U. S. AIR FORCE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Grand Forks Air Force Base, North Dakota

See INRMP signature pages for plan approval date

Template Version October 2018

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.

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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 10/03/2018 and supersedes the 2015 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 refer to the eDASH EMP Repository to ensure they have the most current version.

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.

Grand Forks Air Force Base – Integrated Natural Resources Management Plan Signature Approvals and Implementation Agreement

The Integrated Natural Resources Management Plan (INRMP) for the 319th Reconnaissance Wing, Grand Forks Air Force Base (GFAFB), North Dakota (ND), has been prepared in accordance with regulations, standards and procedures of the Department of Defense, the United States Air Force and the Sikes Act (16 United States Code 670a) in cooperation with the United States Fish and Wildlife Service (USFWS) and the North Dakota Game and Fish Department (NDGFD). This review and mutual agreement by signature of all parties for the base management of fish and wildlife keeps the INRMP current and in operation.

The accepted and proposed updates are minor edits to provide current information, or adjust timelines that do not result in changes to management goals and objectives that are substantively different than those previously agreed to by the cooperating agencies, and would not result in environmental consequences different from those in the existing INRMP.

The execution strategy for the INRMP Work Plan is coordinated with participating agencies, and the agencies have identified projects they have interest in executing. All other implementation will be performed through other authorized acquisition methods.

To the extent that resources permit, the USFWS, NDGFD and GFAFB, by signature of their respective agency, do hereby agree to a cooperative plan for the conservation, protection and management of fish and wildlife resources presented on GFAFB. By signature below, the certifying official acknowledges the 5-year and subsequent annual review and coordination of this INRMP.

Approving Official:

DREW BECKER Digitally signed by DREW BECKER
Date: 2020.04.03 15:16:54 -05'00'

Mr. Drew Becker
Field Supervisor
US Fish and Wildlife Service
Ecological Services Office
Bismarck ND

Date

Terry Steinwand

Mr. Terry Steinwand
Director
North Dakota Game and Fish Department
Bismarck ND

4/8/20
Date

Cameron Pringle Digitally signed by PRINGLE.CAMERON.S.1152628230
Date: 2020.07.10 09:40:45 -05'00'

Cameron S. Pringle, Colonel, USAF
Commander, 319th Reconnaissance Wing
Grand Forks Air Force Base

10-Jul-20
Date

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (INRMP) represents a commitment by the U.S. Air Force (USAF) to protect the integrity and value of the natural resources of Grand Forks Air Force Base (GFAFB). This INRMP has been developed in accordance with Air Force Manual (AFMAN) 32-7003, *Environmental Conservation,* the Sikes Act (including amendments), and the Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*. This INRMP supports the Department of Defense's (DoD) policy of managing natural resources to support the base mission while practicing the principles of multiple use and sustained yield. The INRMP provides GFAFB with a description of the base and the surrounding environment, and integrates an interdisciplinary approach to ecosystem management with planning for the military mission. The predominating goal for natural resources planning and management is:

> *Integrate project & management activities by sustaining, promoting, and restoring the health and integrity of ecosystems and enhancing the human environment at GFAFB, North Dakota.*

This INRMP is a fundamental part of the Air Force's ecosystem management program for GFAFB. The objective of ecosystem management on GFAFB is to maintain and improve the sustainability and biological diversity of unique native ecosystems while supporting the specific military mission at GFAFB. Goals were formulated from a comprehensive scientific analysis of regulatory requirements and the condition of natural resources on GFAFB. This plan identifies specific objectives and projects which, if implemented, contribute to the achievement of each goal. Further implementation of the INRMP will help ensure that GFAFB continues to implement a multiple-use approach to support present and future mission requirements while preserving ecosystem integrity. General predominant objectives of the GFAFB INRMP are:

- To outline the military mission and its effects on the natural resources on the base;
- To recommend guidelines for the management and protection of natural and cultural resources on the base;
- Protect native species and discourage non-native, invasive, noxious and exotic species;
- To monitor and maintain biological diversity and sustainability of mission training needs;
- To describe the physical characteristics of the base; and
- To recommend solutions or procedures available to assist in the resolution of natural resource and base mission concerns

Chapter 10 contains a work plan to implement the goals/objectives/projects of this document; this plan can be updated to document annual progress and funding. In addition, performance requirements are provided for each goal and they establish appropriate monitoring for project oversight. Monitoring the success or failure of INRMP projects provides an opportunity to use adaptive management on all proposed goals and objectives. Adaptive management can apply remedies to operational actions adversely affecting the function and composition of ecosystems. Monitoring the results can lead to a change in management strategy outlined in this plan and allows update of the base's Environmental Management System.

1.0 OVERVIEW AND SCOPE

This INRMP was developed to provide for effective management and protection of natural resources. It summarizes the natural resources present on the installation and outlines strategies to adequately manage those resources. Natural resources are valuable assets of the 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

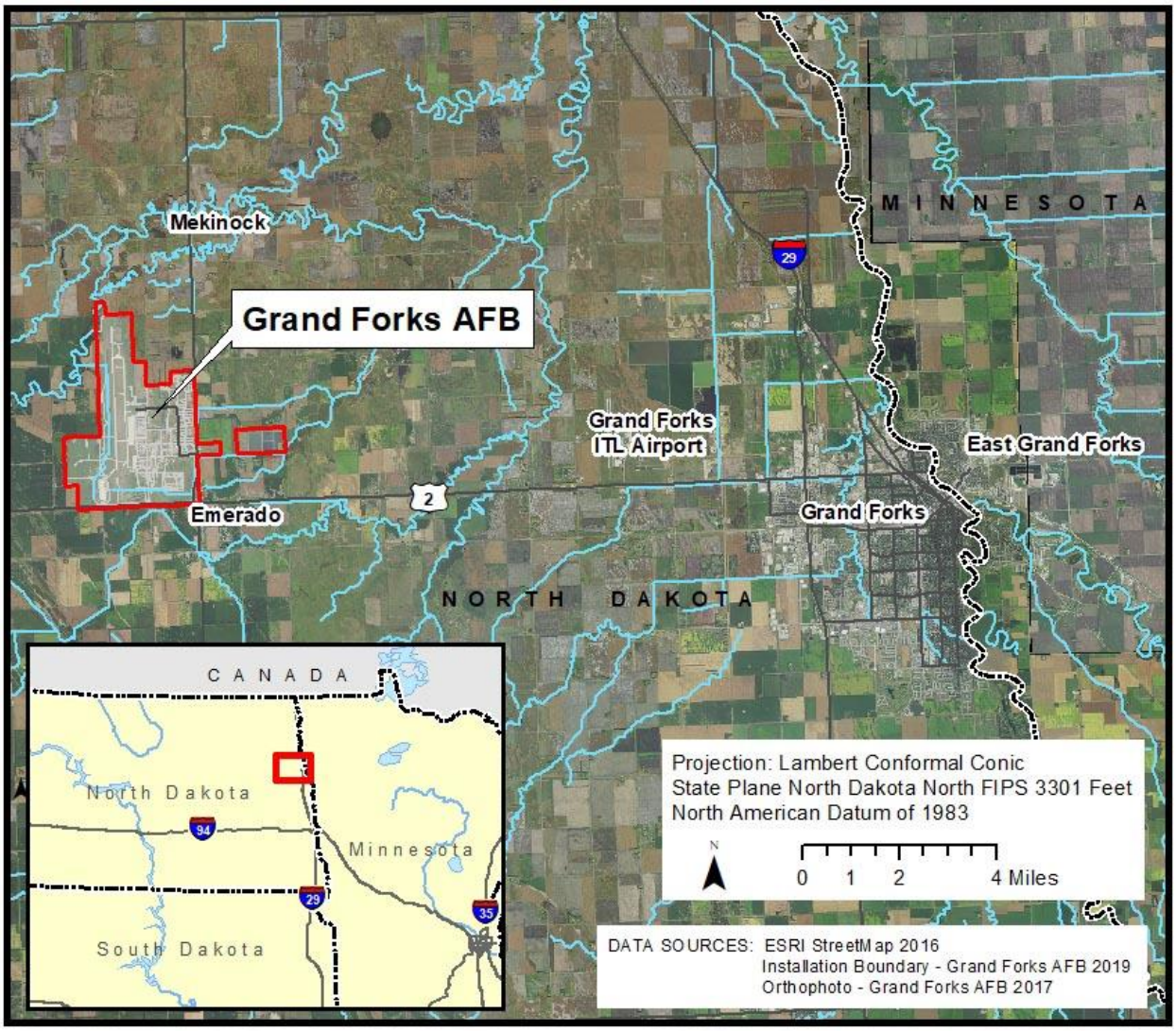
This INRMP has been developed for use by GFAFB in accordance with AFMAN 32-7003 – *Environmental Conservation*, AFPD 32-70 - *Environmental Quality*, and the provisions of the Sikes Act (16 United States Code [U.S.C.] 670a et seq.). GFAFB is located in eastern North Dakota, approximately 15 miles west of the City of Grand Forks, ND (See GFAFB Regional Location).

Integrated natural resources planning provides GFAFB with a description of the installation (e.g., location, history, and mission), information about the surrounding physical and biotic environment, and a guide to managing natural resources consistent with the mission requirements. Furthermore, the INRMP recommends various management practices, in compliance with Federal, state, and local standards, designed to mitigate negative impacts and to enhance the positive effects of the installation's mission on local ecosystems.

The purpose of the INRMP is to serve as guidance for natural resources management at GFAFB. This INRMP integrates all aspects of natural resource management, as well as the management of sensitive species, wetlands, watershed protection, fish and wildlife, outdoor recreation, and public access with the current military mission. Other studies relevant to these activities will be consulted and integrated into this plan. The INRMP enables managers to:

- Be aware of the past, present, and projected future condition of installation natural resources;
- Identify management issues and specific concerns for each type of natural resource present;
- Understand the installation goals and objectives for the protection and enhancement of these resources; and
- Ensure integration of the natural resource conservation program with the Air Force mission.

This approach to resource management attempts to balance human-centered multiple uses of the natural environment such as direct mission support, agriculture production, planning, safety, cultural resources and outdoor recreational uses with the preservation and sustainment of ecosystem functions and the conservation of biological diversity. When fully coordinated with appropriate federal and state agencies, this INRMP fulfills the Sikes Act (16 U.S.C. 670 et. seq.) definition of a cooperative plan.



GFAFB Regional Location

The goals and objectives of the plan will be reviewed annually by the INRMP tripartite and installation stakeholders, and updated annually. Major revisions may be required by the Air Force whenever planning or development projects and mission changes are proposed, if there are biophysical changes (climate change impact), or if there are federal threatened and endangered species changes that impact GFAFB. This plan is a dynamic document striving to integrate all aspects of natural resources management with each other and the rest of the installation's mission. Its goals and specific objectives must be given consideration early in the planning process to accommodate potential project and mission changes that may occur on the installation.

1.2 Management Philosophy

As part of its mission, the USAF has chosen to be a national leader in environmental and natural resources stewardship. The vitality of natural resources must be ensured in order to achieve its military mission. The USAF seeks to develop a program facilitating interagency collaboration and enhancing interagency resource stewardship while allowing training activities to occur, now and in the future. By

working together on an eco-regional scale, the USAF and its neighbors can practice collaborative ecosystem management, conserve biodiversity, and sustain the mission of GFAFB. As a steward of natural resources, GFAFB acknowledges its commitment to be a conservation leader for its designated areas.

Conservation is an integration or blending of natural resources management to maintain ecosystem integrity. This INRMP is a dynamic document maintained and adapted, as necessary, to reflect updated natural resources information and integrate conservation where applicable into the base mission. The development and implementation of this INRMP indicates senior management at GFAFB is committed to natural resources management as reflected in DODI 4715.03.

This INRMP is based on existing information on the biotic and abiotic environments, mission activities, and environmental management practices on GFAFB. Information was obtained from a variety of base documents, interviews with base personnel, and professional natural resource observations. Management issues and concerns as well as goals and objectives detailed in this INRMP were developed from an analysis of all the gathered information, and they were reviewed by base personnel involved with and/or responsible for various aspects of natural resources management. Throughout the INRMP, emphasis is placed on the role of GFAFB in maintaining healthy and functional ecosystems. Regulatory requirements such as those associated with the Endangered Species Act, the Clean Water Act, and other natural resource legislation were primary considerations in establishing management practices. However, in keeping with the guidance of AFMAN 32-7003, management recommendations moving beyond basic regulatory compliance were also developed to enhance ecosystem functioning as well as human use of the natural environment.

1.3 Authority

This INRMP is developed under, and proposes actions in accordance with, applicable Department of Defense (DoD) and USAF policies, directives, and instructions. AFMAN 32-7003, *Environmental Conservation*, provides the necessary direction and instructions for preparing an INRMP. Issues are addressed in this plan using guidance provided under legislation, Executive Orders (EOs), Directives, and Instructions including DoD Instruction 4715.03, *Natural Resources Conservation Program*; AFPD 32-70, *Environmental Quality*; and AFMAN 32-7003, *Environmental Conservation*. DoD Instruction 4715.03 provides direction for DoD installations to establish procedures for an integrated program for multiple-use management of natural resources. AFPD 32-70 discusses general environmental quality issues, including proper cleanup of polluted sites, compliance with applicable regulations, conservation of natural resources, and pollution prevention. AFMAN 32-7003 provides guidance on the preservation of cultural resources at USAF installations.

Appendix A -- Annotated Summary of Key Federal Legislation and Regulations Related to Design and Implementation of the INRMP summarize key rules and guidance used to create and implement this INRMP. State Laws and Regulations as well as installation specific policies shown at the table below further provide local governing rules used to create and implement this INRMP. Review of natural resources and implementation will follow the Natural Resources Playbook process for the update and monitoring of INRMPs.

Installation-Specific Policies (including State and/or Local Laws and Regulations)	
State of North Dakota Laws and Regulations	
Golden Eagle and Bald Eagle Protection, implemented	Prohibits take, killing, hunting, possessing, selling, purchasing, pursuing, shooting, disturbing, capturing, or destroying any golden

through North Dakota Cent.Code § 20.1-04-05	eagle, bald eagle, or any nest or egg thereof, within the state of North Dakota.
North Dakota Noxious Weed Law North Dakota NDCC § 4.1-47-02	The responsibility for control of noxious weeds is placed on many state and local governing bodies and certain private entities under the guidance and approval of the North Dakota Department of Agriculture.
North Dakota Century Code Chapter 55-11	It is therefore the public policy of the state of North Dakota that natural areas be acquired and preserved by the state and that other agencies, organizations, and individuals, both public and private, be encouraged to set aside such areas for the common benefit of the people of present and future generations. To make surveys and maintain registers and records of nature preserves and other natural areas within the state.
North Dakota Century Code Chapter 20.1	Protection of birds, game, fish, turtles, frogs, fur-bearers, aquatic nuisance species control, etc.
Installation Policies	
GFAFBI32-4004 Bow Hunting	The primary purpose of this instruction is to implement a hunting program on GFAFB. 16 U.S.C. 670 The Sikes Act, DoDI 4715.03, and AFMAN 32-7003 set forth policies and procedures for the management of base natural resources, including use of outdoor recreational hunting. Nov 2017.

1.4 Integration with Other Plans

The INRMP is coordinated annually with all internal and external stakeholders to ensure plan integration with other applicable base plans (IPMP, ICRMP, IDP and BASH).

2.0 INSTALLATION PROFILE

Office of Primary Responsibility (OPR)	Installation Commander has overall responsibility for implementing the natural resources management program. BCE is delegated to annually review and provide compliance with applicable federal, state, and local regulations.
Natural Resources Manager/Point of Contact (POC)	Name: Kristen Rundquist Phone: 701-747-4774 Email: kristen.rundquist@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	USFWS: Mr. Drew Becker NDGFD: Mr. Terry Steinwand
Total acreage managed by installation	5745
Total acreage of wetlands	412
Total acreage of forested land	78
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	No
Natural Resources Program Applicability (Place a checkmark next to each program that must be implemented at the installation. Document applicability	☒ Fish and Wildlife Management ☒ Outdoor Recreation and Access to Natural Resources ☒ Conservation Law Enforcement

and current management practices in Section 7.0)	☒ Management of Threatened, Endangered, and Host Nation-Protected Species ☒ Water Resource Protection ☒ Wetland Protection ☒ Grounds Maintenance ☒ Forest Management ☒ Wildland Fire Management ☒ Agricultural Outleasing ☒ Integrated Pest Management Program ☒ Bird/Wildlife Aircraft Strike Hazard (BASH) ☐ Coastal Zone and Marine Resources Management ☒ Cultural Resources Protection ☒ Public Outreach ☒ Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

GFAFB occupies approximately 5,745 acres, of which the USAF owns 5,150 acres and the remaining 595 acres are various easements, permits and licenses (see GFAFB Regional Location). The main cantonment area is centrally located in the rural portion of Grand Forks County in Mekinock and Blooming Townships near the town of Emerado, North Dakota. GFAFB has responsibility for some Geographically Separated Units (GSUs) under Air Combat Command (ACC) including a waste lagoon annex (320 acres) directly east of the main Installation Cantonment and a radar site. The Nashwauk Radar Site falls under the Federal Aviation Administration and is contacted regarding projects that may affect the radar site. All missile sites that historically received grounds maintenance support have been sold as well as the Defense Fuel Supply Point in the city limits of Grand Forks.

The Mark Andrews Airport serving the City of Grand Forks is located eight miles to the east of the installation. The City of Grand Forks itself is approximately 15 miles east of the base. Primary highway access to the base consists of U.S. Highway 2, along the southern boundary of the base, and North Dakota County Road B-3, that borders the base on the east.

The rich black fertile farmland and commerce associated with the rivers made the area attractive to early settlers and thus the Red River Valley became one of the leading agricultural regions of the world and the City of Grand Forks became a crossroad for trade between the plains of North Dakota and the forests of Northern Minnesota.

The north to south aligned airfield divides GFAFB. The main cantonment area is located on the eastern side of the airfield. All housing, medical facilities, community uses, and administration are located in this area. The primary land uses west of the airfield are the Grand Sky Mixed-use Aviation Business Park, fire training and open space. Mission and industrial uses are found in close proximity to the airfield within both sections of the base.

Installation/GSU Location and Area Descriptions

Installation/ Geographically Separated Unit (GSU)	Main Use/ Mission	Acreage	Addressed in INRMP?	Describe Natural Resource Implications
GFAFB	ACC	5,745	Yes	No Net Loss
GFAFB Waste Lagoon Annex	ACC	320	Yes	No Net Loss
Nashwauk Radar Site	ACC	1	No	NA

2.1.2 Installation History

GFAFB was established in 1956, when a 4,830-acre agricultural area was chosen as the site of the base, west of the city of Grand Forks, North Dakota. It was during this Cold War period the DoD announced plans to build an Air Defense Command (ADC) fighter-interceptor base in North Dakota. This new base was to also accommodate Strategic Air Command (SAC) bombers and tankers.

The 478th Fighter Group was activated at GFAFB in February 1957, serving as the host unit for the fighter-interceptor squadron, an air defense sector operation, and SAC units. Later during the same year, the ADC activated the Grand Forks Defense Sector of the North American Air Defense Command (NORAD) that, by 1959, was responsible for air space in three states and one Canadian province. During the same time NORAD was being established, the 4133rd Strategic Wing was activated as a SAC tenant unit at Grand Forks, accompanied by the first KC-135 Stratotankers in the early 1960s.

During 1960s, the 18th Fighter-Interceptor Squadron with F-101 Voodoo aircraft was transferred to GFAFB, and the 478th Fighter Group was redesignated the 478th Fighter Wing. In 1963, in response to receiving the first B-52 Stratofortresses and to the deactivations of the Grand Forks Air Defense Sector and the 478th Fighter Wing, the 4133rd Strategic Wing was deactivated and SAC assumed command of the base under the 319th Bombardment Wing (Heavy). With the new command, more changes occurred at the base, and the 804th Combat Support Group was activated, assuming host duty responsibilities. The nation's first Minuteman II intercontinental ballistic missile wing, 321st Strategic Missile Wing (SMW), was established at GFAFB, and began operations late in 1966 as part of the 4th Strategic Aerospace Division (STRAD).

Host duties for GFAFB were transferred to the 321 SMW in 1971 when construction began at the base to upgrade to Minuteman IIIs and the 804th Combat Support Group was deactivated. In the mid-1980s, the 319th Bombardment Wing phased out B-52s and began flying B-1B Lancer aircraft. The 42nd Air Division was transferred to GFAFB, assuming host duty responsibilities until 1991. In 1991, the 42nd Air Division was inactivated and the 319th Bombardment Wing renamed the 319th Bomb Wing assumed host unit responsibilities when GFAFB was transferred to the newly established Air Combat Command (ACC). The 321st Missile Group remained as a tenant unit with responsibilities for the Minuteman III missiles.

