** – Department of Defense

**DV** – Distinguished Visitor

**FAR** – Federal Acquisition Regulation

**HQ** – Headquarters

**IAW** – In Accordance With

**IPM** – Integrated Pest Management

**SDS** – Safety Data Sheet

**PGMS** – Professional Grounds Management Society

**POV** – Personally Owned Vehicle

**PPE** – Personal Protective Equipment

**PWS** – Performance Work Statement

**QTY** – Quantity

**SS** – Services Summary

**VHF** – Very High Frequency

**APPENDIX E – DRAINAGE DITCHES (Linear Feet)**

<b>SURFACE DRAINAGE DITCHES</b>				
<b>ZONE</b>	<b>LINEAR FEET</b>		<b>ZONE</b>	<b>LINEAR FEET</b>
2	4106.00		30	3055.00
4	1451.00		31	394.00
13	2550.00		44	3907.00
15	2296.00		45	1756.00
16	1212.00		46	468.00
21	1062.00		83	3497.00
28	2509.00		84	660.00
29	3949.00		85	2457.00
<b>Total - Base Proper</b>				<b>35329</b>

**APPENDIX F - IRRIGATION SYSTEM DESCRIPTION AND SYSTEM MAINTENANCE  
PROJECTED WORKLOAD DATA**

Zone	Bldg(s)	Location Description	System Type	ACRES
16	996	Technical Training	In-Ground Automatic	0.07
23	2320	Pilot Training	In-Ground Manual, Quick Coupler	2.68
23	2322	Pilot Wing Command	In-Ground Automatic	1.24
23	2333	Pilot Training	In-Ground Manual	0.31
25	2316	Pilot Group Command	In-Ground Automatic	0.92
25	2326	Pilot Training	In-Ground Automatic	2.95
30	Athletic	North Athletic Complex - North of Missile Rd	In-Ground Automatic	2.99
31	2113	Group Command / Supply	In-Ground Automatic (X2 clocks)	3.87
31	2118	Security Forces	In-Ground Automatic	0.09
32	1950	Technical Training	In-Ground Automatic	1.21
34	1902 - 1903	Air Operations and Control Tower	In-Ground Automatic	4.94
35	1900	Technical Training	In-Ground Automatic	0.03
35	1912	Lift Station	In-Ground Automatic	0.02
35	1917	Group Command / Technical Training	In-Ground Automatic	1.18
35	1923	Technical Training	In-Ground Automatic	2.36
36	1921	Technical Training	In-Ground Manual	0.50
36	1927	Technical Training	In-Ground Manual	4.20
37	1956	Technical Training	In-Ground Automatic	1.98
38	1025, 1035, 1045	Technical Training	In-Ground Automatic	1.14
40	960	Technical Training	In-Ground Automatic	0.79
41	922	Technical Training	In-Ground Automatic	0.01
42	DV route	D & E island (9th Ave to Missile Rd)	In-Ground Automatic	1.30
45	Athletic	North Athletic Complex - West of Bldg 1403	In-Ground Automatic	3.23
45	Gate	Missile Road Gate	In-Ground Automatic	0.16
45	Gate	Hospital Gate	In-Ground Automatic	0.44
50	DV route	D & E island (5th Ave to 1st troop walk)	In-Ground Automatic	2.00
50	DV route	D & E island (1st troop walk to 9th Ave)	In-Ground Automatic	1.08
56	882	Dormitory	In-Ground Automatic	4.02
58	540	Pitsenbarger Fitness Center	In-Ground Automatic	2.64
60	690, 699 Complex	Dormitory, Navy Admin	In-Ground Automatic	1.93
60	790 Complex	Dormitory	In-Ground Automatic	1.93

63	Parade Field	Parade Field	In-Ground Automatic, Quick Coupler	7.79
64	F-111 Park	F-111 Park	In-Ground Automatic	1.47
67	DV route	D & E island (1st Ave to 2nd Ave)	In-Ground Automatic	0.70
67	DV route	D & E island (2nd Ave to 5th Ave)	In-Ground Automatic	3.10
71	204	Burger King	In-Ground Automatic	0.29
71	237	Communication Sq	In-Ground Automatic	0.41
74	340	Sheppard Club	In-Ground Automatic	0.88
75	370	Lodging	In-Ground Manual	3.14
75	384	Levitow Fitness Center	In-Ground Automatic	0.79
76	260	Lodging	In-Ground Automatic	2.23
77	1670	Dormitory	In-Ground Automatic	2.22
78	195	Child Development Center	In-Ground Manual	0.25
78	196	Youth Center	In-Ground Manual	1.47
80	120	Commissary	In-Ground Automatic	1.42
82	Gate	Main Gate	In-Ground Automatic, Manual	1.21
84	Athletic	South Athletic Complex	In-Ground Automatic	3.47
			In-Ground Irrigation Total	83.05
75	Athletic	Athletic Field (Corner of Ave J and 4th Ave)	Portable	1.13
76	Athletic	Athletic Field (Corner of Ave I and 3rd Ave)	Portable	0.81
54 / 58	TC Park	Town Center Park - South of bldg 740	Portable	1.49
			Portable Irrigation Total	3.43
			TOTAL IRRIGATION SYSTEMS	86.48
These quantities are the government's best estimates and should not be construed as exact figures.				
All highlighted zones had changes in AC + or -				