In 1993, the base was transferred to AMC. This change resulted in activation of the 319th Air Base Wing as host unit, and redesignation of the 319 Bomb Wing to a tenant unit—the 319th Bomb Group which, in turn, was deactivated in 1994 when the last B-1B was transferred from GFAFB. During the historic flood of 1997, GFAFB was ordered to minimal manning and then sent busloads of off-duty personnel to help fill sandbags, shore up dikes and eventually help rescue people stranded by floodwaters. Of the estimated 3.5 million sandbags that were used in the flood fight, it's estimated the base was responsible for filling approximately 800,000 bags. When a mandatory Grand Forks City evacuation was ordered, six shelters were set up on base for evacuees. At its peak, the base housed

approximately 3,500 evacuees, mainly civilians. Most people stayed in three aircraft hangar bays. Fire broke out in downtown Grand Forks at the height of the flood, and eleven buildings were destroyed. It could have been worse if not for the response of base firefighters who poured nearly 100,000 gallons of water on the fire from midnight to 9 a.m.

The 321st Missile Group was realigned in 1998. The Minuteman III missiles were transferred to Malmstrom AFB, Montana and Hill AFB, Utah. The last 321st Missile Group launch facility was demolished under the Strategic Arms Reduction Treaty (START) in August 2001. One Missile Launch Facility and one Missile Alert Facility near Cooperstown, ND, (roughly 50 miles southwest of GFAFB) were donated to the State Historical Society of North Dakota (SHSND) and converted into museums as part of the Ronald Reagan Minuteman Missile State Historic Site.

In September 2005, the Defense Base Closure and Realignment Commission (DBCRC) submitted findings to the President for approval by congress. The findings became law on November 9, 2005 (DBCRC 2005). In support of the 2005 Base Realignment and Closure (BRAC) directives, the DBCRC directed the realignment of GFAFB. Under these directives, GFAFB was earmarked to accommodate the emerging Remotely Piloted Aircraft (RPA) and other future missions.

In Feb. 2009, the Department of Homeland Security, Customs and Border Protection (CBP) became a tenant unit on the base. CBP began a Predator B remotely piloted aircraft mission that monitors the United States' northern border. The Predator B aircraft helped serve during the emergency of the 2009 and 2010 Red River floods in the Midwest. On 3 Jun 2019, CBP welcomed a manned aircraft group including a light helicopter (AS-350) and the Cessna 206 onto GFAFB stationed in hangar 602.

In late-December 2010 personnel assigned to Detachment 1, 9th Reconnaissance Wing (9 RW) began arriving at GFAFB. Their arrival signaled the operational status of the unit's Global Hawk (UAS) mission that operates from GFAFB. The arrival of personnel and equipment to support the RPA mission marked the fulfillment of the BRAC 2005 recommendation for future operations at GFAFB. Subsequently, all tanker aircraft were removed by December 2010. On January 7, 2011, the 18th Air Force to the Expeditionary Center formally assumed command of five Air Mobility Command units, including the 319th ARW at GFAFB. The 319th ARW changed its name to the 319th Air Base Wing (ABW) on March 1, 2011.

Detachment 1 received its first commander on 23 May 2011. The first Global Hawk UAS arrived at GFAFB on 2 June 2011. On Sep. 19, 2011, Detachment 1 was activated as the 69th Reconnaissance Group (RG), an Air Combat Command unit along with its 348th Reconnaissance Squadron and 69th Maintenance Squadron. The 69th RG flies and maintains Global Hawk remotely-piloted vehicles from GFAFB. The 69th RG had the first flight of a Block 40 RQ-4 Global Hawk from the flightline at GFAFB on Aug 7th, 2012. Previously, the 69th RG had only conducted flights in deployed environments. During July 2012, the 119th Air National Guard (ANG), 178th Reconnaissance Squadron moved onto the base to set up an MQ-1 Predator Launch Recovery Element Detachment, but in 2016 moved off installation and positioned all mission activity back to Fargo, ND.

During the summer of 2017, the 319th ABW was repositioned under the ACC from the AMC. Then on 28 Jun 2019, the 319th ABWs name was changed to the 319th Reconnaissance Wing (RW). Subsequently the 69th RG was transitioned to the 319 Operations Group (OG) and the following units belong to the 319th OG: Det 1 - Anderson AFB, Guam, Det 2 – Beale AFB, CA, OLA – Beale AFB,

CA, 7 RS Sigonella, Italy, 12 RS Beale AFB, CA, 319 Aircraft Maintenance Squadron, Det 1 Aircraft Maintenance Squadron - Beale AFB, CA, 319 OSS and 348 RS.

For additional Base history, see the GFAFB Integrated Cultural Resources Management Plan (ICRMP) (Associated Plans, Tab 4).

2.1.3 Military Missions

The 319th RW serves as the GFAFB host unit and maintains the base property. The 319 RW provides decisional advantage to our warfighters and national leaders through support of our Nation's Global Hawk High Altitude ISR mission. Ensures strategic command and control through operation of the Nation's High Frequency Global Communication System. Affords Combatant Commanders mission-ready Airmen anytime, anywhere. Provides Airmen and families of the GFAFB team, to include geographically separated units, with responsive, tailored, and mission-focused support. The mission is to fly, fight, and win in air, space and cyberspace.

GFAFB is home to a variety of units, missions, and other federal organizations. Base tenants and supported organizations include:

Tenant Organization	Natural Resources Responsibility
10th Space Warning System (Cavalier Air Force Station)	CAFS
Army Corps of Engineers Resident Office	GFAFB
Air Force Office of Special Investigation	GFAFB
Area Defense Council	GFAFB
Army and Air Force Exchange Service (AAFES)	GFAFB
Canadian NORAD Region Headquarters, Air Force Audit Agency, Great Plains Area Audit Office Team B	GFAFB
373rd Training Squadron Detachment 10	GFAFB
Four Air Force ROTC detachments (410, 400, 610, and 420) (not physically located on base)	GFAFB
Commissary	GFAFB
Balfour Beatty Community, Inc (Housing Lessee)	GFAFB
Grand Forks County (Grand Sky Mixed-Use Aviation Business Park	GFAFB
Custom Border Patrol	GFAFB

Table Listing of Tenants and Natural Resources Responsibility

2.1.4 Natural Resources Needed to Support the Military Mission

This INRMP reflects the commitment set forth by GFAFB to conserve, protect, and enhance base natural resources. Supported mission activities managed and conducted on base are varied.

There is a need for outdoor recreation on GFAFB that contributes to the physical and mental health of all Airmen living and working on the installation. Providing outdoor recreational opportunities to military personnel and their families is essential to maintaining well-being and fitness for duty. A small proportion of the base's overall land use is designated to outdoor recreation. Some opportunities include, paintball, horseback riding, BMX biking, golf, cross country sking, running, and camping. Natural Resources management in CE provides deer hunting opportunities and a nature trail. Several

tree shelterbelt areas are maintained to help with wind and snow control protecting trail areas used for multiple purposes. Security Forces needs open spaces for training events to be mission ready. The open spaces supported by natural resources on the base provide opportunities for training, solitude and mental well-being, fitness exercise, hiking, picnicking, wildlife viewing and hunting.

Wetland features are important to basic functions supporting the mission at GFAFB. Base wetlands provide important groundwater recharge to regional aquifers. Many users depend on aquifers for domestic and municipal wells, however GFAFB receives water from the City of Grand Forks. Wetlands can also provide separation of contaminants and sediments potentially contained in runoff and reduce flooding magnitude and severity by holding and retaining water.

2.1.5 Surrounding Communities

The area surrounding the base is rural. Three small farming communities, Emerado, Arvilla, and Mekinock are located within 5 miles of the base. Of these communities, only Emerado is incorporated. According to 2018 Census data for the City of Emerado (www.census.gov) the total estimated population was 453. The township of Arvilla's estimated 2018 population was 333 and Mekinock township was 2,462.

The city of Grand Forks, the third largest city in the state of North Dakota, is located approximately 15 miles east of GFAFB, with an estimated population of 56,948 (2018 US Census Estimated Population). The 2018 estimated population count for Grand Forks County is 70,770 (www.census.gov). Between 2010 and 2018, Grand Forks County population had a 0.9 percent increase in population. The 2017 estimated median household income for Grand Forks County is $51,410 (www.census.gov).

Cash crops in this agricultural region include sugar beets, soybeans, corn, barley, spring wheat, and oats. The valley ranks first in the nation in the production of potatoes, spring and durum wheat, and sunflowers. Manufacturing in the Grand Forks area is predominately agriculturally related food-processing industries.

The land adjacent to GFAFB is currently zoned in the Mekinock and Blooming townships and an Airfield reserve district. One exception is a piece of land directly south of the airfield zoned Airfield preservation district. Encroachment is not an issue around GFAFB. The base is continually working closely with the city of Emerado, directly south of the base, to minimize the potential of incompatible land uses impacting GFAFB flying operations.

According to the FY19 *Economic Impact Analysis*, total base personnel population was 4,421 (this number includes active duty, family members, DoD civilians, Department of Homeland Security, and non-appropriated fund contract workers). The base annual expenditures total approximately $91,008, 116. This include costs for structural and grounds maintenance, upkeep including snow removal, housing management, housing maintenance, medical contracts, utilities, etc. The base's military and civilian annual payroll was approximately $136,803,053 million with a total economic impact of $270,701,809.

2.1.6 Local and Regional Natural Areas

The Turtle River and associated riparian corridor that extends from Turtle River State Park past GFAFB and on eastward past Kellys Slough and is a tributary to the Red River is probably the most

important link connecting natural ecosystems in the GFAFB landscape. The river and riparian area runs through the northwestern corner of the Base. The river and its wooded banks serve as both habitat and as a corridor for native wildlife and plants, such as species of concern like the Dutchman's breeches, eastern prickly gooseberry, Canadian toad, creek heelsplitter, mapleleaf, common snapping turtle, and river otter.

Grand Forks County is composed of 1,437 square miles of land (U.S. Census Bureau). The land surrounding GFAFB not lying within the municipality of Emerado is under Grand Forks County's jurisdiction. Area landcover is a mixture of highly cultivated agricultural land, small town structures of Emerado, Arvilla and Mekinock, the turtle river riparian area with various CRP properties and other conservation type areas. Some agricultural areas are continuously tilled and planted in row crops. GFAFB is contained within Turtle River Watershed.

Several natural areas maintained by the state or federal government are located within 5 to 10 miles of GFAFB (see Natural Areas Surrounding GFAFB). In addition, the Grand Forks Prairie Project initiative has many partners (e.g., North Dakota Game and Fish, Natural Resources Conservation Service, local birding community, the University of North Dakota, North Dakota Natural Resource Trust, and U.S. Fish and Wildlife Service) joining efforts on approximately 10,000 acres of grasslands with interspersed wetland and wetland complexes in this area that strive to preserve and protect native and restored prairies. The largest area is the Kellys Slough National Wildlife Refuge (NWR) Greater Complex of more than 6,800 acres approximately 3 miles east of the base. This area serves as a major stopover point for migratory waterfowl and shorebirds, provides breeding habitat for several bird species, and is an excellent bird watching location enjoyed by the local community within the region.

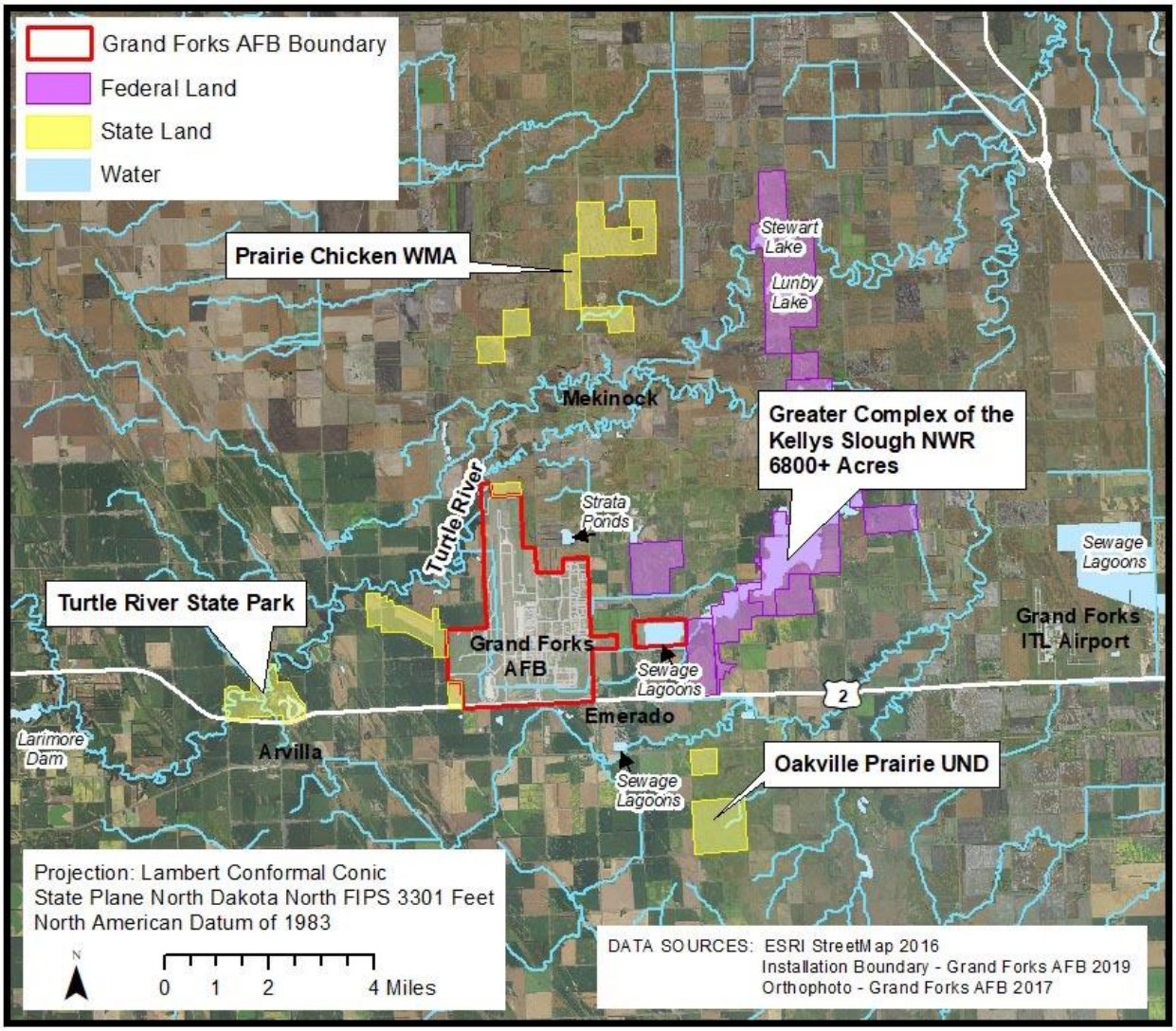
Treated lagoon-wastewater and storm water from eastern and southern portions of the Base discharge into a western reach of Kellys Slough NWR. The slough drains northeast to the Turtle River. On 20 July 2003, a shorebird conservation group recognized Kellys Slough NWR west of the city of Grand Forks as a regional site of the Western Regional Shorebird Reserve Network. The designation is a result of the huge numbers of shorebirds utilizing the refuge wherein an area must host at least 20,000 shorebirds annually or five percent of a species' flyway population based on peak counts. University of North Dakota (UND) research studies have shown the population at Kellys Slough NWR easily meets the minimum, providing habitat for 26,000 to 43,000 individuals of various species of shorebirds each year.

In addition to bird watching, other recreational opportunities at Kellys Slough NWR have traditionally centered on waterfowl hunting within the waterfowl production areas surrounding refuge lands. Interpretive panels are installed at two turnouts along the gravel road leading to the main parking area and at the elevated observation platform near the main parking area. A viewing telescope is also available for guests as well as a short trail system. No significant fisheries are present although bow fishing for carp is popular in the waterfowl production areas. Kellys Slough is managed by the Devils Lake Wetland Management District, located in Devils Lake, North Dakota.

UND owns a parcel of land adjacent to the western portion of the base in Mekinock Township. This parcel runs northwestward. DoD originally purchased this land when the base was first established and a northwest/southeast runway was planned in addition to the current north/south runway. When this alternate runway was not constructed, the land was sold to UND. Currently, the land between the base boundary and West 28th Street to the west has been left to revert to "naturalized" grassland. It was not

seeded nor is it managed for native tallgrass prairie species, and various invasive shrubs are scattered throughout the area. UND uses this land for field biology studies and leases the remainder west of West 28th Street for agricultural production.

Turtle River State Park, which is approximately 6 miles west of GFAFB on the Turtle River, contains approximately 784 acres of diverse habitat including upland hardwoods, wetlands, and prairie remnants. Turtle River State Park offers the greatest variety of outdoor recreational opportunities in the immediate GFAFB area. Facilities at the park include: campsites with hookups, picnic areas, a day-use lodge, woodland cabins for overnight stays, a visitors center, nature trails, interpretive programs, biking trails, a playground, cross-country skiing, and sledding. Fishing for stocked rainbow trout in the



Natural Areas Surrounding GFAFB

Turtle River is available from spring through fall. An abundance of small mammals, deer, waterfowl, and occasionally moose make the area ideal for wildlife viewing.

Larimore Dam Recreation Area and Campground is located southwest of Turtle River State Park. This facility on the Turtle River has a swimming beach and provides opportunities for boating, fishing, camping,

picnicking, and hiking. The Myra Arboretum is also a part of this outdoor recreational area, including 500 varieties of trees and shrubs.

Just north of Mekinock, there is Prairie Chicken WMA consisting of 3,471 acres. The WMA provides habitat not only for the uncommon and declining prairie chicken, but also for deer, sharp-tailed grouse, and other upland species. Its purpose is for the reestablishment of prairie chickens in the area. The prairie chicken, along with the sharp-tailed grouse, may be hunted by permit only in certain areas.

Oakville Prairie WMA consists of 160 acres and is located 3 miles east and 2 miles south of Emerado. This area provides prairie habitat for a variety of grassland wildlife.

2.2 Physical Environment

2.2.1 Climate

GFAFB has a humid continental climate. The Northern Plains are characterized by a wide temperature range and frequent, drastic weather changes. The climate is typified by short, humid summers with frequent thunderstorms, and by long, severe winters associated with almost continuous snow cover and ice storms. The spring and fall seasons are generally short transition periods. The average annual temperature for GFAFB is 39.85 degrees Fahrenheit (F), the average low temp is 28.8 degrees F and the average high temperature is 50.9 degrees F (US Climate Data 2020. The highest and the lowest daily temperatures ever recorded in North Dakota occurred in the same year and were 121 degrees F in July and -60 degrees F in February of 1936. The average low temperature is -3 degrees F occurring in January. The table below provides climate data for GFAFB (US Climate Data 2020).

Average annual precipitation recorded at GFAFB is 20.73 inches. Rainfall is generally well distributed throughout the year, with summer being the wettest season and winter the driest. The maximum rainfall recorded in a 24-hour period was 4.4 inches. An average of 34 thunderstorm days per year is recorded at GFAFB with some of these storms being severe and accompanied by hail and tornadoes. Winters are long with almost continuous snow cover. Average annual snowfall recorded at GFAFB is approximately 49 inches. Average monthly snowfall ranges from 2.0 inches in October to 11 inches in January and December, with the maximum monthly snowfall record over the past 60 years as 42 inches in 1966.

Climate Data for GFAFB, ND

Month	Avg High °F	Avg Low °F	Avg Precip in inch	Avg Snowfall in inch
Jan	17	-3	0.55	11
Feb	22	2	0.51	7
Mar	34	16	0.94	7
Apr	54	30	1.02	3
May	68	42	2.68	0
Jun	76	52	3.46	0
Jul	81	56	3.15	0
Aug	80	54	2.87	0
Sep	70	44	2.05	0

Oct	54	32	1.97	2
Nov	35	17	0.94	8
Dec	20	3	0.59	11

Source: 2020 US Climate Data | Version 2.3 | Retrieved 15 Jan 2020 from https://www.usclimatedata.com/climate/grand-forks-afb/north-dakota/united-states/usnd0147

In eastern ND, the prevailing winds are from the north to north-northwest during winter and from the south to south-southeast during summer. In the rest of the state prevailing wind directions are west, northwest, and north during most of the year although this depends somewhat on the season. During the summer winds blow from the south a significant amount of time which is how the moist air for our rainfall is transported. Average wind speeds range from 10 to 13 mi/hr which doesn't seem very high, but the air is rarely calm in the Northern Great Plains. Our windiest months are April and May while July and August are the calmest. Humidity is usually low during summer afternoons and dewpoint temperatures are rarely greater than 70° F. Dense fogs are experienced on average 10 to 13 days. Percent of possible sunshine is 70 to 75 percent during July and August, and averages about 60% for the entire year (ND State Climate Office – Retrieved 8 Apr 2020).

2.2.2 Landforms

GFAFB is located within the Central Lowlands physiographic province and lies on a large lake plain in the eastern portion of Grand Forks County. The topography of Grand Forks County and the entire Red River Valley is largely a result of the former existence of Glacial Lake Agassiz, which existed in this area during the melting of the last glacier about 12,000 years ago. The lake plain is characterized by somewhat poorly drained flats and swells separated by poorly drained shallow swales and sloughs. This physiographic region extends westward to the Pembina escarpment in the western portion of the county. The escarpment separates the Agassiz Lake Plain District from the Drift Plain District to the west. Glacial Lake Agassiz occupied the valley in a series of recessive lake stages, most of which were of sufficient duration to produce shoreline features inland from the edge of the lake. Prominent physiographic features of the Agassiz Lake Plain District are remnant lake plains, beaches, inter-beach areas, and delta plains. Strandline deposits associated with fluctuating lake levels are also present, and are indicated by narrow ridges of sand and gravel that typically trend northwest to southeast in Grand Forks County. The elevation of the lake plain district ranges from about 1,160 feet above mean sea level (MSL) along the escarpment to about 800 feet MSL in the northeast corner of the county. Specifically, base topography is relatively flat, with elevations ranging from 880-920 feet MSL, and averages about 890 feet MSL. GFAFB land slopes to the northeast at less than 12 feet per mile wherein local relief is typically less than one foot.

2.2.3 Geology and Soils

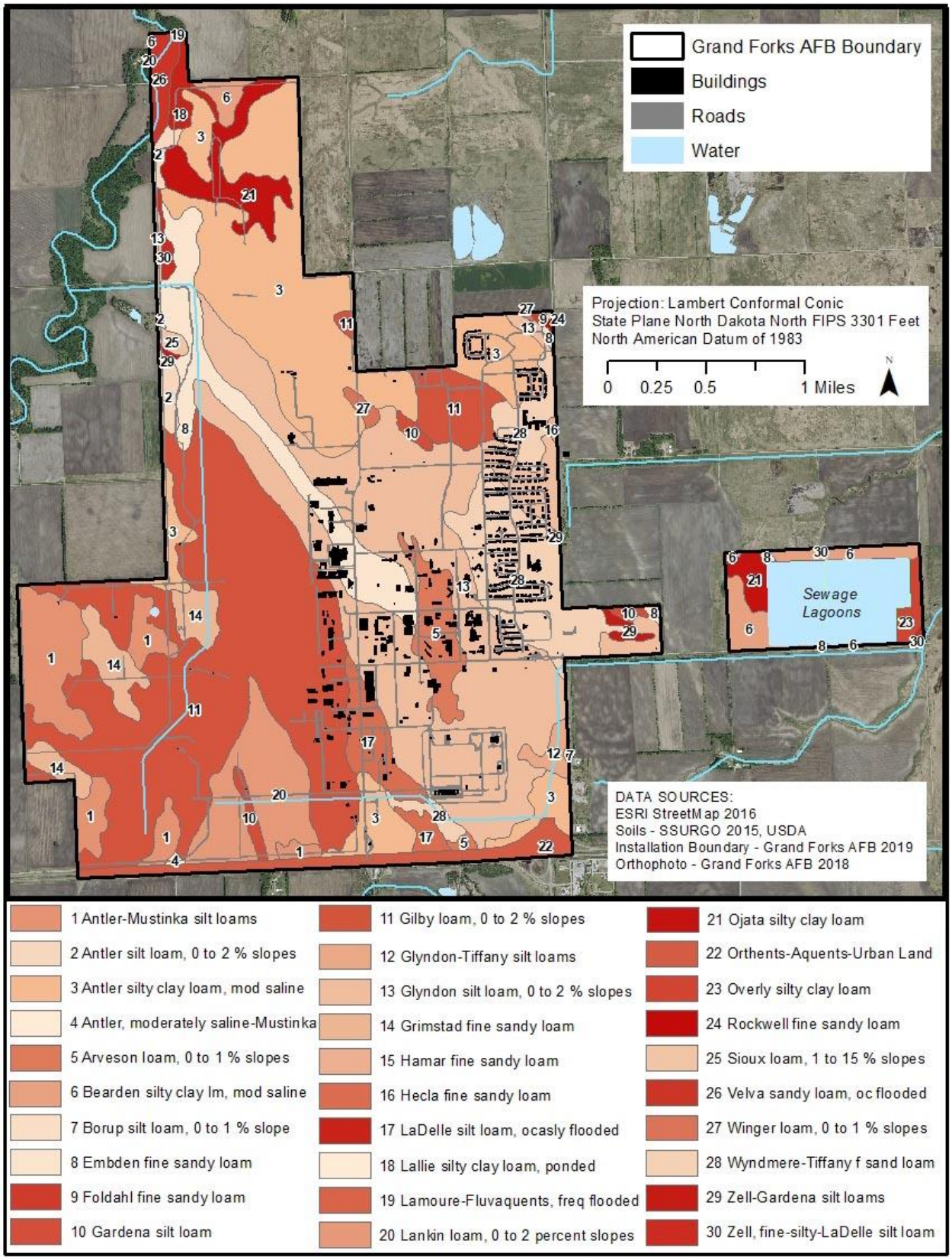
Grand Forks County is located near the eastern edge of the Williston Structural Basin. The bedrock strata, underlying the county, dip gently to the west toward the center of the basin.

Surficial deposits at GFAFB are comprised of late Wisconsin glacial drift, and are approximately 225 feet thick beneath the base. The glacial deposits beneath the Agassiz Lake Plain consist of up to 95 feet of clay and silt-rich lake deposits, underlain by glacial till containing isolated deposits of sand and gravel. The glacial deposits are underlain by the sandstones, siltstones, and shales of the Lower Cretaceous Fall River and Lakota Formations, which in turn are unconformably underlain by the limestones and dolomites of the Ordovician Red River Formation. The oldest and deepest rocks underlying the area are Precambrian igneous

and metamorphic granites, schists, and greenstones. The depth to these rocks is several hundred feet in eastern Grand Forks County, and increases rapidly to over 2,000 feet in the western portion of the county.

The soils at GFAFB generally formed in glaciolacustrine deposits overlying glacial till. Illustrated soil types present at GFAFB are available from the updated 2015 SSURGO (Soil Survey Geographic Database) information for Grand Forks County, North Dakota performed by the U.S. Department of Agriculture (USDA) Natural Resources Soil Conservation Service (see Soil Types Present at GFAFB). GFAFB has some soil types classified as prime and unique farmlands. The land designated as prime farmland could be subject to the requirements of the Farmland Protection Policy Act (FPPA) if currently in agricultural production; however, acquisition or use of farmland by a Federal agency for national defense purposes is exempted by section 1547(b) of the FPPA [7 U.S.C. 4208(b)]. As per Section 1540(c)(1) of the FPPA, "Farmland" does not include land already in or committed to urban development or water storage (which includes land with a density of 30 structures per 40-acre area, lands identified as an urbanized area on a Census Bureau Map, urban areas mapped with a "tint overprint" on USGS topographical maps, or as "urban-built-up" on USDA Important Farmland Maps). These areas would not be subject to the FPPA.

Soil types on the base may limit management options, as most of the soil associations are listed as partially hydric, and may have a higher water holding capacity. All of GFAFB is either in the Bearden-Antler association or the Ojata association. Both of these general soil groups are considered Saline soils. The Antler-Gilby-Svea and Bearden-Antler groups are suited to vegetative growth, although salinity, wetness, soil blowing, and boulders and stones may restrict cultivation. These soils are poorly suited to building site development and sanitary facilities due to wetness and slow absorption of liquid waste. The Glyndon-Gardens group is generally suited for sanitary facilities and building site development. The LaDelle-Cashel soil type is well suited for cultivated crops and supporting native hardwoods in level to gently sloping areas, and is generally unsuited for building site development due to flooding. The Ojata association is well suited for pasture or wildlife habitat, and is unsuitable for crops, due to high salinity. The Wyndmere-Tiffany-Arveson soils are typically used for cultivated crops. This group is generally not suitable for septic systems and building site development, with wetness due to a seasonally high water table being the main limitation.



Soil Types Present at GFAFB

2.2.4 Hydrology

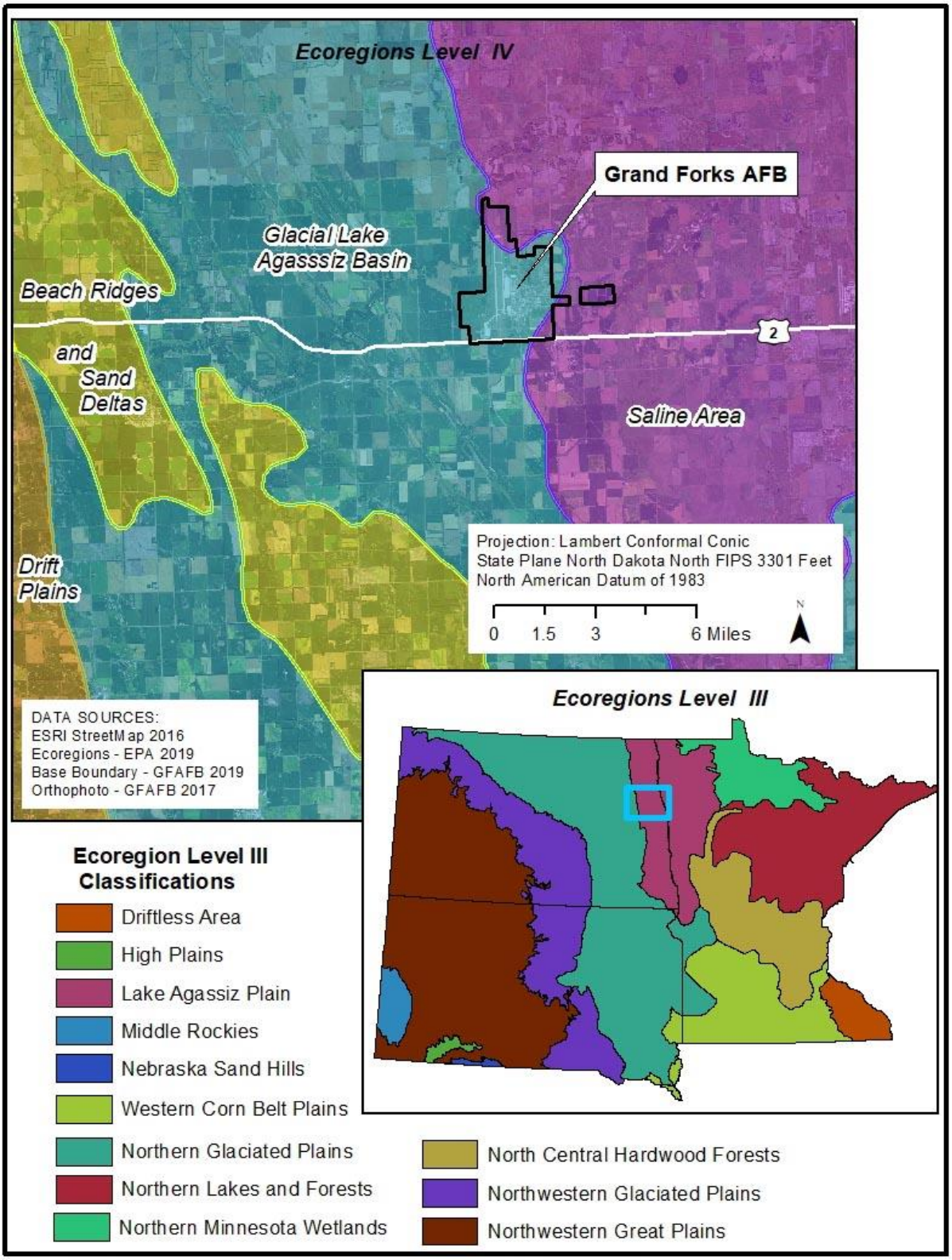
Other than the reflection pond by the dormitories, the fire training pit and the sewage treatment lagoons, there are no surface water impoundments on GFAFB. A bio-retention basin was constructed and installed for the Security Forces Squadron (SFS) complex. GFAFB continues to research the installation of rainwater gardens in urban areas on base. Rainwater gardens are an effective and "environment-friendly" management technique to increase infiltration and thus reduce stormwater runoff and will likely be developed on GFAFB for future surface water drainage collection. Underground concrete pipes and catchment basins collect storm water. Runoff is conveyed primarily by grassy drainage ditches located on the west, northwest, north, and southwest sides of the main base. The Northwest Ditch collects drainage from the northern portion of the base; the West Ditch drains runways on the west side; the South Ditch drains vehicle maintenance, power production, and fuel storage; and the North Ditch receives storm water from hangers, selected aircraft maintenance areas, and nonindustrial areas. The Northwest Ditch and the West Ditch drain to the Turtle River. The South Ditch and North Ditch flow to Kellys Slough NWR (see map in Section 2.3.5). Ultimately, all drainage from GFAFB flows into the Red River of the North.

The USFWS manages open wetland areas in Kellys Slough NWR primarily for the control of plant community succession for waterfowl habitat. Much of the drainage pattern at Kellys Slough NWR is managed through the manipulation of water levels by a multi-tiered diking system associated with the refuge's waterfowl production area. According to USFWS, a significant narrow-leaf cattail stand and bulrush community exists for nearly two miles beyond the base's wastewater treatment lagoons leading to Kellys Slough NWR. These nutrient-dependent communities gradually end where diluted brackish surface water is exposed to spring-fed saline groundwater.

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

According to USFS use of Bailey's Ecoregions, Eastern North Dakota and GFAFB is located in the Humid Temperate Domain. This domain is governed by both tropical and polar air masses. This domain contains forests of broadleaf deciduous and needleleaf evergreen trees. The variable importance of winter frost determines six divisions. GFAFB is located in the Prairie Division. The Prairie Division is typically associated with continental, mid-latitude climates designated as subhumid. Precipitation in these climates range from 20 to 40 inches per year, and is almost entirely offset by evapotranspiration. Prairie vegetation is dominated by tall grasses associated with subdominant broad-leaved herbs. Trees and shrubs are almost totally absent, but a few may grow as woodland patches in valleys and other depressions. Grasses are deeply rooted and form a continuous cover. Soils of the prairies are Mollisols, which have black, friable, organic surface horizons and a high content of bases. These soils are extremely productive. This division can be



Ecoregions Derived from Omernik (1987) and U.S. EPA

further divided. GFAFB resides in the Prairie Parkland (Temperate) Province (251). This Province covers an extensive area with alternating prairie and deciduous forest. The topography is mostly gently rolling

plains, but steep bluffs border a number of valleys. Vegetation in this province is forest-steppe, characterized by intermingled prairie, groves and strips of deciduous trees. This Province can be broken down into sections. GFAFB is located in Section 251A – Red River Valley (USFS 1994).

The EPA adopted a Roman numeral hierarchical scheme for different levels of ecological regions. Level I and Level II divide the North American continent into 15 and 51 ecological regions, respectively. At level III, the continental US contains 98 regions. GFAFB resides in the Lake Agassiz Plain Level III ecoregion (see Ecoregions Map). Glacial Lake Agassiz was the last in a series of proglacial lakes to fill the Red River Valley since the beginning of the Pleistocene. The Lake Agassiz Plain is comprised of thick lacustrine sediments underlain by glacial till. It is extremely flat and has fewer lakes and pothole wetlands than neighboring ecoregions. The historic tallgrass prairie has been replaced by intensive agriculture. The preferred crops in the northern half of the region are potatoes, beans, and wheat. Soybeans and corn predominate in the south. Sugar beets are grown throughout the region.

The Lake Agassiz Plain is broken down into Level IV ecoregions. GFAFB is partly located in the Saline Area of the Lake Agassiz basin. The Saline Area is approximately 348 square miles. In this area, salty artesian groundwater flows to the surface through glacial till and lacustrine sediments from the underlying beds of Cretaceous sandstone. Other saline areas occur along the tributaries of the Park, Forest, and Turtle rivers in northeast North Dakota. Salt-affected soils in the saline area reduce crop productivity. Land use where salinity levels are moderate, allows for sunflower, barley, sugar beets, and potato fields. Land cover in this area includes grazing land, and brackish wetland habitat (USGS NPWRC 2006).

2.3.2 Vegetation

Historic Vegetation Cover

The North Dakota Game and Fish Department (NDGFD) further delineated the EPA ecoregions of North Dakota into grassland landscapes. GFAFB lies within the Tallgrass Prairie landscape in the Bluestem Prairie Region, within the Red River Valley. Tallgrass and mixed grass prairie communities dominated this region and their deep roots formed a thick and continuous layer. Boundaries of the historic bluestem prairie are forested areas to the east and shortgrass plains to the west. Although the native vegetation of the prairie may have appeared uniform, its species composition was extremely diverse. Often referred to as the "true prairie," bluestem prairie typically occurs on flat and rolling plains.

Poorly drained soils in the vicinity of the GFAFB would have supported a prairie community dominated by little bluestem (Schizachyrium scoparium), green needle grass (Nassella viridula), big bluestem (Andropogon gerardii), prairie dropseed (Sporobolus heterolepis), porcupine grass (Stipa spartea), rough dropseed (Sporobolus clandestinus), and green muhly (Muhlenbergia racemosa). Forbs in this community would have included prairie coneflower (Ratibida sp.), leadplant (Amorpha canescens), stiff goldenrod (Solidago rigida), white prairie aster (Aster falcatus), and purple prairie clover (Dalea purpurea).

Bluestem prairie, once characteristic throughout the wetter areas of eastern North Dakota, has largely been converted to agriculture. This tallgrass community originally covered an area from near GFAFB southward into South Dakota and Nebraska. By the time the land for GFAFB was acquired by DoD, the entire area had long been under intense cultivation and no native tallgrass prairie remained. Suppression of fire has encouraged the invasion of shrubs and trees into what few prairie remnants remain.

Historically, trees and shrubs were limited in this region, although woodland patches were present in valleys, along rivers and other depressions. The forested area adjacent to the Turtle River running through the installation would have consisted of a mix of bottomland, hardwood forest in the floodplain transitioning

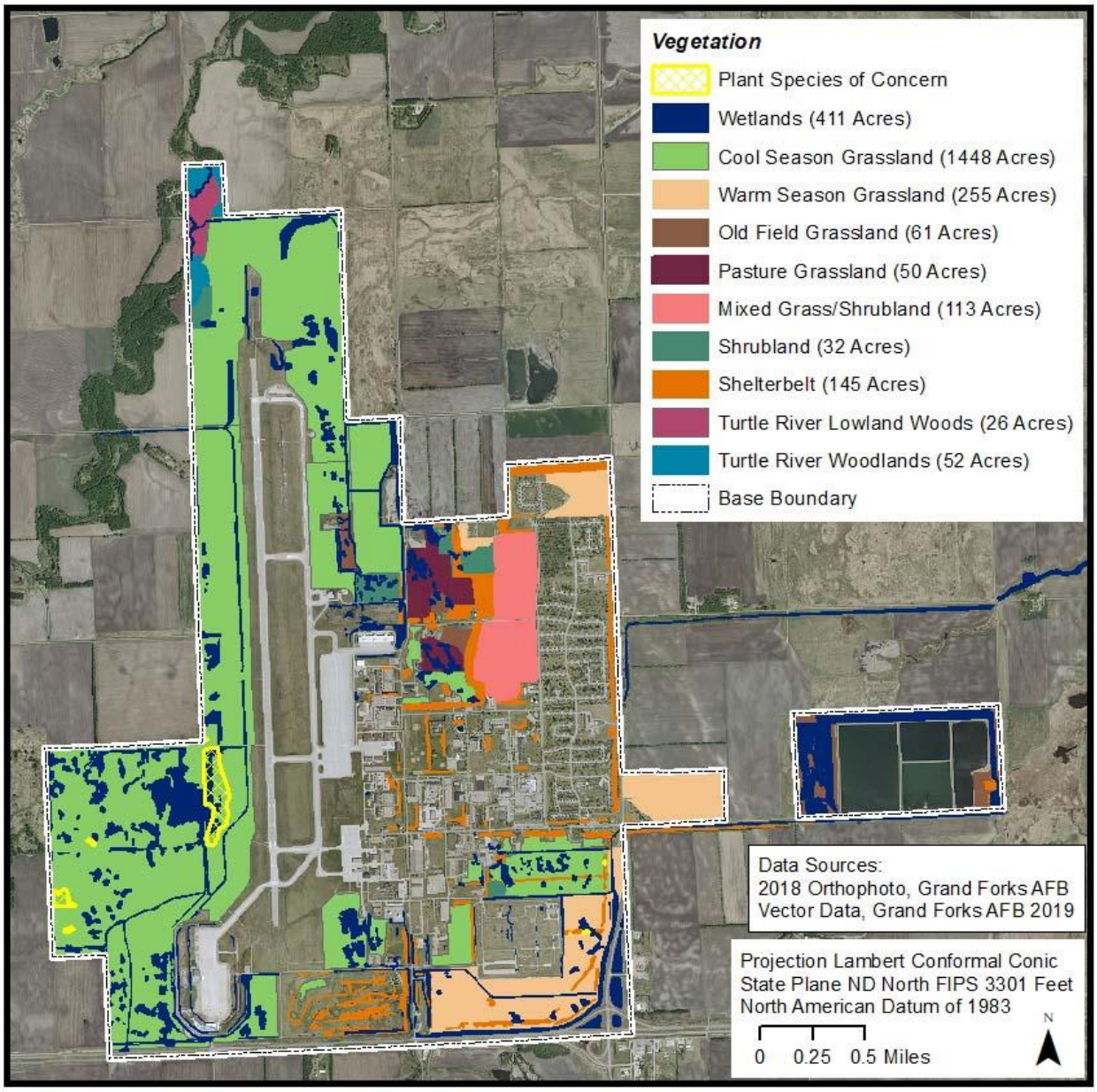
to tallgrass prairie on higher areas. Frequent fires that historically occurred on the prairie were prevented from spreading into riparian forested areas by the wetter soils. The forest would have been dominated by bur oak (Quercus macrocarpa), green ash (Fraxinus pennsylvanica), and American elm (Ulmus americana) on the higher, drier soils and cottonwood (Populus deltoides), basswood (Tilia americana), and boxelder (Acer negundo) in lower, wetter soils (Red River Regional Council 2006).