**APPENDIX G – BACKFLOW PREVENTION ASSEMBLY CHECKLIST**

	CONTRACT # FA3020-19-XXXX	DATE: _____
1	Type of assembly tested:	
2	Manufacturer:	
3	Model Number:	
4	Serial Number:	
5	Size:	
6	Fire hydrant # and or description of area being irrigated:	
7	Is the assembly installed IAW manufacturer recommendation and the uniform plumbing code? (Yes / No)	
8	Test results: Initial test? Check valve #1? Check valve #2? And relief valve?	
9	Repairs and materials used, if applicable.	
10	Final test results (NOT required if repairs were not made):	
11	Test gauge make and model used to test device:	
12	Test gauge serial #, calibration date (Required annually) ____/____/____	
13	Backflow test statuses (PASS / FAIL)?	
14	Certified testers firm/company/address/phone number:	
15	Certified testers name and signature: _____.	
16	Certified testers license(s) number: _____.	
17	Test date:	
	REMARKS:	
	The above test is certified to be true at the time of testing.	

## APPENDIX H – ENVIRONMENTAL REQUIREMENTS

**5.1. Conformance with Environmental, Safety and Occupational Health Management System (ESOHMS):** The Service Provider shall perform all work in a manner that conforms to all operational controls as identified within the SAFB ESOHMS Plan. This plan is available to the Service Provider upon request. Components requiring Service Provider compliance are addressed below.

**5.1.1. Compliance with Environmental Laws:** The Service Provider shall comply, and assure that all SubService Providers comply, with all applicable AF, federal, state, and local laws, regulations, ordinances, policies and standards related to environmental matters. Typically environmental laws and regulations are codified and can be found in the Code of Federal regulations (CFR). The Service Provider shall also comply and assure that all SubService Providers comply with all applicable specific instructions, policies or references contained herein

**5.2. Environmental Management System Training Requirements.** In compliance with SAF/AQ and AF/A4/7 Memo, Conformance with AF EMS Requirements AF Installations, Service Provider personnel working on an AF installation where the AF has implemented its EMS must complete AF-provided initial EMS awareness-level training. The awareness-level training need only be completed by supervisory personnel.

**5.2.1. Prior to beginning any work on SAFB, the Service Provider shall ensure, and certify to the CO, that all on-site supervisory personnel have completed the ESOHMS training.**

**5.2.2.** Following completion of all applicable training modules, the on-site supervisory personnel shall provide an awareness briefing to all on-site personnel to ensure every employee is aware of the SAFB ESOHMS requirements.

**5.3. Hazardous Materials (HM):** The Service Provider shall comply with all local, state and federal rules and regulations dealing the handling, storage and use of HM. A product, chemical or substance is a HM if listed or described in 49 CFR 172.101 and 40 CFR 302-304. Additionally, all paints, thinners, adhesives, refrigerants, solvents, acids, petroleum products (such as greases, oils, or other lubricants), compressed gases or similar materials are subject to the same reporting and approval requirements as HM, defined above.

**5.3.1.** The Service Provider shall, to the maximum extent practicable, submit for approval product alternatives to HM. Their use is subject to disapproval if viable alternatives exist.

**5.3.1.1.** The Service Provider shall submit documentation specified below and obtain approval from the CO an authorization to use each HM intended for use on the project, or any other material



that has potential risk to pollute or cause environmental harm. Submissions must provide the Safety Data Sheet (SDS), container size, and other appropriate supporting documentation for each HM used. The Service Provider shall submit the documentation to and obtain from the CO any change in approved type or container size of HM.

The Service Provider shall track and report use of the HM on the job site. At project completion the Service Provider shall report to the CO quantities used, and remove all unused HM from SAFB. The Service Provider shall not dispose HM in base dumpsters, sewer inlets, grounds, or other unauthorized locations. The Service Provider shall remediate contamination resulting from unauthorized disposal of HM, as directed by the CO.

The Service Provider shall submit a request and obtain approval from the CO authorization to store HM on SAFB. The request shall explain Service Provider storage practices, which must comply with regulations, policies, plans, and procedures outlined within this SOW or as prescribed by the CO. The Service Provider shall store all hazardous materials in a Service Provider supplied trailer or storage unit, which shall be leak proof or contain secondary containment devices. All storage shall be secured when contract personnel are not present.

**Nuisance and Polluting Activity:** The Service Provider shall not dump, discharge, or otherwise dispose of any harmful, nuisance, or regulated materials (such as concrete truck washout, vehicle maintenance fluids, residue from saw cutting operations, solid waste and hazardous substances, etc.) into Bldg drains, site drains, streams, waterways, holding ponds or to the ground surface. The Service Provider shall not construct, place haul roads, stock piles, staging areas, or other project specific locations (PSLs) in or near waters of the United States. The Service Provider shall not place, nor discharge, solid materials, including Bldg materials into water of the state, except as authorized by the CO. The Service Provider shall, if directed by the CO, perform other tasks necessary to remediate contamination as a result of improper polluting activity.