Current Vegetation Cover

When the initial construction of GFAFB was completed in the mid-1950s, most of the base was planted with a standard mixture of grasses established by DoD. Included in this mixture were three introduced grass species, smooth bromegrass (Bromus inermis), red fescue (Festuca rubra), and Kentucky bluegrass (Poa pratensis). Kentucky bluegrass and red fescue grasses are most common in improved or typical lawn-like areas. Where bromegrass dominates and is left uncut or unimproved, cool season grasslands now exist (see Vegetation Distribution Map). Some grassland areas have been improved with project dollars where present soil conditions and hydrology are conducive, and warm season grasses such as western wheat grass (Pascopyrum smithii), little bluestem (Schizachyrium scoparium), big bluestem (Andropogon gerardii), switchgrass (Panicum virgatum), sideoats gramma (Bouteloua curtipendula), and Indian grass (Sorghastrum nutans) have been established. There are no known prairie remnants on installation property, however some prairie index species (such as coneflowers) are found mixed in with both the cool season and warm season grassland areas to include various herbaceous annuals such as goldenrod.

The North Dakota Parks and Recreation completed an inventory of protected and rare plant communities on GFAFB in 1994. During this study, 142 total taxa representing less than a third of the known Grand Forks County plant taxa were identified. In 2004, BS Bioserv Inc. conducted a biological survey of the Base to update the survey done in 1994. A comprehensive list of all species recorded at GFAFB between 1994 and 2004 contains 225 species, 83 additional species were identified since the 1994 survey. The most recent biological survey update was conducted in 2008 and 2009. A total of 304 plant species were identified, including 145 new plant identifications. A total of 365 species of plants have been identified at GFAFB to date. Of these, seventy-seven are grasses or grass-like species preferring moist conditions, such as sedges and rushes. Two hundred and twenty-eight species are broadleaf species or forbs. Sixty tree or shrub species were identified, including shelterbelt (American elm, green ash, Russian olive), upland forest (oaks, dogwood), and wetland (willows) species. The most common tree and shrub species recorded during the surveys were non-native species. The dominant herbaceous species were non-native grasses. Four state-listed species of concern plants (White lady's slipper (Cypripedium candidum), Lesser yellow lady's slipper (Cypridpedium parviflorum var. parviflorum), Dutchman's breeches (Dicentra cucullaria), and eastern prickly gooseberry (Ribes cynosbati) were identified during the 2008 and 2009 survey (see Appendix D). The orchids were reinventoried and mapped most recently during the 2019 summer season.

A tree inventory shows that the base urban forest has 10,595 trees representing over 100 different species. Green ash and Colorado spruce are the most common species and comprise nearly half of the base tree population. Shelterbelts are common to North Dakota and the Great Plains and on GFAFB, as they provide wind protection, reduce maintenance costs involved with maintaining snow fence, assist with dust control, provide noise abatement, reduce erosion, improve water quality, provide a carbon sink, and provide habitat. GFAFB has approximately 7 miles and 145 acres of shelterbelts on the installation.



Vegetation Distribution Map

Shrublands account for 32 acres on the installation and are a transition area. Some of these areas have woody encroachment from invasive shrubs and trees. Some areas includes demolished housing land returned to vacant acres constituting a mixed/shrub grassland. The base also has approximately 50 acres of active horse pasture grassland.

The Federal Noxious Weed Act (7 USC 2801 et seq .) and Executive Order 13112 require federal agencies to monitor and control noxious weeds on federal properties. Control of noxious weeds is also mandated by North Dakota Century Code Title 63, and AFMAN 32-7003. The spread of noxious weeds remains a serious problem in North Dakota. Millions of acres are infested with noxious weeds costing the state's farmers and ranchers tens of millions of dollars. The North Dakota Weed Law requires landowners to control and prevent the spread of noxious weeds from their properties. The Grand Forks County Weed Control Board is responsible for administering the noxious weed control program in Grand Forks County.

Officially Listed Noxious Weeds

- Absinth wormwood (Artemisia absinthium L.)
- Canada thistle (Cirsium arvense (L.) Scop.)
- Diffuse knapweed (Centaurea diffusa Lam.)
- Leafy spurge (Euphorbia esula L.)
- Musk thistle (Carduus nutans L.)
- Purple loosestrife (Lythrum salicaria L., Lythrum virgatum L., and all cultivars)
- Russian knapweed (Centaurea repens L.)
- Spotted knapweed (Centaurea maculosa Lam.)
- Yellow starthistle (Centaurea solstitialis L.)
- Dalmatian toadflax (Linaria genistifolia)
- Saltcedar (Tamarix chinensis, T. parviflora, T. ramosissima)
- Kochia (Kochia scoparia)

Counties and cities in North Dakota have the option to add additional weeds onto a list for enforcement only in their jurisdiction. The county of Grand Forks, as well as the city of Grand Forks, added kochia to the individual city/county noxious weeds list for Grand Forks County. Six state-listed noxious weeds have been found on base: 1) Absinth wormwood, 2) Canada thistle, 3) leafy spruge, 4) musk thistle, 5) spotted knapweed and 6) kochia. Generally, Canada thistle and leafy spurge along with the invasive species perennial sowthistle are frequently found throughout the installation.

Future Vegetation Cover

Climate change impacts to grasslands and prairie bioregions include increased seasonal, annual, minimum, and maximum temperature and changing precipitation patterns. North Dakota's average temperature has increased faster than any other state in the contiguous United States, and the number of days with temperatures over 100°F is projected to double in the Northern Plains by 2050 (EPA 2016). Climate suitable for Great Plains grasslands is expected to remain relatively stable with some expansion to the north in Canada and retraction on the eastern and southern boundaries (Climate Change Resources Center 2020). Grand Forks AFB is located on the north and eastern edge of the Great Plains grasslands.

Changes in temperature and the length of the growing season may disrupt natural ecological processes and shift species' ranges (EPA 2016). Rising carbon dioxide concentrations are likely to increase the productivity of grasslands. Grassland community composition will likely be affected by climate change, but complex interactions make predictions problematic. Temperature increases can cause phenology changes such as flowers blooming earlier in the spring. Even small changes in the timing of plant development or animal migration can disrupt predator-prey relationships, mating behavior, or availability of food. Warmer winters may promote the growth of weeds and pests. Human-caused stress factors such as fragmentation of habitat will also make native species more vulnerable to climate change.

2.3.3 Fish and Wildlife

GFAFB is classified as a Category I installation as defined in AFMAN 32-7003 due to the geographic location of GFAFB to major flyways, the immediate adjacency to waterfowl production areas, national wildlife refuge and wildlife management areas, presence of undeveloped and outdoor recreation base

areas, leased agricultural leased-lands, prolific wetlands and base hunting program. Category I installations require an INRMP and have natural resources requiring protection and management, such as habitat for protected species, aquatic resources, or any habitat that is suitable for conserving and managing wildlife. A diversity of wildlife species are found on the installation nestled in a mixed-prairie and agricultural landscape. Wildlife species observed on base range from small mammals, such as mice, to larger ungulates, such as white-tailed deer.

Most undeveloped base areas and the geographically separated unit of the sewage lagoons east of the main cantonment with associated ditch easements provide varied habitats for wildlife. These areas contain a mixture of semi-native wetlands, grassland, shrubland, shelterbelts, and a riparian corridor. Wildlife such as hawks, owls, deer, songbirds, waterfowl, badger, fox, small mammals, and upland birds may occur in these areas. Migratory birds are common, including waterfowl, neo-tropical migrants, and grassland birds. A comprehensive list of mammals, birds, reptiles, mollusks, oligochaetes, and arthropods observed on GFAFB during the 1994, 2004, and 2009 biological surveys is available in the 2009 biological survey (see Appendix D, Fish and Wildlife Management). The eastern portion of the base is mostly developed and contains habitats and species typical of urban landscaped areas.

There are four major North American Flyways, the Atlantic, the Mississippi, the Central and the Pacific. Except along the coasts, the Flyway boundaries are not always sharply defined and overlap with one another. In North Dakota, the Mississippi, and the Central flyways overlap. The Mississippi Flyway lies within the majority of the state and is situated over the central and eastern portions. The Central flyway covers a smaller area of the state and is situated over the western/southwestern portion of the state. The Mississippi Flyway is used by a large number of ducks, geese, shorebirds, blackbirds, sparrows, warblers and thrushes. The flyways are used as routes between northern breeding grounds and southern wintering areas. The USFWS has established administrative boundaries to manage federal migratory bird resources. North Dakota is included in the jurisdiction of the Central Flyway Council that manages the Central Flyway.

Prairie pothole marshes spread from New York and New Jersey to North Dakota and eastern Montana, and are present on GFAFB. Formed by glacial action, they are greatest in abundance in moraines of undulating glacial till especially west of the great lakes in Wisconsin, Minnesota, and the Dakotas. They are a rich and very important habitat type particularly in regard to their value as the sole breeding habitat for many waterfowl species and stopover sites for resting and feeding for all types of birds. Not only are they very important to birds, but also they provide vital habitat to many other animals including shrews, voles, muskrats, mice and predators like weasels and foxes. Wetlands also function as a key player in the local prairie hydrologic system improving water quality, recharging groundwater, and holding back floodwaters.

Mammals

Mammals observed on base are primarily small mammals common to grassland habitats, including the plains pocket gopher (*Geomys bursarius*), the Richardson's ground squirrel (*Spermophilus richardsonii*), the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), the white-tailed jackrabbit (*Lepus townsendii*), eastern cottontail rabbit (*Sylvilagus floridanus*) and the striped skunk (*Mephitis mephitis*). All of these species are common to eastern North Dakota.

Both the red and grey squirrels are documented on base. The red squirrel was observed in the lowland forest/Turtle River habitat, while the grey squirrel was sighted near the landfill, during the 2009 biological survey. Six other small mammals were surveyed during the summers of 2014 and 2015 as part of a Bemidji State University student thesis including the Arctic Shrew, a state Species of Concern.

Common Name	Scientific Name	MSA Hay Field		Sunflake/Dakota		Prairie View	
		2014	2015	2014	2015	2014	2015
Meadow vole	*Microtus pennsylvanicus*	X		X	X	X	X
Deer/white-footed mouse	*Peromyscus sp.*			X	X	X	X
Meadow jumping mouse	*Zapus hudsonius*				X		
Arctic shrew	Sorex arcticus					X	X
Shrew	Sorex sp.						X
Ermine	*Mustela ermine*					X	

Table – Small Mammal Survey Results, 2014-2015

An AF wide acoustic survey for the Northern Long-eared Bat during the summer of 2016 identified 5 species of bats across 5 listening stations set-up on base (see Appendix C, Acoustic Surveys for the NLEB 2017). No long-eared bats were identified. The biological survey of 2004 also identified two species of bats, silver-haired bat and eastern red bat.

Species	Station					Overall Mean Activity Rate
	NDGF-01	NDGF-02	NDGF-03	NDGF-04	NDGF-05	
Big brown bat	18.2	1.8	4.5	4.7	20.6	**10.0**
Eastern red bat	16.3	10.3	7.9	12.8	21.6	**13.8**
Hoary bat	22.1	148.2	9.6	9.2	15.7	**41.2**
Silver-haired bat	151.6	25.2	54.0	45.4	153.1	**86.2**
Little brown bat	1.9	1.0	0.9	2.2	4.6	**2.1**
NLEB- no manual verification	0.1	0.0	0.0	0.0	0.2	**0.1**

Table – Acoustic Bat Survey Results, 2017

A significant mammal sighting at GFAFB during a biological survey was the discovery of two fisher (*Martes pennanti*) carcasses. This species has not been previously identified on-base and no living specimens were detected in the 2009 Biological Survey (see Appendix D). Historically, the fisher has been classified as extirpated from North Dakota since the early 1900s. However, these mammals have

been re-colonizing eastern North Dakota recently, due to an expanding population in Minnesota (Sovada and Seabloom 2005). Typically, these mammals have recently been found along river drainages and in riparian areas in North Dakota, as this species prefers forest habitat.

River Otter, a ND Species of Conservation priority, was identified on GFAFB was depredated in the west ditch during the spring of 2016. During that same time, two beaver were also taken in the west ditch and one snapping turtle was relocated to the Red River of the North. Beaver are somewhat common and were documented during the biological survey.

Red fox were observed near the horse pastures and munitions storage area during both the spring and summer 2008 surveys. Coyotes are occasionally observed in various base areas and frequently depredated under the authority of ND Game and Fish Department Resident Wildlife permit (see Appendix B) along with fox, skunk, squirrels and rabbits by base Safety.

The largest mammal most commonly observed on base during biological surveys is the white-tailed deer (*Odocoileus virginianus*). White-tailed deer can be found base-wide. Other large mammals observed include moose (*Alces alces*) and black bear. Moose were reported in 2004, 2006, 2009 and 2013-2015. In North Dakota, habitat for this moose is very limited and populations are small, although they have been documented in the Red River Valley, which is considered a secondary moose range.

Fish

GFAFB fish distribution and population is limited to available habitats of prairie potholes, drainage ditches, sewage lagoons and the Turtle River. Frequent low water levels within wetlands, drainage channels, the reflection pond, and stormwater detention areas are generally insufficient to support fish populations. The Turtle River, which runs through the northwestern corner of the base is the only area covered by this INRMP that supports game fish. Minnows are observed frequently in the sewage lagoons during sampling events, and have also been observed in the west ditch and south ditches. These minnows are likely dispersed through natural occurrences such as movement by birds. Despite these limitations, 14 species of fish were found and identified during the summer survey of 2012.

yellow bullhead *(Ameirus natalis)*	bigmouth shiner *(Notropis dorsalis)*
white sucker *(Catostomus commersoni)*	spotfin shiner *(Notropis spilopterus)*
johnny darter *(Etheostoma nigrum)*	sand shiner *(Notropis stamineus)*
striped shiner *(Luxilus chysocephalus)*	blackside darter *(Percina maculate)*
common shiner (Luxilus cornutus)	fathead minnow (Pimphales promeales)
golden redhorse (Moxostoma erythurum)	western blacknose dace (Rhinicthys obtuse)
shorthead redhorse (Moxostoma macrolepidotum)	creek chub (Semotilus atromaculatus)

Table -- Fish Species Documented on GFAFB

Game fish species that are known to occur in Turtle River, but were not identified in 2012 include rock bass, black bullhead, northern pike, channel catfish, rainbow trout, and brown trout. The NDGFD stocks the Turtle River with brown trout (Salmo trutta) and rainbow trout (Oncorhyncus mykiss) each spring upstream of GFAFB, near Turtle River State Park. The Turtle River is ranked as a Class 2 Fishery by the NDGFD. Class 2 indicates this river has appropriate habitat for spawning activity for the Red River fishery. This river is classified as a River/Creek community and is ranked S2 by the North Dakota Natural Heritage Program (NDNHP), indicating this community type is imperiled in the state because of rarity or because of other factors making it vulnerable. Non-point source pollution from upstream areas along the Turtle River has created water quality problems in the section of river in the GFAFB vicinity.

Amphibians and Reptiles

Through the herptile survey accomplished in the summer of 2012 and other ocular observation data collected by various biological surveys, there have been four amphibian species and four reptile species identified on base using available wetland and turtle river riparian habitats. The identified amphibians include the American toad (Bufo americanus), Canadian toad (Bufo hemiphrys), northern leopard frog (Rana pipiens) and wood frog (Rana sylvatica). The reptiles found were the common garter snake (Thamnophis sirtalis), plains garter snake (Thamnophis radix), painted turtle (Chrysemys picta) and the common snapping turtle (Chelydra serpentina). Tiger salamanders (Ambystoma tigrinum) and chorus frogs, although not documented to occur on base, are common prairie amphibians in the region and could potentially occur on base.

Birds

There are 238 bird species known to occur on GFAFB with 105 breeding species recorded (see Appendix I - GFAFB Bird Checklist). The sewage lagoons, located east of base, provide habitat for many species of waterfowl, black terns, shorebirds, swallow species and others. Additionally, the Turtle River area and shelterbelt system provide habitat for a variety of woodland bird species. The installations grasslands and wetlands provide habitat for grassland birds like the Nelson's sharp-tailed sparrow. Grasslands are recognized as one of the most threatened ecosystems. Grasslands are threatened by overgrazing, conversion to croplands, frequent haying, field abandonment and a lack of fire (both of which encourage woody growth), invasive plants, resource extraction, and urbanization. It is predicted climate change will exacerbate decreasing population trends in grassland birds that already are deteriorating, and many currently common birds likely will be added to concern/watch lists in the near future unless additional conservation measures are taken (2010 State of the Birds).

Base habitats displaying the greatest diversity of bird species are the sewage lagoons, and old field grasslands, with the sewage lagoons having the highest number of bird species and the most individual birds. The area with the fewest species observed was the golf course, where maintenance of the grounds limits the variety of habitat within that specific area.

The most common species observed utilizing the base include red-winged blackbird (Agelaius phoeniceus), mourning dove (Zenaida macroura), brown-headed cowbird (Molothrus ater), ring-billed gull (Larus delawarensis) and house sparrow (Passer domesticus). All of these species have been identified as common or abundant on the GFAFB bird checklist (GFAFB 2016). The base bird

checklist is derived from over 20 years of data to include surveys from 1994, 2004, 2005, 2006, 2008, 2010, 2011, 2014, 2017 and 2019.

The peregrine falcon was delisted from the federally threatened and endangered list in 1999. However, the falcon remains on the NDNHP, USFWS, and NDGFD species of conservation concern lists, and is protected under the MBTA. The falcon was observed loafing by the sewage lagoons in the fall of 2009 by a local birding enthusiast. The city of Grand Forks has hosted a breeding pair of peregrine falcons for the last several years. Given the nest fidelity of the breeding pair, the potential exists for other peregrine falcons to make stopovers at GFAFB.

Some record-firsts of bird species occurrences at GFAFB include the black-billed cuckoo (Coccyzus erythropthalmus), spring 2009 on the golf course, yellow rail (Coturnicops noveboracensis), fall 2008 in horse pasture, sharp-shinned hawk (Accipiter striatus), winter 2009 in residential area, and Bohemian waxwing, winter 2010 in residential area (29 individuals).

Bird game species can be hunted at various state and federal hunting areas near GFAFB to include Kellys Slough NWR. Typical game birds include waterfowl, ring-neck pheasant, Huns (Hungarian partridge or gray partridge); sharp-tailed grouse, mourning doves, wild turkey and sandhill cranes. The greater prairie chicken, along with the sharp-tailed grouse, may be hunted by permit only in the following areas: southeastern North Dakota east of State Highway 32, north of State Highway 11, and south of the Sheyenne River, and an area in Grand Forks County bordered on the east by the Red River, the south by US Highway 2, the west by State Highway 18 and the north by the Walsh and Grand Forks County line. Game bird species present on GFAFB include ring-neck pheasant (rare), mourning doves, and wild turkey (occasional). Only deer archery hunting is authorized on GFAFB.

Mussels, Invertebrates and Insects

Aquatic invertebrates are important in wildlife management and provide many food sources for wildlife species. One example is the non-biting midge, family Chironomidae. Adult midges often swarm in large numbers near lakes and streams, though swarms can occur at a considerable distance from the nearest water. Midge larvae are an important food item for all types of small fish, which in turn are preyed upon by larger fish like pike and walleye. Protecting water quality by reducing and preventing erosion with BMPs during ground disturbing activities, and by keeping vehicles out of bodies of water will ensure aquatic ecosystems are protected. During the surveys of 2007 and 2012, 42 invertebrate families have been collected and identified as occurring in base wetlands and the turtle river areas.

About 70 percent of mussels in North America are extinct or imperiled, compared to 16.5 percent of mammalian species and 14.6 percent of bird species. Pollution and sedimentation of rivers and streams, building of dams, pesticide use and invasive species all negatively impact mussel abundance, diversity, health and distribution. During the summer of 2012, GFAFB conducted a mussel survey and found four mussels in the Turtle River area. Mussels identified include fatmucket clam (*Lampsilis*

siliquoidea), White heelsplitter (*Lasmigona complanata),* Giant floater (*Pyganodon grandis) and* Mapleleaf (*Quadrula quadrula).* The invasive zebra mussel has been identified in the Red River on a bridge structure in Grand Forks in Oct 2015. The zebra mussel has not been identified in the Turtle River, a tributary to the Red River as of yet.

Only a few insect species are harmful or destructive to crops. Insects, spiders and others are a very important part of the food chain and provide food to many other species. Predatory insects like the preying mantis and the dragonfly are important in keeping the numbers of smaller insects and other invertebrates in check. Migratory birds rely heavily on insect and other invertebrate food sources all year long but this food source is especially important during breeding season when energy demand of youngsters is high. A comprehensive lepidoptera survey was accomplished during 2012 and 334 species (26 butterflies and 308 moths) were identified representing 14 new moth records for the state of North Dakota. The base does have habitat for the powershiek skipper (endangered) and the Dakota skipper (federally threatened) butterflies, however neither of these butterflies have been observed to date on the installation. As tallgrass prairie is successively lost, butterflies and other plants and animals obligate to the prairie ecosystem are rare and primarily restricted to prairie preserves.

2.3.4 Threatened and Endangered Species and Species of Concern

In 1972, President Nixon declared that conservation efforts in the United States aimed toward preventing the extinction of species were inadequate and called on the 93rd Congress to develop comprehensive endangered species legislation. Congress responded, and on December 28th, the Endangered Species Act (ESA) of 1973 was signed into law. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the U.S. Fish and Wildlife Service and the Commerce Department's National Marine Fisheries Service (NMFS). Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. "Candidate" species are those undergoing research and monitoring to determine if federal listing as Endangered or Threatened is warranted.

Federally endangered, threatened, candidate and critical habitat species listed for Grand Forks County (USFWS 2020) include the gray wolf (Canis lupus), whooping crane (Grus americana), Northern Long-eared Bat (Myotis septentrionalis), Red Knot (Calidris canutus rufa), Dakota Skipper (Hesperia dacotae), Powesheik skipperling (Oarisma powesheik, Rusty Patched Bumble Bee (Bombus affinis) and Sprague's Pipit (Anthus spragueii) a previous candidate species removed from listing in 2016. However, the Sprague's Pipit remains a ND level 1 Species of Conservation Priority. The USFWS has proposed to delist the gray wolf in March, 2019. The Red Knot was recorded on the City of Grand Forks sewage lagoon area through the Grand Cities Bird Club. The Rusty Patch Bumble was listed in 2017, but there is currently no available information for the species in North Dakota. Potential exists for this bee at GFAFB and studies are programmed to inventory this species on base.

Both the Dakota Skipper and Poweshiek Skipperling (Oarisma poweshiek) butterflies have been listed as threatened and endangered and are found in ND, however no critical habitat has been identified in Grand Forks County. Neither species has been identified in recent lepidoptera surveys.

The gray wolf is most frequently observed in the Turtle Mountains, and generally presence of wolves throughout North Dakota is sporadic with occasional dispersing of animals from Minnesota, Montana and Manitoba. The whooping crane is most often associated with shallow wetlands and occasionally upland areas during migration.

Most whooping cranes migrate through North Dakota each spring and fall, frequently with sandhill cranes. The current population of whooping cranes is believed to be approximately 505 individuals (USFWS 2018).

The northern long-eared bat has been sighted in North Dakota, but there is not yet any documentation of northern long-eared bats hibernating in the state. The bats have been found in areas like the Missouri and Little Missouri River forested corridors in small numbers. North Dakota is on the very western edge of their range. These bats are endangered primarily because of the fungus, white-nose syndrome that is spreading rapidly throughout their range and rapidly reducing the species population to dangerously low levels.

The Sprague's Pipit is uncommon in North Dakota and can be present here from mid-April to mid-October. Grand Forks County is on the eastern edge of the pipit range. Sprague's pipits require native grasslands of intermediate height and sparse to intermediate vegetation density, low forb density, and little bare ground but low litter depth. The Sprague's pipit has been found in Grand Forks County a few times. The bird was documented in 2008 and 2012 in the Oakville Prairie area SE of the installation.

None of these federally-listed T&E species have ever been documented on GFAFB during official biological survey events or identified from anecdotal accounts. No critical habitat for any of these species has been designated in Grand Forks County. However, Bald Eagles have been observed on the installation, and they are protected by the Bald and Golden Eagle Protection Act of 1940 (16 USC 668a-d).

The bald eagle (Haliaeetus leucocephalus) was formally removed on June 28, 2007 (50 CFR 17) from the federally threatened and endangered species list. The Bald Eagle is listed by the North Dakota Natural Heritage Program (NDNHP) as S1-Critically imperiled and as endangered by the North Dakota Chapter of the Wildlife Society. The bald eagle is also listed as a species of conservation concern by the USFWS, and a species of conservation priority by the NDGFD. In 2009, the NDGFD identified 66 active bald eagle nests in the state of ND as compared with zero nests in 1978 (Johnson 2010). In 2006, a UND study identified 48 bald eagle nests in the Red River Valley of ND (Johnston and Vandeburg 2006). The nests are primarily located near larger water systems to include the Red River of the North. While many bald eagles migrate through the state, several of birds now stay and breed once again in North Dakota. Bald eagles observed at GFAFB property have been documented harassing waterfowl near the sewage lagoons, occasionally seen feeding on road kill in the area, and observed hunting in the Turtle River riparian area. There is a documented bald eagle nest approximately two miles east of the installation on the west side of Kellys Slough NWR. During the 2009 winter bird survey (GFAFB 2010), a bald eagle was observed near the Turtle River riparian area. Golden eagles also have been observed migrating through the area during the spring time near the lagoons in 2009 and 2010. The Base currently holds a permit to harass Bald Eagle for Aviation Safety concerns.

Species	Scientific Name	Federal Status	Occurrence at GFAFB	Habitat
Rusty Patched Bumble Bee	Bombus affinis	Endangered	Unknown; GF County is in historical range	Variety of habitats, including prairies, woodlands, marshes, farms, parks and gardens

Powesheik skipperling	Oarisma powesheik	Endangered	No	Remnants of native prairie; No critical habitat in GF County.
Dakota skipper	Hesperia dacotae	Threatened	No; GFAFB Habitat Available	Tallgrass and mid-grass prairie with little bluestem, needle and thread, and purple coneflower. No critical habitat in GF County.
Northern Long-eared Bat	Myotis evotis	Endangered	No	Wooded areas, principally coniferous or oak forests, near rocky bluffs or cliffs
Red Knot	Calidris canutus rufa	Endangered, Migratory Bird Treaty Act	No; However, found on City Lagoons	Breeds in drier tundra areas, such as sparsely vegetated hillsides. Outside of breeding season, it is found primarily in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays.
Whooping Crane	Grus Americana	Endangered, Migratory Bird Treaty Act	No, potential migratory stopover	Extensive marshes with numerous shallow ponds dominated by bulrush, cattails, sedges and other aquatic plants.
Gray Wolf	Canis lupus	Endangered	No	diversity of habitats from the tundra to woodlands, forests, grasslands and deserts
Sprague's Pipit	Anthus spragueii	Was Candidate, Migratory Bird Treaty Act	No; However found in Oakville Prairie SE of base	Mixed grass prairie on uplands.
Bald Eagle	Haliaeetus leuccocephalus	Bald and Golden Eagle Protection Act	Yes	Diversity of habitats, forested areas, open water (Base holds harassment permit)

Table of Federal T&E Species

A 1988 amendment to the Fish and Wildlife Conservation Act mandated USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973." The ***Birds of Conservation Concern*** list was established to identify migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent USFWS highest conservation priorities.

North Dakota does not have a state endangered species act. North Dakota has two drivers for safeguarding rare and declining fish and wildlife species in the state. The first, is the state's Nature Preserves Act (NDCC 55-11) gives the North Dakota Parks and Recreation Department the responsibility to set aside a system of natural areas and nature preserves for the benefit of North Dakota citizens (NDPRD 2009). The NDNHP is administered under this act. The NDNHP uses an international system for ranking rare, threatened and endangered species within the state of North Dakota as well as those ranked throughout the world. Species are ranked on a 1 to 5 scale, primarily based on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors throughout the species range. The NDNHP develops a list of species along with their state rank

identified as critically imperiled (S1), imperiled (S2), or rare or uncommon (S3), apparently secure (S4) or secure (S5).

The second state program is the State Wildlife Action Plan (SWAP) of 2015 wherein a list of "Species of Conservation Priority" or SCP was developed are prioritized. One hundred fifteen species of birds, mammals, reptiles, amphibians, fish, and mussels were identified to one of three conservation levels. Level I species are those having a high level of conservation priority, Level II are those having a moderate level of conservation priority, and Level III are those having a moderate level of conservation priority but are believed to be peripheral or non-breeding in North Dakota (NDGFD 2015).

Species on all of the discussed conservation lists were cross-referenced with documented occurrences, if any, on GFAFB. Using these species of concern lists, a comprehensive GFAFB "Species of Concern" (SOC) and management list for plants, fish and animals was developed. This table also provides the current protection status, INRMP management priority and habitat preferences for each SOC. In many cases a single species is listed several times from each of the discussed programs. The complete table is available in Appendix C.

2.3.5 Wetlands and Floodplains

There are many wetlands, including potholes, in the Red River Basin. Wetlands found in the counties of Grand Forks, Barnes, Pembina, Ramsey and Nelson Counties are mostly associated with the USFWS-managed waterfowl production and conservation areas. Wetlands on GFAFB occur in drainage ways, low-lying depressions (natural or manmade) and potholes. Most wetlands found in the unimproved base areas are emergent marshes containing plants such as cattail (*Typha latifolia*), which grow with their roots submerged and their tops protruding from the water.

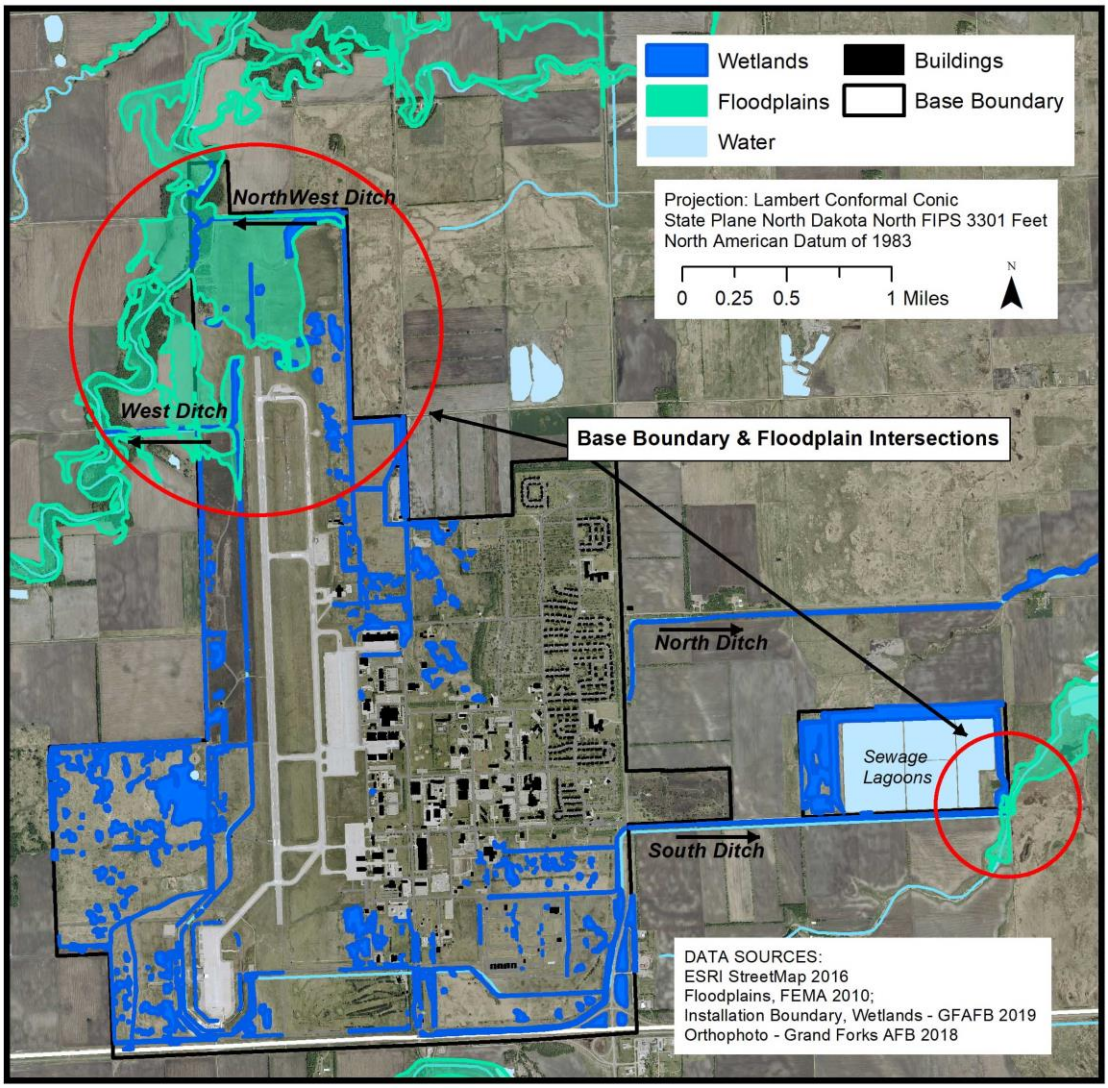
Several wetland surveys and delineations for various projects have been accomplished over the years and are available in Appendix H. Most installation wetlands are less than an acre in size, and are typical of the prairie pothole region extending from Iowa to central Alberta in Canada. Prairie potholes generally receive the majority of their water from snowmelt runoff in the spring with secondary sources emanating from warm season precipitation. GFAFB has approximately 412 acres of wetlands, wherein palustrine wetlands compose most of the total at 363 acres (see Wetlands and Floodplains Map). Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, emergents, mosses or lichens. There is a palustrine emergent/lacustrine wetland north of the base sewage lagoons of ~46 acres. Lacustrine wetlands are situated in a topographic depression or a dammed river channel and lacks trees, shrubs, persistent emergents, emergent mosses or lichens. The remaining 3 acres are riverine wetlands found in the northwest corner of the Base along the Turtle River. Riverine wetlands are those that occur within the river channel and are dominated by emergent vegetation.

The shape of the Red River Valley has resulted from past glacial activity. The floodplain is poorly defined, and floods are frequent. Flooding usually lasts only for a short period because of a vast network of drainage ditches and channelized streams. The Red River has several basin characteristics making it susceptible to flooding including an undersized main channel in relation to its floodplain, a small main channel gradient, and a northerly flow that synchronizes flooding with the progression of the spring thaw. Floods typically occur during late spring resulting from quick temperature rise, spring rains, snowmelt, and soil-moisture content held over from the fall.

An exceptionally deep snow pack resulting from a series of blizzards during the 1996-97 winter rapidly melted in heavy spring rains and unusually warm early spring temperatures. The result was unprecedented

flooding of the Red River Valley. The entire town of Grand Forks was evacuated as result of the floodwaters, which lingered in the area for several weeks before receding. GFAFB played a critical role in providing temporary shelter for the flood victims who were forced from their homes. Again in 2009, deep snow pack and heavy spring rains resulted in flooding of the Red River Valley. Although the town of Grand Forks was not evacuated, as flood waters did not overtop the levees, GFAFB continues to play a critical role in assisting with flood conditions.

GFAFB is located in the Turtle River watershed. The Turtle River flood zone occupies only a small section of the northwest corner of the Base. Vegetation along the river consists of narrow strips of woody shrubs, occasional forested areas, and aquatic plants occurring in shallow areas. The floodplain surrounding Kellys Slough runs near the southeast corner of the lagoons annex. The mapped 100-year floodplain of the Turtle River is located in the northwest corner of the installation and the mapped 100-year floodplain of Kellys Slough is located in the southeast corner of the lagoons parcel (see Wetlands and Floodplains Map).



Wetlands and Floodplains Map

2.3.6 Other Natural Resource Information

As discussed in the previous sections, GFAFB contains a variety of sensitive and natural resources. Natural resource surveys and inventories conducted at GFAFB include the following:

- **Grand Forks Air Force Base Final 2010 Biological Survey (1994, 2004 and 2010)**

In order to develop and periodically revise the INRMP, these biological surveys are conducted to establish and update the nature of the natural resources present on GFAFB. The focus of field surveys is typically a list of target species agreed upon by the Natural Resources Manager. The agreed upon approach to conducting these surveys is to specifically look for the target species, and generally note other species encountered in the process.

- **Butterfly and Moth Survey, Report, and Management Plan, Jan 2014.**

A preliminary list of the Lepidoptera of GFAFB, Grand Forks County, North Dakota and an overall management plan is presented. Individual management actions are presented for species which have restricted geographical ranges in conjunction with univoltine (one annual generation) phenology, and/or exposed larval feeding habits. Survey methods were Mercury (Hg) Vapor and Ultra violet light (UV lt.) trapping for moths and walking designated areas of favorable habitat along transects used in the 2008/2009 biological survey for butterflies (GFAFB 2010). Aerial netting and sweep net sampling was used for butterflies and larvae. Visual identifications of butterflies were employed whenever possible for species in the field to minimize the potential take of rare or endangered species. Field trips were scheduled to optimize locating such species. A total of 334 species of Lepidoptera were found within the study area, of these, 165 species were represented by single specimen collections and 14 species (all microlepidoptera) represented new records for the state of North Dakota.

- **Aquatics and Herptile Survey, Report, and Management Plan, Oct 2013.**

This report and management plan provides a comprehensive species inventory for aquatic species and herptiles. During the 2012 survey a total of 4 mussels, 14 fish, 3 amphibians, 2 reptiles, and 29 other aquatic invertebrates were observed. These results were used to develop this biological inventory along with management recommendations that ensure protection of aquatic species of concern (mapleleaf mussel, Canadian toad, northern leopard frog and snapping turtle) identified and their associated habitats.

- **Species of Concern Management Plan, Dec 2011**

This Species of Concern Management Plan (SOC) Management Plan was prepared to ensure that the GFAFB INRMP complies with federal and Air Force regulatory guidance. The GFAFB SOC Management Plan covers all species of concern found on GFAFB including species federallylisted for protection as endangered or threatened under the Endangered Species Act, candidate species for federal protection, North Dakota threatened or endangered species ranked by North Dakota Natural Heritage Program, species of conservation priority listed in the North Dakota Comprehensive Wildlife Conservation Strategy, Partners in Flight Land Bird Conservation Plan Watch List, and U.S. Fish and Wildlife Service Birds of Conservation Concern for the Prairie Pothole Bird Conservation Region.

- **Wetland Delineation and Assessments (2000, 2004, 2006, 2008, and 2012)**

These assessments identified, located, mapped, and updated the wetland resources across the entire GFAFB to create a comprehensive GIS Wetland layer. The map created and information gathered in these efforts is used in base operation, management and development decisions. Wetlands identified are classified using the Cowardin system. Some were delineated using the USACE wetland manual, however not all. Information collected in these surveys was integrated into the GFAFB GIS and Geobase systems.

- **Wetland Management Plan, Dec 2013**

All previous wetland assessments and information was addressed and packaged in a comprehensive Wetland Management Plan in 2013 detailing the inventory of wetland areas, procedures and best management practices.

- **Migration and Breeding Bird Surveys on Grand Forks Air Force base, ND (May 2006, May 2008, April 2010, Feb 2014, and 2017)**

The focus of these surveys is to identify individual species of birds using GFAFB and surrounding communities and to determine relative abundances of each species. In addition, any potentially important habitats for migrating and breeding birds are identified and an effort is made to initiate baseline data to detect any bird population trends. The reports accompanying these surveys categorizes and documents the conservation priority status for migrating and breeding birds found on the installation and provides recommendations for maintaining or improving habitat for migrating and breeding birds.

- **Winter Bird Counts (2006-2013, 2015, 2017, 2019)**

The Winter Bird Counts are modeled after a nation-wide volunteer effort called the Christmas Bird Counts. The Christmas Bird Count is an annual survey organized by the National Audubon Society in which thousands of volunteers conduct a bird census between mid-December and early January. Data collected are reported and used to study bird population trends in North America. The Winter Bird Counts are used to determine what species are wintering at GFAFB. Combined with other Christmas Bird Counts in the region, the information gathered in the Winter Bird Counts on GFAFB will assist with finding local trends and developing management recommendations based on population numbers. The Winter Bird Counts continue to be a very useful monitoring tool.

- **Noxious Weed and Invasive Plant Survey and Control Plan (Dec 2003, Oct 2013)**

A noxious weed control plan and inventory update was completed during the summer of 2012 to quantify and locate the specific nature and extent of the infestation of listed noxious weeds. The purpose of the noxious weed and invasive plant survey was to document the occurrence of all noxious and invasive plants, listed by the State of North Dakota as noxious (absinth wormwood, Canada thistle, field bindweed, leafy spurge, musk thistle, and spotted knapweed), and three invasive plant species (bull thistle, perennial sowthistle, and wavyleaf thistle). Federal and State laws mandate the control of noxious weeds, making this survey an important tool in compliance with Federal, State, and local laws. The survey was a valuable tool for development of the Noxious Weed and Invasive Plant Control Plan. Previous surveys have made it possible to identify populations not responding to treatment and areas of control success.

- **Urban Forest Inventory (June 2007)**

The Urban Forestry Inventory provides information regarding the tree population of the areas known as the "Industrial Zone/Base-side" and the housing sector. Included in the survey are GPS locations of trees, species names (both Latin and common), a general health assessment of each tree or shrub, and maintenance recommendations and species composition. This inventory provided baseline information for developing the Urban Forest Management Plan (June 2007).

Information from this survey was integrated into the GFAFB GIS and Geobase systems.

- **Shelterbelt Health Assessment Survey, Report and Management Plan, July 2013**

There are over seven miles covering approximately 145 acres of shelterbelts in various conditions across GFAFB. Shelterbelts provide numerous benefits including wind breaks, snow breaks, wildlife habitat, shade, dust control, noise abatement, erosion control, and more. The general health of the existing shelterbelts was determined good; however, several areas are in need of maintenance in order to restore their quality and efficiency in accomplishing their intended purpose. This report summarizes the data collected from field surveys, presents a management plan for the existing shelterbelts, proposes locations for new shelterbelts, recommends an annual monitoring plan, and discusses future shelterbelt management for integration into the INRMP.

2.4 Mission and Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Some of the natural resources mentioned in the previous sections could have an adverse impact on the base's flying mission or future planning operations. The potential negative impacts could range from a delay in the construction of new buildings to a loss of life as a result of severely damaged aircraft. The natural resources constraints to base planning and missions are summarized below.

- The base supports several native species and habitats, as well as species of conservation concern to include state-ranked species. The potential for occurrence of sensitive species and habitats requires increased planning. The lack of specific biological information about potentially sensitive insect, amphibian, reptile, and fish species to appropriately define management parameters may cause a greater constraint on activities and planning than if more information was known about occurrence and habitat requirements.
- Bird aircraft strikes on the runway and during takeoffs and landings have been documented as an ongoing safety hazard.
- Deer use both unimproved and improved base areas impacting landscaping as well as posing a safety hazard to vehicular traffic. Extensive fencing, fence repairs and operational gates are required to exclude deer from the airfield where they could become a hazard.
- Habitat needs for identified conservation species could adversely affect timing and expense of grounds maintenance, construction activities, or agricultural outleasing opportunities.
- Invasion of noxious weeds into the grassland communities reduce opportunity for recreational experiences in a natural prairie landscape and reduce quality of wild hay.
- Approximately 412 acres of wetlands have been mapped at GFAFB. Prior to initiating new projects in wetland areas, wetland boundaries should be reconfirmed. Wetland areas present challenges for planning and new development due to increased costs for mitigation.
- Wetlands have the potential to limit current grounds maintenance, Security Forces exercises, pest management, and construction. Wetland management should be integrated with other natural resources management activities on base, as wetland resources on GFAFB are subject to

multiple uses. Management of these resources should take into consideration the strain this can impart.

- GFAFB does have a comprehensive wetlands management plan in this INRMP which can help assist the base planning process. Areas on GFAFB currently managed as improved or semi-improved grounds increase maintenance costs and reduce habitat quality.
- Protection of conservation species may conflict with some pest-management objectives such as control of potential disease vectors or animals of other medical importance, control of undesirable or nuisance plants and animals (including insects such as mosquitos).
- Land management on adjacent private lands could reduce displacement habitat for wildlife or attract wildlife, both posing a potential hazard to the flying mission. Proliferation of noxious weeds on adjacent private lands increases the threat of dispersal onto the base which could increase costs of control. A good rapport with the adjoining landowners is necessary to ensure that the interests of the base are represented.
- Nonnative and invasive species could be introduced to the base during re-vegetation efforts and landscaping activities or large open base community events such as air shows, therefore limiting seed mixtures and plant selection for landscaping and grounds maintenance.

2.4.2 Land Use

This section discusses a general distribution of land use at GFAFB. For a discussion of regional land use, see section Local and Regional Natural Areas. GFAFB encompasses 5,745 acres, of which the USAF owns 5,150 acres and another 595 acres are lands containing easements, permits, and licenses. The GFAFB General Plan identifies 10 current general land use classifications. Land use within the base is a mix of improved, semi-improved, and unimproved areas. Improved areas, consist of all covered areas (under buildings and sidewalks), land surrounding base buildings, the 9-hole golf course, recreational ball fields, and the family housing areas. Semi-improved grounds, include the airfield, fence lines, ditch banks, skeet range, and riding stables. Primarily unimproved areas, include wetlands, wastewater lagoons, woodlands, open grassland, agricultural outleased land, shrub areas, and riparian forest.

2.4.3 Current Major Mission Impacts on Natural Resources

The following subsections summarize potential risks and consequences of mission impacts (including pollutant concerns) and programs relevant to natural resources.

Air Quality

GFAFB has been issued a Title V Permit to Operate (T5-F78004) by the North Dakota Department of Environmental Quality (NDDEQ) under the CAA. GFAFB is a major source of criteria pollutants, but is not a major source of HAPS. Only small amounts of Hazardous Air Pollutants (HAPs) are generated from internal combustion processes or earth-moving activities on base. Because GFAFB is a major source of criteria pollutants, these emissions could potentially impact climate change and the acidity of waters on the base, subsequently affecting flora and fauna. The table of air emissions below indicates the criteria pollutants and their respective major sources occurring at the base.

Criteria Pollutant	Source(s)
Carbon Monoxide (CO)	External combustion sources
Nitrogen Oxide (NO_x)	External combustion sources

Particulate Matter <10 microns	Heavy construction operations
Particulate Matter <2.5 microns	External combustion sources
Sulfur Dioxide (SO_2)	External combustion sources
Ozone (O^3)/Volatile Organic Compounds (VOCs)	Asphalt paving, miscellaneous chemicals, gasoline service stations
Source: Grand Forks AFB – CY2019	

Table of Air Emissions at GFAFB

Hazardous Waste and Hazardous Materials

The use of hazardous materials and control of hazardous waste at GFAFB is important to the management of natural resources, primarily because of the potential for release into the environment and contamination of soil, air, and surface and ground waters. Hazardous materials are used on the base in association with aircraft maintenance and other aspects of the mission. To minimize additional avoidable releases of hazardous materials into the environment, the base has implemented a number of safeguards in the storage, use, and disposal of hazardous materials.

Hazardous materials management programs include inventory control, storage area inspections, and material resale programs. Bulk storage systems at the base include fuel and petroleum aboveground and underground tanks, drum storage areas for oils and maintenance materials, hazardous waste storage and accumulation areas, and storage areas.

Spill and emergency response equipment is maintained in accessible areas throughout GFAFB. The Civil Engineer Fire Department (319 CES/CEF) maintains adequate fire response, spill control and spill containment equipment.

Aircraft flight operations and maintenance at GFAFB, as well as many other activities, require the storage and use of a variety of hazardous materials which include flammable and combustible liquids, acids, corrosives, caustics, anti-icing chemicals, compressed gases, solvents, paints, paint thinners, pesticides, petroleum hydrocarbons, batteries, hydraulic fluids, and fire retardants. There is a minimal risk of contamination of soils and surface waters from spills and/or fires involving hazardous materials or wastes because materials are typically stored and used indoors, or within containment.

Liquid hazardous wastes are stored within containment systems capable of preventing a release to the environment due to container over filling or leaks. Inspection of accumulation sites are conducted in accordance with the GFAFB Installation Hazardous Waste Management Plan (GFAFB 2020). The Hazardous Waste Management Plan governs the management of all hazardous wastes on the base.

Environmental Restoration Program (ERP)

GFAFB participates in the ERP, a specially funded DoD program established in 1978. Under the program, the DoD identifies and evaluates its hazardous waste sites and acts to control the migration of hazardous substances from these sites. GFAFB has seven ERP sites. These sites are identified as potentially impacted by past hazardous material or hazardous waste activities with the primary constituents being fuels and solvents found in soil and water resources. The seven ERP sites are the Fire Training Area/Old Sanitary

Landfill Area, FT-02; New Sanitary Landfill Area, LF-03; Strategic Air Ground Equipment Building 306, ST-04; Explosive Ordnance Detonation Area, OT-05; Refueling Ramps and Pads, ST-08; Base Tanks Area, ST-06; and Petroleum, Oil, and Lubricants Off-Loading Area, ST-07. Two sites, the Fire Training Area/Old Sanitary Landfill Area and the New Sanitary Landfill Area, are considered closed and will undergo post-closure monitoring for 30 years; monitoring wells were installed around the perimeter of the landfill areas to monitor groundwater conditions. Long term groundwater and soil monitoring will be performed at the Petroleum, Oil, and Lubricants Off-Loading Area, and at the Refueling Ramps and Pads. The remaining sites (ST-04, OT-05, and ST-06) are in the site closeout phase and no further remedial actions are required or are being performed.

Groundwater containing contaminants have the potential to affect surface water, depending on the depth of groundwater and possible hydrological connections. Monitoring wells are located in many areas throughout GFAFB, but most are concentrated in a few areas. There are clusters located southwest of the runway, northeast of the runway near the perimeter and the northeast corner of the base, near the center of the airfield area, and due east of the southern end of the runway.

Aboveground and Underground Storage Tanks

Because GFAFB is a military installation with a mission involving RPA and other military vehicles, there are several underground storage tanks (USTs) and aboveground storage tanks (ASTs) located on base. The main natural resource concern for ASTs and USTs is the potential for spills of fuels and lubricants and entry of these pollutants into surface waters. Fuels and lubricants storage on base is discussed in the Spill Prevention, Control, and Countermeasures Plan (GFAFB 2020), which addresses storage locations on base and proper handling procedures for all oil-related materials to minimize the potential for spills and releases.

Liquid fuels in use at GFAFB are Jet Petroleum (JP)-8 (jet fuel), No. 2 light fuel oil, unleaded gasoline, and diesel. Deicing fluid is also stored in ASTs at GFAFB. Sixty nine (69) ASTs and eight (8) USTs are currently present at GFAFB and used to store liquid fuels. Both ASTs and USTs are used to store petroleum fuel with the majority of petroleum handled at GFAFB being JP-8 for military aircraft.

Wastewater

Wastewater has the potential to affect off-base waters, although the risk is fairly low. For wastewater generation purposes, GFAFB is in effect a city, with daytime population of greater than 4,000 people (employees plus housing residents). The base wastewater collection system, which consists of more than 50 miles of sanitary mains, services the base industrial, administrative, community support (churches, stores, child care center, recreation facilities, etc.), elementary schools, and family housing facilities. GFAFB complies with the NDDEQ's guidance to protect water.

Base water flow reaches the wastewater treatment facility (sewage lagoons) through two main lift stations. Facility 1336 located in the family housing area in the north central portion of the base serves predominately family housing and an elementary school, but also serves the most northern section of the base flightline including a large aircraft hangar. The flow from lift station 1336 is directed to the lagoons. Facility 801 is the other main lift station, and it passes wastewater to the sewage lagoon treatment facility from a large part of the housing area, an elementary school, base administrative facilities, community support facilities, as well as the majority of the base industrial-type facilities.

The sewage lagoons consist of four stabilization cells located east of the main base. The four separate treatment lagoons consist of one primary treatment cell (75 acres), two secondary treatment cells (north – 26 acres, south – 35 acres), and one tertiary treatment cell (38 acres), all without mechanical treatment or aeration. Wastewater effluent is discharged under a State of North Dakota Waste Water Discharge Permit (ND0020621) into Kellys Slough. Wastewater discharge has not occurred in several years due to the large decrease in base population and recent lagoon rehabilitation project that required drawing down all cells. Industrial wastewater at the base comprises less than 10% of the total flow to the treatment lagoons. As long as the permit requirements are met by GFAFB, Kellys Slough will not be adversely affected by wastewater discharge from GFAFB.

Storm Water

Storm water runoff has the potential to affect surface and ground water quality. Storm water from the base carries amounts of contaminants normal to an urban area. As an industrial complex, there is the potential for larger volumes of contaminants to enter surface waters.

Underground concrete pipes and catchment basins collect storm water runoff from the base. There are four man-made ditches conveying industrially affected storm water from the variety of individual storm water outlets on the base. The four industrially affected storm water outfalls are designated as the Northwest Ditch, West Ditch, South Ditch, and North Ditch. The NDDEQ approved these outfalls as stated in the GFAFB ND Pollutant Discharge Elimination System (NPDES) Permit, NDR02-0314 Storm Water Discharges from Industrial Activity. The Northwest Ditch collects drainage from the sanitary landfill areas (both closed and capped), the base small arms range, the northern-most end of the airfield and the part of the parallel taxiway area. Under typical working conditions the entire area would not pose a storm water contamination threat, however, the potential exists. The West Ditch collects drainage from the majority of the airfield runway and taxiway areas (including associated pavement underdrain systems), the now closed Explosive Ordnance Detonation Area (EODA), and the western perimeter of the base. The South Ditch collects drainage from vehicle maintenance, power production, and fuel storage areas. The North Ditch collects drainage from hangars, selected aircraft maintenance areas, and non-industrial areas.

Storm water discharging to surface waters via the Northwest, West, South, and North Ditches have the potential to contain significant materials. The following significant materials (based on the definition of General Storm Water Permit, Part VI) potentially present in surface-discharged storm water are: propylene glycol (deicer), fuels (jet fuel, diesel, motor vehicle gasoline), oils and lubricants, used oils, and hazardous chemicals under CERCLA, Section 101 (14) (40 CFR 302).

Because GFAFB is not a manufacturing facility, the raw materials and finished materials categories do not pertain to the base. Similarly, the base is currently not required to report chemical inventories as defined by Superfund Amendments and Reauthorization Act (SARA), Title III, Section 313, as designated quantities of regulated chemicals are not exceeded (USAF, 1994b).

Storm Water Management Controls

Oil-water separators and tank containment areas are provided at strategic points within each drainage area to capture accidental releases of tank contents and non-water-soluble materials. The installation

contracts with consultants to evaluate additional controls on storm drainage systems and to ensure all cross connections with sanitary sewers are eliminated.

GFAFB employs Best Management Practices (BMP's) such as promptly installing sod and silt fences to reduce erosion, and structural controls such as dikes to prevent accidental spills from reaching the environment. GFAFB also has a Spill Prevention Control and Countermeasures Plan in place.

As part of its NPDES permit, GFAFB is required to monitor its storm water discharge. The following storm water parameters are monitored:

- Oil and grease (visual) – if a sheen is observed, a grab sample is obtained
- Total Suspended Solids
- Total Phosphorus
- Total Kjeldahl Nitrogen
- Nitrate
- Biochemical Oxygen Demand, 5-day
- Chemical Oxygen Demand
- Any pollutant limited in an effluent guideline to which the facility is or may be subject

All discharges from GFAFB are in compliance with the existing stormwater permit. Each ditch has a type of control device able to handle any accidental spill and to contain the affected waters until appropriate treatment has been made.

Because the topography at the GFAFB is relatively flat, there is no significant soil erosion problem in the drainage areas served by the industrial outfalls unless the ground is disturbed due to construction or maintenance. The base requires BMPs to be used during projects that could discharge sediment to storm ditches. Additional measures to prevent sediment discharges are outlined in the GFAFB Construction Permit guidance and EPA Stormwater Management for Construction Activities, EPA 832-R-92-005, 2020. All section 404 permits obtained at GFAFB through USACE have BMP's associated with them to curtail any soil erosion or potential sediment discharges downstream.

Noise

The primary concern of noise in the natural resources setting is conflict with wildlife habitat. To date, there have been no reported conflicts of this type. Noise generated on GFAFB consists mostly of aircraft, vehicular traffic and construction activity. Most noise is generated from aircraft during takeoff and landing and not from ground traffic. Noise levels are dependent upon type of aircraft, type of operations, and distance from the observer to the aircraft. Duration of the noise is dependent upon proximity of the aircraft, speed, and orientation with respect to the observer. An Environmental Assessment (EA) was developed for the proposed Beddown and Flight Operations of RPA at GFAFB. The EA found no significant environmental impacts in noise or any other resource areas to be associated with the beddown and flight operations (USCBP 2008). GFAFB takes measures to minimize noise levels by evaluating aircraft operations. Blast deflectors are utilized in designated areas to deflect blast and minimize exposure to noise.

Pesticide Management

Pesticides are handled at various facilities, including the Pest Management shop, golf course, grounds maintenance facility and the USFWS extension of the natural resources office. Primary uses are for weed and mosquito control. Herbicides, such as picloram, nonselective glyphosate, and 2,4-D are used to maintain areas on base. Military Public Health, Bioenvironmental Engineering, and Environmental Management provide information on the safe handling, storage, and use of pesticides. The Fire Department on-base provides emergency response in the event of a spill, fire, or similar type incident and subsequent release to the environment.

Impacts to natural resources from pesticide applications include potential impacts to nontarget species, runoff from application sites, and unintentional releases to the environment by spills and application errors of chemicals. With recent listings of the Dakota skipper, Poweshiek butterly and the rusty patch bumble bee, monitoring of applications and inventory and study of insects on GFAFB is needed. It is suggested monitoring of application frequency, timing, and chemical type are needed to address nontarget species impacts to natural resources to support decision making as needed for mission projects and natural resources management.

Limited monitoring and sampling has occurred in base wetlands that have identified past usage of pesticides on base. Detections of DDX isomers (4,4-DDT,4,4-DDE, and 4,4-DDD) within a water sample collected from wetland, LS-02b, and the sediment samples collected from wetlands, FLW-11, SES-24, and FLN-06b, were found during the wetlands characterization project in 2007 (for further information on these specific wetland classifications, see 2007 Wetlands Characterization Report in Appendix H). The analyte 4,4-DDT is a chlorinated pesticide used widely in agriculture in the past, but is now banned in the United States. The two major 4,4-DDT decomposition products, 4,4-DDE and 4,4-DDD, are known to persist in the environment for long periods of time. As a result of the broad use of DDT in the past in the prairie pothole region, the detection of DDX isomers in these samples was not unanticipated. The actual source of these DDX isomers is not known. Further study would be needed to determine whether the DDX isomers are the result of DDT based pesticide applications by former landowners for agricultural purposes, or possibly by GFAFB to control mosquito populations. These detections provide screening level information only. Additional sampling and analysis with a thorough QA/QC program is required to determine concentrations of these compounds with a degree of confidence that is sufficient for estimating risk and decision making.

Solid Waste Management

Domestic solid waste and construction debris are collected and hauled by qualified contractors to appropriate off-base landfills. There are currently no active landfills on the base. Disposal of solid waste at permitted off-base facilities reduces the risks of environmental contamination, reduces the cost of management, and allows for better use of the available space on the base, including natural resources. Municipal solid waste landfills also attract birds, which could conflict with the flight mission.

GFAFB operates a permitted land treatment facility (IT-183) for the remediation of petroleum-contaminated soils (PCSs). PCSs are generated on-base through current spills and those soils encountered while excavating for various subsurface repairs, replacing or removing USTs and piping and/or cleaning out OWS. These solid wastes are tilled or turned several times a year to remediate the

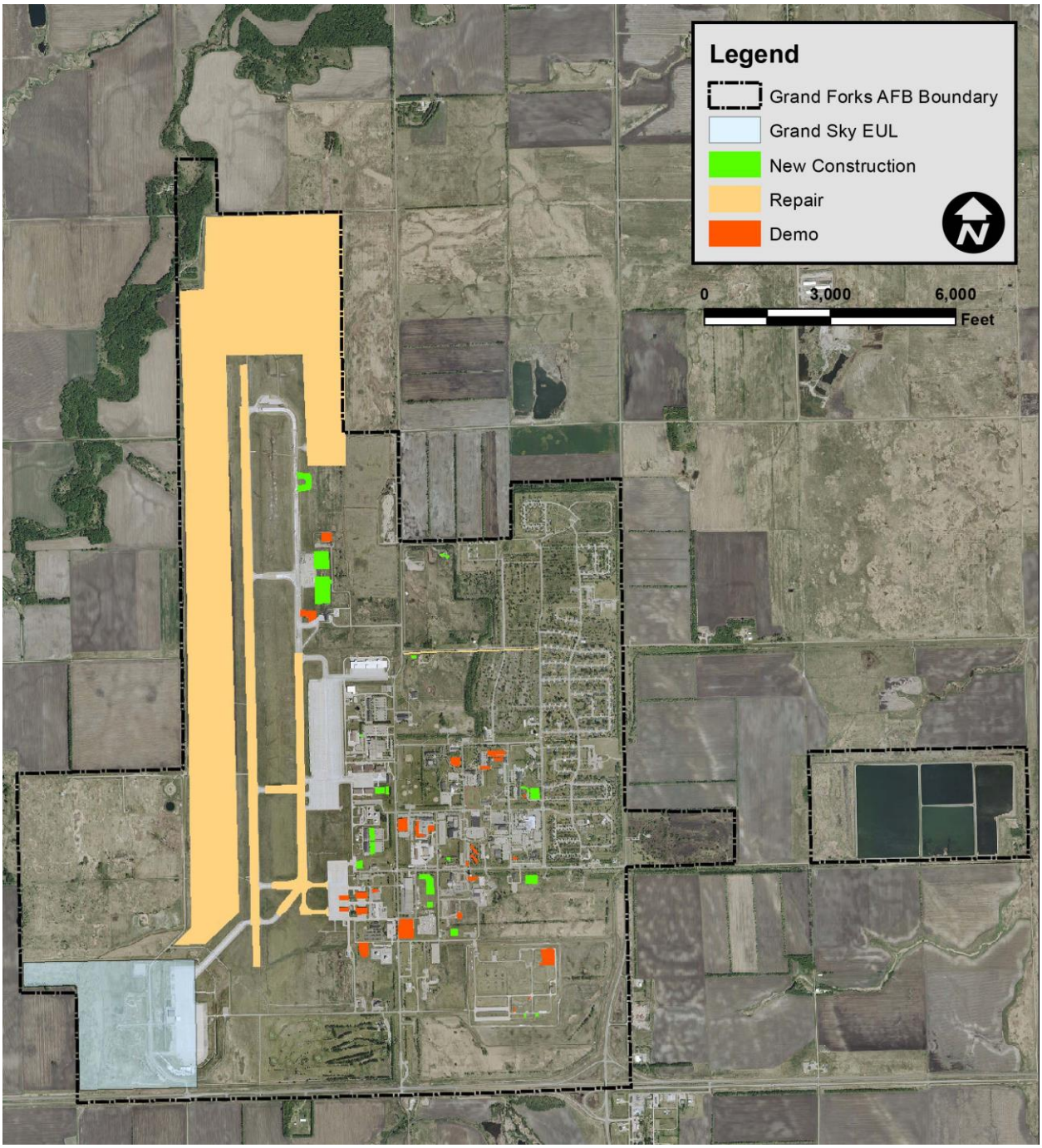
soils to acceptable levels according to NDDEQ permit requirements. An Integrated Solid Waste Management Plan (ISWMP) has been developed to meet Air Force requirements and includes a narrative to reduce, reuse, and recycle.

2.4.4 Potential Future Mission Impacts on Natural Resources

BRAC 2005 removed the tanker mission from GFAFB and then directed the stand-up of the new Remotely Piloted Aircraft (RPA) mission. All tankers were removed from the base as of December 2010 and the RPA mission is now in place fulfilling the BRAC 2005 mandate. The RPA mission remains fluid due to its infancy and evolving technology. Ongoing infrastructure and construction modifications are anticipated to support the Global Hawk and Predators growing mission.

Future facility development must respond to the existing and future missions of the units it supports. According to the Installation Development Plan, various projects are included in the base's Area Development Plans (ADP), or proposed studies; however, most of the projects are proposed on developed portions of the base and would not impact natural resources located in unimproved areas (see Future Development Projects Map). However, one large Environmental Assessment was completed for the development of an Enhanced Use Lease on 217 acres of undeveloped property for the purposes of a mixed-use business and aviation park on the west side of the runway, known today as the "Grand Sky Business Park". This lease was signed on 6 Feb 2015 by the Grand Forks County Commissioner and the Deputy Assistant Secretary of the AF, Environment, Safety and Infrastructure. Paragraph, 14.4.3, of the lease states that the lessee shall comply with the INRMP and provide the Lessee a reasonable opportunity to review and comment on any proposed future revisions.

GFAFB has and will continue to construct new buildings and facilities in support of its tenants' changing missions. As such, the discrete and cumulative impacts on the local environment must be evaluated continually.



Future Development Projects Map

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The USAF environmental program adheres to the Environmental Management System (EMS) framework and a Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*; 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.

4.0 GENERAL ROLES AND RESPONSIBILITIES

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

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander	The INRMP is subject to approval by the Wing Commander (WC) in a tripartite by signature w/the USFWS & NDGFD. The Wing Commander (WC) is responsible for ensuring that base assigned and tenant units comply with laws and requirements associated with the management of natural resources. The WC provides appropriate funding and staffing to ensure implementation of the INRMP, controls access to and use of installation natural resources, and signs cooperative agreements entered into between the installation and other entities pursuant to the Sikes Act. The WC has delegated the BCE to annually update and provide compliance with applicable federal, state, and local regulations.
AFCEC Natural Resources Media Manager/SME/Subject Matter Specialist (SMS)	Coordinates with installation natural resources managers (NRM)/points of contact (NR POC) to: identify changes to each respective base's program; changes to execution strategy (to include accomplishing in-house) and/or execution agent; confirm funding amounts, distribution date, and mission/situational changes that may initiate the emergent requirement process; as well as serve as liaison with the AFWFB (AFCEC/CZOF) on all matters pertaining to coordination of support activities of the AFWFB with installation POCs.
Installation Natural Resources Manager/POC	The NRM is responsible for completing the annual INRMP review and coordination, maintaining a compliant INRMP, sustaining records of fish and wildlife and natural resources permits and reports, and disposition of natural resources such as agricultural and forestry resources. The NRM is the Wildland Fire Program Coordinator.
Installation Security Forces	Supports conservation law enforcement program. Cooperatively enforces state fish and wildlife laws with North Dakota Game and Fish. Primary enforcement is through access control and encroachment enforcement.

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Unit Environmental Coordinators (UECs); see AFI 32-7001 for role description	AFI 32-7001
Installation Wildland Fire Program Manager	NRM is the Wildland Fire Program Coordinator. The CZOF/Ellsworth Wildland Fire Support Module accomplishes wildland fire and prescribed burning support and works to improve wildland fire installation work efforts.
Pest Manager	Civil Engineer Operations; Pest Management Mosquito control, pest dispersal and control, noxious weed control, coordination to prevent non-target treatment, integrate IPM with INRMP
Range Operating Agency	
Conservation Law Enforcement Officer (CLEO)	Installation Security Forces
National Environmental Policy Act (NEPA)/Environmental Impact Analysis Process (EIAP) Manager	Civil Engineer EIAP Manager
Base Safety	Provides monthly reports on wildlife and bird depredation activities for permit compliance to NRM
US Forest Service	Riparian and Urban Forestry
USFWS	Technical Assistance; development of operational component plans to be developed in conjunction with implementation of this INRMP. Tripartite Signature Approval required.
North Dakota Game and Fish Department	Technical assistance; development of operational component plans to be developed in conjunction with implementation of this INRMP. Tripartite signature approval required.
Natural Resources Conservation Service (NRCS)	Soil conservation
North Dakota Natural Heritage Database (NDNHD)	Plant and species inventories
USACE	Wetlands permitting issues

5.0 TRAINING

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

Installation Supplement – Training

The natural resources manager (NRM) at GFAFB is an experienced and trained natural resources professional and holds a natural resources degree. The NRM coordinates with many on-base organizations and personnel to implement the INRMP. These organizations play a vital role in the yearly review of the management objective and natural resources topics of concern presented in this plan.

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

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

Installation Supplement – Recordkeeping

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 – Reporting (none)

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

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

Installation Supplement – Natural Resources Program Management

The concept of ecosystem management is integral to natural resource planning. Provided below is a brief summary of natural resource management goals at GFAFB:

• Geographic Information System (GIS) – Update and maintain spatial data for natural resource management, support project planning and decision making with current records and data;

• Fish and Wildlife – Manage fish and wildlife species to maintain compliance with laws and regulations and build partnerships with fish and wildlife management agencies and groups;

• Threatened and Endangered Species – Manage and protect sensitive species while maintaining operational functionality of the base's missions and remaining in compliance with the Endangered Species Act and other applicable regulations;

• Water Resources – Continue to monitor water quality and remain in compliance with laws and regulations;

• Wetlands - Protect wetlands and other surface waters by data gathering, monitoring and maintaining compliance with the CWA;

• Grounds Maintenance – reduce costs by planning and integrating actions with the INRMP projects, and control noxious and invasive plants;

• Forest Management – Sustain and maintain the "urban forest", protect riparian forest, and manage functional shelterbelts for wind and snowbreaks and to reduce greenhouse gases, save energy, provide wildlife habitat where applicable and sequester carbon emissions;

• Wildland Fire – Use prescribed fire as a tool for grassland management while protecting military missions;

• Agricultural Outlease – Continue using the hay lease program to manage grasslands and support control of noxious and invasive weeds;

• Pest Management – Eliminate noxious and invasive plant species on base and reduce pest species that could be harming natural environments;

• Outdoor Recreation - Support outdoor recreation opportunities involving natural resources while maintaining ecosystem integrity;

• Cultural Resources – Protect and prevent the loss of important cultural resources on base;

• Public Outreach – Promote natural resources awareness, educational opportunities and appreciation of native wildlife and plants at GFAFB.

7.1 Fish and Wildlife Management

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 section of the INRMP details management of fish and wildlife with consideration and integration to GFAFB's mission. Fish and wildlife management is defined as manipulation of the environment and fish and wildlife populations to produce desired objectives. Fish and wildlife management is executed base-wide regarding the regional landscape and ecosystem scale within the Red River Valley of North Dakota. The INRMPs objectives and actions are to be integrated with the Installation Development Plan and other base-wide project planning initiatives.

Wildlife population and habitat management on GFAFB will attempt to (1) deter animals from foraging or roosting in areas on the airfield, (2) maintain open grassland areas free of noxious weeds and woody encroachment, and (3) protect and conserve Species of Conservation Priority where applicable. This approach is used due to the rich abundance and variety of wildlife species present on and around the installation and to also support the safety of the flying mission.

White-tailed Deer

The GFAFB deer population has been subject to much base scrutiny. Because of community interest and the potential threat of deer to the airfield, a bow-hunting program at GFAFB was developed in 2003. The administration of the recreational hunting program is discussed in section 7.2. Deer

harvests through the hunting program assist with population control and provide recreational opportunities. Over the past decade the bow-hunting program has provided opportunity to ~300 Airmen, and has averaged a harvest of about 5 deer each year. The base in partnership with the NDGFD has conducted aerial surveys during winters with snow cover to assist counting and monitoring the deer population. White-tail deer are fairly common throughout all base areas to include shelterbelts, housing, grasslands and the Turtle River riparian area. White-tailed deer are also common throughout Grand Forks County.

A 2010 air-survey counted 28 deer on the installation and 35 deer east of the main entrance gate. During March of 2011, a total of 22 deer on-base were counted in an air-survey with zero noted inside the airfield fence. Nineteen deer were also observed off-base outside of the perimeter fence, using agricultural fields between the eastern boundary of the base and the sewage lagoons. A night mammal survey of the airfield in Oct of 2015 identified zero deer. Trail cameras positioned inside the airfield fence near the northwestern Scotch pine area, during the fall of 2016, did not capture any deer using the area as habitat. As of spring 2019, the on-base deer population is estimated at about 40 deer.

One deer, in 2019, was verified and depredated inside the airfield fence by base Safety. Previous to this event, the last deer verified inside the airfield fence were during the 2010 depredation event. Other depredation events, conducted by base Safety, include 20 deer west of the airfield in 2016 and then 4 more deer were taken in the same location in 2019 (see Table of Deer Removal). One deer was found injured and then subsequently depredated in a base parking lot during the summer of 2019 as well. Automatic airfield gates added to the flightline since 2010 have helped eliminate deer wandering into the fenced secure airfield area. However, not all airfield gates are automatic, and human error has left some gates unlocked or gaping. Fence and gate damage due to weather cycles and flooding are also a concern as it can provide potential entry points for deer.

During a 2019 fall meeting between the base and INRMP regulatory stakeholders, deer management issues were debated among parties. NDGFD remarked that the base did not have an appropriate identification of the perceived deer problem regarding access points to the entire installation. NDGFD stated that a comprehensive survey for deer entry to the base with respect to available habitats outside the base-wide fence be examined. Concern was noted that deer pressure on the west towards the Turtle River might be of greater concern regarding the available habitat and adjacency to the airfield than deer residing on base proper. NDGFD further commented it would like to see the hunting deer harvest rates increased. Further discussion was had regarding a zero deer management policy desired by base Safety for the entire installation property with the stakeholders. Essentially, GFAFB was advised to firstly find perimeter access vulnerabilities due to habitat and fence points that facilitate deer entry to the base and then remedy those problems prior to base-wide deer depredation. If the problems are not identified and fixed first, deer likely will continue to find their way onto base property. NDGFD stated that repeated significant depredation events were not a viable long-term management strategy. Depredation as a tool is available at this time given the state-issued General Wildlife Permit to GFAFB (see Appendix B). The permit requires annual reporting and renewal with the state.

Deer Removal	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019

Hunting	7	3	2	3	10	5	4	4	4	7
Depredation	6	0	0	0	0	0	20	0	0	6

Table of Deer Removal

Without proper surveys that examine and evaluate deer entry and habitat pressure points and without the construction of major infrastructure upgrades to all base fencing and gates, managing for zero deer via repetitive, potentially significant base-wide deer depredation on all GFAFB property invites regulatory risk and is indiscreet given stakeholder input with consideration of the adjacent regional healthy white-tail deer populations in Grand Forks County. Consequently, existing deer management that enacts steps to depredate, under the permit, any deer that breaches the fenced and secured airfield area shall be continued. Any other deer found on base proper shall be assessed against airfield risk. Should the deer be ascertained as high risk (immediate threat to mission or life of personnel), and only after harassment and other methods fail, should a deer then be depredated on base property under the authority of the issued base permit. The base will also continue to offer bow-hunting opportunities that support deer management on base proper that will help reduce airfield fence pressure. This course of action is recommended to support airfield safety needs, to foster good regulatory relationships and to ensure permit longevity forward into the future. All deer taken must comply with permit rules. Permit rules state that no part of the deer can be kept for personal use and all efforts to donate the deer meat to local shelters shall be pursued. Deer meat was donated to food shelters in 2010 (6 deer) and 2019 (2 deer).

Therefore, continued deer management will work toward excluding deer from the secured airfield as best possible with existing fences, gates and USDA personnel, and secondarily will offer bow-hunting opportunities. In addition, no personnel feeding of deer on base property is allowed. Deer harvest rates need to be improved and researched for acceptable safe ways to accomplish that effort following regulatory stakeholder involvement. The magnitude of base-wide deer-exclusion fencing needed, manpower, maintenance requirements along with a comprehensive survey of deer-access points to the installation and regional habitat, are unavailable resources to the installation at this time. When proper surveys and habitat studies are accomplished, it could strengthen and more importantly focus project programming to address identified and proven vulnerabilities and support funding requests for deer-exclusion fence construction upgrades. A sustainable, zero, base-wide deer management policy could then potentially be executed and advanced by a regulatory advised and accepted design with construction of deer-exclusion fencing, implementation of habitat alterations and updated deer management planning. Airfield fence issues are further discussed in section 7.12.

Mammals

Beaver have occasionally been problematic for the installation causing damage in base ditches. Beaver like to plug culverts and cause unwanted flooding in human developed areas. While the base has suitable beaver habitat, base operations and safety needs do not mix well with the resultant flooding activity the beaver creates. Subsequently, under the NDGFD Director's Permit for resident wildlife issued to GFAFB, the installation may trap and remove beavers as necessary. Species of conservation concern such as the river otter and the fisher have been observed on base as well. Areas

in the riparian forest along the Turtle River are attractive to these species and provide a suitable connective habitat corridor. Bank stabilization with landscaping, removal of noxious and invasive weeds and trash are natural resources actions supporting this area.

Coyotes and fox are currently being studied by USFWS to develop an inventory and assessment of furbearers that are resident on base. It is known that both coyote and fox have a high reproductive and recruitment potential and their response to a temporarily reduced population in an area is to have larger litters of young. As such, shooting for removal is not always the best management technique. Determining the best approach to manage these species can be multi-fold depending on location, resources and safety. Free shooting, trapping, chasing or harassing of animals that appear to be nuisance species by base personnel or residents is not authorized. Public outreach to educate the community on the legalities of illegally shooting furbearers, as recommended by the local game warden, is an ongoing process. Such incidences need to be reported immediately to the SFS personnel and natural resources manager. The base does have authority to trap and remove these species under an issued permit from the NDGFD for resident wildlife species. The USDA personnel hired for the airfield safety program has been implementing this authority as has trapped a few coyotes over the last several years.

Large transient wildlife such as black bear and moose have occasioned on the base. There is no suitable habitat large enough to support these species on GFAFB. Procedures for addressing the presence of these animals include notification of the Natural Resource Manager and Security Forces. Security Forces will work to keep people away from any identified large transient wildlife until other game and fish officials can deal with the issue. It is preferred that the animal be able to leave the installation unharmed. If the animal is not causing any immediate damage or threat to the mission and appears healthy in condition, it is recommended to leave the animal and/or gently direct the animal off of the installation. If the animal is causing undue stress, damage, appears sick in condition, or is a threat to the mission, the local game warden may be called for removal. It is preferred that the animal be relocated alive off of the installation, however depending on the situational logistics and game warden's judgement, the animal may be depredated. Several moose have been routed off the installation and out gates over the years. In 2003, a black bear was depredated on the installation by the local game warden on the golf course. A taxidermy mount was made from the black bear, permitted and is now on display in the outdoor recreation building for public viewing.

Grassland Management

Maintaining open grasslands in unimproved base areas is a focus area for natural resources management. This includes a variety of techniques to include prescribed burning, woody encroachment removal, noxious and invasive species control, weed monitoring, haying, mowing, avoidance of habitat fragmentation, and reseeding as appropriate. Delayed mowing until July 15 is employed where applicable and feasible on unimproved lands at GFAFB as requested by the USFWS Denver office, INRMP stakeholder to support grassland wildlife. Generally noted, large open tracts of grassland provide habitat for several species of conservation priority in Grand Forks County to include pollinators. Wildlife dependent on grasslands have experienced dramatic, consistent widespread declines, due to habitat loss and fragmentation.

Grassland management actions must consider unique care regarding the existing saline and hydric soil conditions at GFAFB. The ability to mechanically manage unimproved areas and associated

vegetation at GFAFB can be severely limited by seasonal ground conditions due to landform and hydrology and that can make conventional maintenance and mowing difficult in certain areas (glacial beach ridges, hydric saline soil spots). GFAFB soils are lacustrine and riverine sediments over glacial till and are flat and poorly drained. The combination of slope and discontinuity of soil texture provides a slow draining surface, high water holding capacity, and can easily perch water following snowmelt during times of high precipitation. In addition most of the soils contain moderate to high salinity. Sodium chloride is the dominant salt in the saline soils of eastern Grand Forks County. Artesian flow from geologic deposits with significant sodium and chloride sources has added sodium chloride to shallow groundwater in this area (Franzen 2013). Native vegetation is uniquely adapted to growing conditions in this ecotype, while introduced and turf-type grasses will not thrive in the combination of hydric soils, salinity, and temperature extremes at GFAFB. The use of deep rooted plants with long growing seasons is generally recommended to manage these types of soil salinity levels (Franzen 2013).

Compaction and rutting is increased when soils have high moisture content. Compaction leads to reduced infiltration and ponding of water. Ponding and open water areas will reduce root depth and vegetation often drowns causing open bare areas. These bare soil areas can be seen across GFAFB with visible white crusts indicating their saline nature. Compaction further causes infiltration issues by increasing surface evaporation and salinity levels.

Uniform vegetation management (frequent mowing) and reduced leaf area decreases evapotranspiration in prairie pothole ecosystems (Renton et. al 2015). The natural evapotranspiration process in non-forested biomes (like GFAFB) has the greatest impact on reducing surface saturation (Frank and Inouye 1994). As such, allowing grasslands to increase leaf area, evapotranspiration rates are increased which accelerate soil moisture drawdown making mechanical vegetation management possible. Frequent mowing, therefore in grassland environments like these is generally not recommended. A management tool, like annual haying, allows biomass to grow, assists evapotranspiration drying out the soils, and eventually enables equipment maneuvering without rutting and ponding of water.

GFAFB Tier 1 Wildland Fire Management Plan (Associated Plans, Tab 1) recommends prescribed burning as a maintenance tool for open grassland areas and does support existing environmental local conditions. For example, in 2000, the Prairie View Nature Preserve was developed as a restored prairie area. Natural resources maintenance projects have implemented prescribed burns at prairie view in 2004, 2008 and 2012, and 2017. A rotational burn every 3 to 5 years is recommended in unimproved grassland areas as noted in the burn plan. Prescribed burning actions should take place prior to ground-nesting activities in the spring or during the fall. Grassland maintenance activities are planned in areas around the Munition Storage Area (MSA), west of the lagoons, west of the airfield

security fence, in and around the horse pasture areas, near family camping, and in the Dakota/sunflake parcel east of County Road B3.

Sewage Lagoon Habitat

The sewage lagoon east of the base is important habitat for waterfowl, swallows, shorebirds, and black terns. The lagoons are immediately adjacent to a 6800+ Kellys Slough National Wildlife Refuge complex wherein the management objective is waterfowl and shorebird production by the USFWS. Several rare birds have been observed at the sewage lagoon area including the peregrine falcon, golden eagle, short-eared owl, snowy owl, horned grebe, short- billed dowitcher, northern harrier, and marbled godwit. The sewage lagoons shall continue to be monitored for rare bird species using the area, and the adjacent grasslands will be included in the fire management plan and noxious weed control plan. A migration and breeding bird monitoring effort is scheduled to be conducted every 5 years. The most recent migration and breeding bird surveys were conducted in 2019 (see Appendix I). The same sampling points are used in this survey located in a variety of habitats throughout the Base in an effort to provide population and trend data over time. The grassland to the west of the lagoons is an alkali mud flat that regularly is filled with shorebirds. Noxious weeds and Russian olive trees are invasive in this area and are targeted for removal.

7.2 Outdoor Recreation and Public Access to Natural Resources

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

There is a wide array of outdoor recreation activities at GFAFB for military and civilian employees. These activities are restricted for public use by the current military mission and base entry procedures. The region provides a plethora of private and public lands with an array of recreational activities from fishing and boating to camping and hunting. The primary outdoor recreation goal on base is to conserve and protect current resources in an effort to foster community spirit and improve quality of living.

The natural resources program provides deer archery and an interpretive nature trail. The nature trail winds through the Prairie View Nature Preserve and butterfly garden and includes several points for “ecosystem observation.” The multi-use trail is approximately nine miles long and is partially asphalt covered. The trail is used for a variety of exercise and nature-related walks and activities.

Deer Archery

Hunting, fishing, and trapping are appropriate when they are consistent with INRMP goals for natural resources management. Fish and game harvests must comply with all national and state laws and regulations, and will be consistent with Department of Defense principles for ecosystem management and biodiversity conservation. The designated installation natural resources program manager is responsible for direction and oversight of the hunting programs and fee collection for hunting permits. Organizations outside the installation chain of command shall not direct policy on hunting, fishing and trapping. GFAFB coordinates hunting policies with the NDGFD and the USFWS for the installations hunting program.

Published base instruction, GFAFBI 32-4004 regulates all hunting on base (Appendix D, Fish and Wildlife Management). White-tail deer frequent all base areas to include grasslands and shelterbelts of the MSA, the golf course, horse pastures, multi-use trail, prairie view nature preserve and the turtle river riparian area. Parts or in some cases all of these areas are open to deer archery and are specifically detailed in the base instruction. NDGFD has commented that deer harvest rates need to be increased. Research to improve harvest rates while not potentially increasing airfield safety are ongoing.

Administrative and management costs associated with the wildlife management of hunting, fishing, and trapping must be fully reimbursed by user fees collected by the installation and deposited into the AF account for fish and wildlife management (57 5095). The DoD Form 1131, Cash Collection Voucher is used to record fee collections and submit collections to the appropriate accounting and finance office. The Natural Resources Program Manager issues base permission permits and collects the fees. All hunters must firstly possess a ND deer hunting license. Base permits are issued using a lottery and a fee of $10 is required at the time the permit is issued. Fees are reviewed annually by the NRM and may be adjusted.

The deer archery season is authorized annually and coincides with the state of North Dakota deer archery season in accordance with state law. Due to base requirements necessary to ensure safety and military security, only active duty military and dependents, retired military and dependents, and DoD civilians are eligible to apply for permits to hunt in the designated areas. Each hunter must notify Security Forces prior to entering the field to hunt in their designated area. Under certain circumstances, mission or Force Protection requirements will supersede hunter's rights.

There are areas where mission security and safety concerns will not allow such hunting use.

Off Road Vehicles (ATV's, Snowmobiles', Etc)

Certain EOs and AFMANs provide guidance on outdoor recreation activities having the potential to affect the environment. Current language in AFMAN 32-7003 Section 3.57, Recreational Off Road Vehicle (ORV) Use, requires agencies to restrict and close areas damaged from ORV use. "Allow use of off- road vehicles only after thoroughly analyzing the impact of such use on soils, archeological sites, wildlife, water quality, and other ecosystem attributes." ORV includes ATV's and snowmobiles. Specific language of the AFMAN is provided below:

- 3.57.1. Restrict use of off-road vehicles, including mountain bikes and other all-terrain vehicles, to areas that can sustain their use without damage to natural or cultural resources.
- 3.57.2. Close areas that are damaged from off-road vehicle use to prevent further damage. Undertake rehabilitation projects to restore the damage.

Base Instruction GFAFBI 31-218 (I) also addresses off-road vehicle operation. EOs 11644 and 11989 (an amendment to EO 11644) provide additional guidance and were established to provide "procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands."

EO 11644 requirements include:

- Sec. 3. Instructs agencies to minimize soil, watershed, and vegetation damage, minimize harassment of wildlife and habitat disruption, minimize conflicts between recreation uses or neighboring public lands, and ensure adequate opportunity for public participation.
- Sec 5, Instructs respective agencies to ensure all trails are properly marked, with information available describing the conditions on vehicle use in the area.
- Sec 8, States the respective agency is responsible to monitor the effects and review the impacts of the ORV use. The respective agency "shall from time to time amend or rescind designations of areas or other actions taken pursuant to this order as necessary to further the policy of this order".
- Sec 9, Instructs the respective agency to close the ORV area if considerable adverse effects have taken place, and reopen the ORV area only if the "adverse effects have been eliminated and that measures have been implemented to prevent future recurrence".

This INRMP restricts motorized off-road vehicle use to only designated areas for training purposes, Outdoor Recreation USAF Services grooming equipment on the approved trail for cross-country skiing and security forces patrolling the perimeter road and responding to emergencies as necessary. No recreational use, joy-riding or training in undesignated areas on any type of motorized ORV is further allowed to comply with EOs 11644 and 11989 and AFMAN 32-7003 on GFAFB. ORVs have a documented history on GFAFB of rutting and eroding wetlands and grasslands. During an external EOHCAMP audit, motorized ORVs were found damaging wetlands and grasslands. Signs were erected to help protect these sensitive areas.

Generally, motorized ORVs are noted to disturb wildlife, and can cause erosion and facilitate the spread of noxious and invasive weed seeds and propagules. Any desired use on federal property must have a documented need for the activity according to EOs. Historically, snowmobiles were designated a specific access trail to leave the base as requested by the Freedom Riders club. No snowmobile joy-riding is or was allowed on base property during that time. The Freedom Riders club has disbanded in recent years, and the access trail has been eliminated. There are several snowmobile trails available immediately adjacent to the base to enjoy this winter activity. Should a future ORV use be warranted that is different than listed in this INRMP, an environmental assessment must be conducted, rules and regulations developed, and coordination conducted with INRMP stakeholders to include USFWS and NDGFD to approve any such use. Natural areas like the Turtle River riparian corridor are protected from all off-road vehicles that have the potential to degrade the site; however, some illegal activity still may occur. Areas near the flight line or sensitive natural areas like the Turtle River or wetlands are not appropriate for these types of activity. In addition, ATVs are not allowed in wetlands or places where ground-nesting birds are breeding between May and August.

Dog Park

In 2010, the base installed a dog park. This area consists of a fenced flat grassy parcel located south of the Prairie View Court housing development. This area was conveyed under the housing privatization agreement; however, it will need to be managed in accordance with the INRMP. There are rules posted in the park regarding dog waste removal. The area has a few trees that were relocated into the area from the neighboring Prairie View Nature Preserve. More landscaping should be programmed and designs developed to enhance the natural surroundings and aesthetics of the area.

Outdoor Recreation USAF Services

Outdoor Recreation USAF Services offers rental equipment for recreational activities, such as camping and fishing equipment. Outdoor recreation facilities include horse stables, skeet range, gardens, playgrounds, pavilions, picnicking, an ice skating rink, a multi-use trail, bicycle motocross (BMX) track, paintball, remote-controlled plane club, family camping (FamCamp), golf course, athletic courts, and sports fields. GFAFB has a nine-hole golf course covering an area of about 100 acres and is open from April to October. It is maintained and treated with DoD approved- chemicals.

A gravel-covered BMX mountain bike area lies north of the north horse pasture and is adjacent to the multi-use trail. The grounds maintenance contractor takes care of the multi-use trail and the BMX area by mowing, trimming and spraying for weeds. Gardening opportunities are available for base residents. About five acres are sectioned off into 50, 20- by 40-foot plots which can be rented. In the spring they are tilled and, weather permitting, they are tilled in the fall as well. The Sportsman's Club offers skeet and archery. Membership costs $20 for a single membership or $30 for a family membership. In addition, there is a family campground (FamCamp) consisting of 21 full hook-ups, and amenities such as a mini laundromat, showers, handicapped accessible bathrooms and cable. Pavilions are available throughout the base for a variety of gatherings. Ice skating, depending on the weather is available from December to March. Skates can be rented for $2 a day. Lastly, there is a remote-control plane hobby club that has a small structure and field associated with it.

Paintball

The only official area authorized for paintball use is located in the former housing Dakota/Sunflake parcel, and is operated and maintained by Outdoor Recreation. Paintball is not allowed in the Turtle River riparian area (CE Park), because it is in conflict with the sanctioned deer hunting program and could be detrimental to the sensitive natural resources and soils in that area.

Paintball as an outdoor recreational sport is growing in popularity. Several personnel and their families are participating in this activity during their free time. In response to this demand, Outdoor Recreation developed a part of the former Dakota Sunflake housing area for paintball use. Several obstacles such as movable walls were set up in the area to facilitate paintball gaming. The parcel is posted with signs stating it is US Air Force property. Weeds are becoming a problem in the area, and do require appropriate management. Outdoor Recreation USAF Services purchased a tractor capable of pulling a 20-foot mower and plans to begin mowing management of the paintball area. Security Forces may wish at times to use this area for training missions. Security Forces may practice combat movements in the area, and at that time no recreational paintball occurs. Bow hunting also occurs adjacent to this area, however all paintball events are finished for the year when hunting begins.

This INRMP recommends that Paintball gaming develop a management plan and coordinate the plan with the natural resources program. Ideally all recreational activities should develop management plans to facilitate proper stewardship of natural areas on the base or an overall Outdoor Recreation Management Plan should be developed that can encompass all aspects.

Horse Stable and Pasture

The stables are available to military personnel and their families for boarding privately owned horses. The base does not provide horses for recreation. Outdoor Recreation USAF Services is responsible for managing and maintaining the barns and the pastures. The Saddle Club is concerned about pasture

conditions caused by encroachment of invasive weeds and woody plants, particularly Russian olive trees.

At any given time, there are several horses at the stable individually owned by several families. At the present time, horses are utilizing both north and south pastures. Both pastures combined total about 65 acres. The 45-acre north pasture has been divided into two sections and during the summer, horses are rotated between the two sections. During the winter, horses utilize the south pasture. The south pasture has been restored and replanted. Further reseeding plans need to be discussed and planned with outdoor recreation. Seed for restoring the pastures has been provided by the natural resources program. Grasses planted include timothy, orchardgrass, and perennial ryegrass. Both pastures contain wetlands that require protection during reseeding events, and must be avoided. Occasionally, Outdoor Recreation USAF Services mows the horse pastures to control for weeds. There is currently no management plan for the horse pastures. A management plan for the horse pastures (or overall outdoor recreation mgt plan) is planned to be developed to foster appropriate equine grazing, increase plant biodiversity, provide wetlands protection and manage invasive and noxious weed species.

7.3 Conservation Law Enforcement

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

To enforce wildlife and hunting state laws and base regulation, GFAFB uses federal and state conservation officers for such purpose. Either Security Forces or the natural resources office will contact the proper authority for enforcement. In addition, GFAFB may designate fish and wildlife law enforcement authority to military or civilian personnel who have either been certified in the conservation law enforcement program (CLEP) through training at the Federal Law Enforcement Training Center or by commission as a fish and wildlife conservation officer in the state where the installation is located. Law enforcement personnel, such as Security Forces, who do not possess either federal or state fish and wildlife enforcement certification can be used to supplement fish and wildlife law enforcement under the direction of certified personnel and as such can detain any offenders until appropriate authorities may be reached. GFAFB does not have a CLEP representative, but rather uses the local game warden to typically enforce conservation laws.

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

Applicability Statement

This section applies to USAF installations that have threatened and endangered species on USAF property. GFAFB currently has no documented federal T&E species on base, but is does have numerous species of concern and several species are identified as having a High INRMP priority for management.

Program Overview/Current Management Practices

Because there have been no Federally-listed threatened or endangered species identified on base, there is currently no need to consult with the USFWS under Section 7 of the ESA. Consequently, there are no current biological opinions issued to GFAFB for threatened or endangered species.

Plant, fish and wildlife surveys conducted on installation property have provided extensive presence/absence data for both federal and state threatened and endangered species, species of concern and habitats. An INRMP Priority index was developed for all species of concern by assigning ranked values to 1) all state and federal conservation status listings, 2) available and quality habitat, 3) abundance status, and 4) permit depredation species status. The resultant priority index was then used to assign a High, Moderate or Low ranking to each species of concern identified on GFAFB. Using this method, GFAFB has 1 Amphibian, 5 insects, 2 mussels, 3 plants, and 11 bird species were identified as a High Priority for base conservation.

Species	**Scientific Name**	**Federal Status**	**State Status**	**Habitat**
Canadian Toad	Bufo hymiophyrs	-	ND SCP (level 1)	Shallow wetlands, streams and roadside ditches. Winters in burrows below frost line.
Monarch Butterfly	Danaus plexippus	-	ND SCP (level 1)	Fields, roadside areas, open areas, wet areas, or urban gardens; milkweed and flowering plants are needed for monarch habitat.
Regal Fritillary	Speyeria idalia	-	ND SCP (level 1)	wet meadows and tallgrass prairie
Dakota Skipper	Hesperia dacotae	T		Mixed and tallgrass prairie
Poweshiek Skipperling	Oarisma poweshiek	E		Remnants of native prairie
Rusty Patch Bumble Bee	Bombus affinis	E	-	grasslands and tallgrass prairies
Mapleleaf	Quadrula quadrula	-	S3, ND SCP (level 3)	Large permanent streams. Located in the Turtle River (CE Park).
Creek Heelsplitter	Lasmigona compressa	-	ND SCP (level 1)	Large permanent streams. Located in the Turtle River (CE Park).
Dutchman's breeches	Dicentra cucullaria	-	S1	Early spring bloomer, part shade, woodlands
Lesser yellow lady's slipper	Cypripedium parviflorum var. parviflorum	-	S2/S3	fields and open Areas, wet areas
White lady's slipper	Cypripedium candidum	-	S2/S3	fields and open Areas, wet areas
Bobolink	Dolichonyx oryzivorus	MBTA	ND SCP (level 2)	Variety of grasslands including tall grass prairie, hay-land, and retired cropland.

Black-billed Cuckoo	Coccyzus erythropthalmus	MBTA, BCC	ND SCP (level 1)	Groves of trees, forest edges, and thickets, frequently associated with water.
Le Conte's Sparrow	Ammodramus leconteii	MBTA	ND SCP (level 2), SU	Fens, lowland tracts of tall grass prairie and wet meadows.
Lark Bunting	Calamospiza melanocorys	MBTA	ND SCP (level 1)	Plains, prairies, meadows and sagebrush
American Bittern	Botaurus lentiginosus	MBTA, BCC	ND SCP (level 1)	Bogs, marshes, and wet meadows.
Dickcissel	Spiza americana	MBTA, BCC	ND SCP (level 2)	Alfalfa, sweet clover, and other brushy grasslands, irruptive species – 2007 on base
Black Tern	Chlidonias niger	MBTA, BCC	ND SCP (level 1), S?	Shallow freshwater marshes with emergent vegetation, including prairie slough, lake margins and occasionally river or island edges.
Red-headed Woodpecker	Melanerpes erythrocephalus	MBTA, BCC	ND SCP (level 1)	open forests with clear understories, tree-rows in agricultural areas
Chestnut-collared Longspur	Calcarius ornatus	MBTA, BCC	ND SCP (level 1)	Mixed-grass and short grass uplands. Open prairie and cropland.
Grasshopper Sparrow	Ammodramus savannarum	MBTA, BCC	ND SCP (level 1)	Open grasslands and prairies with patches of bare ground.
Nelson's Sparrow	Ammodramus nelsoni	MBTA, BCC	ND SCP (level 1), SU	Freshwater prairie marshes and meadows.

Table of High Priority Species of Concern

Table Key and Sources:

U.S. Fish and Wildlife Service (USFWS), 2020. USFWS Endangered Species; Species by County Report. Accessed 04 Feb 2020 from http://www.fws.gov/endangered/

MBTA = Protected under the Migratory Bird Treaty Act
BGEPA = Protected under the Bald and Golden Eagle Protection Act
E = Federally Endangered under the Endangered Species Act (ESA)
T = Federally Threatened under the Endangered Species Act (ESA)
C = Federally listed as a Candidate species under the Endangered Species Act (ESA)

BCC = Birds of Conservation Concern for the Prairie Pothole Bird Conservation Region, 2008, USFWS, Division of Migratory Bird Management. The 1988 amendment to the Fish and Wildlife Conservation Act mandates the U.S. Fish and Wildlife Service to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to becomes candidates for listing under the ESA of 1973.

North Dakota Natural Heritage Program (NDNHP), 2013. Accesses 06 May 2013 from http://www.parkrec.nd.gov/nature/heritage.html

S1 = State-listed critically imperiled
S2 = State-listed imperiled
S3 = State-listed rare or uncommon
SU = Unrankable – currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

S? = Inexact numeric rank – denotes inexact numeric rank

SH = Possibly extirpated (historical) – Elements occurred historically in the state, and there is some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years.

North Dakota's Species of Conservation Priority 2015, State Wildlife Action Plan

ND SCP = North Dakota Species of Conservation Priority

North Dakota Century Code 2016, Access 04 Mar 2016 from http://www.legis.nd.gov/general-information/north-dakota-century-code

NDCC = North Dakota Century Code

INRMP Management Priority = Ratings developed from multiple conservation listings, Depredation permits, Abundance Checklists and GFAFB Species of Concern Management Plan, 2011

High priority species of conservation concern include a few pollinators for GFAFB, the rusty patch bumble bee (*Bombus affinis*), Dakota skipper (*Hesperia dacotae*), poweshiek skipperling (*Oarisma Poweshiek*), monarch butterfly (*Danaua plexippus*), and regal fritillary (*Speyeria idalia*). The monarch and regal fritillary butterfly have been documented on base. No apoidea surveys have yet to be conducted on the installation, and therefore occurrence of the rusty patch bumble bee on GFAFB is unknown. Previous butterfly surveys did not detect either the Dakota skipper or the Poweshiek skipperling. The base does have habitat for the Dakota skipper. During previous INRMP stakeholder meetings with USFWS and NDGFD it was requested the base plan, fund and execute an apoidea survey to look for the rusty patch bumble bee. It was further commented that the base should plant milkweed in unimproved grassland areas to support monarch butterflies where applicable. Therefore, natural resources projects shall include support of pollinator habitat to include plantings of milkweed at the Prairie View Nature Preserve, front gate meadow, family camping grassland or other unimproved areas in a manner which attracts butterflies and other pollinators. Surveys targeting the rusty patch bumble bee will also be planned and programmed for execution.

Other high priority species of conservation concern include the Canadian toad, and two mussels (Maple Leaf and Creek Heelsplitter) found along the Turtle River corridor and the corner of the base sewage lagoons area. The common snapping turtle is also found in this location. Both frogs and turtles are protected by ND Law Title 20.1 where licensing is required prior to take of these species. Water quality issues and climate change likely will affect the health, abundance and distribution of these species on base. Mussel species are particularly affected by sedimentation of river bottoms and that is a concern for the Turtle River.

Plant species of INRMP priority include the Dutchman's breeches (Dicentra cucullaria), and it is categorized as state S1 (critically imperiled) species. It was discovered in the Turtle River Lowland Woodlands/riparian forest, located in the northwestern portion of the Base. The lesser yellow lady's slipper (Cypripedium parviflorum var. parviflorum) and the white lady's slipper (Cypripedium candidum) orchids have been found growing in intermixing patches on Base, just west of the airfield and also in the

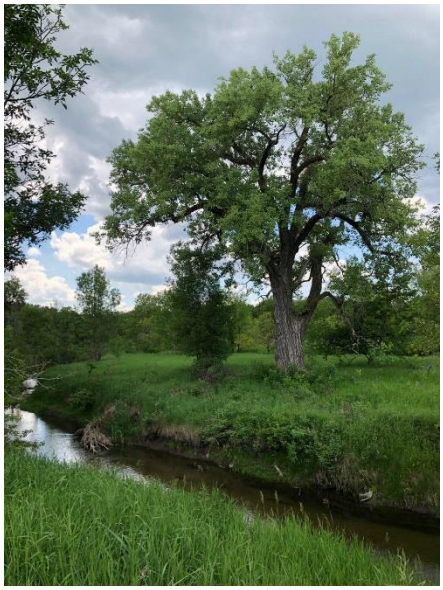
southeastern portions of the base. Both of these plants are listed by the state of North Dakota as S2/S3-State Imperiled/vulnerable species of concern. The location of these plants has been recorded using GPS and these areas should be protected from mowing and agricultural activities as applicable. Hybridization is a concern regarding species conservation.

No mammals ranked as high priority, however several have been observed over the years that are considered species of concern (fisher, river otter, arctic shrew, little and big brown bats). Several bird species were calculated as an INRMP species of conservation priority. None of these priority birds are identified on the Migratory Bird Depredation permit. To help manage for these species, a comprehensive migratory and breeding bird survey is accomplished every five years for species monitoring. In addition, compliance with wetland protections shall also support conservation of these species. The bald eagle is not on the INRMP priority species list, as the installation holds a harassment permit for the species. However, in coordination with NDGFD bald and golden eagle nests are surveyed and documented, if present, annually by the NRM. These field surveys will typically take place before leaf-out so that nests are visible, which is usually between March 1 and May 15. Currently, no known bald or golden eagle nests exist on base. Another important species not listed on the base INRMP species of priority is the peregrine falcon. However, the peregrine falcon is listed on the ND Species of Conservation Concern as a level 3 species. Base safety has requested and been approved to depredate peregrine falcons under the issued USFWS Migratory Bird Depredation permit.

Turtle River Riparian Forest

According to the North Dakota Natural Heritage Inventory, there are several rare species and significant ecological communities surrounding GFAFB. Types of communities are mainly fresh and saltwater marshes/wet meadows. Two remnant natural areas lie within the boundaries of GFAFB and are ranked S2 (imperiled) by the North Dakota National Heritage Program (NDNHP). These communities are the Turtle River, which represents the River/Creek community, and the lowland woodland community associated with the Turtle River area. These two areas are generally referred to as the Turtle River Riparian Forest or CE park. The habitats in the Turtle River area are considered to hold high ecological connective value from a wildlife perspective and the forested area, although a few invasive species have been identified, appears to be in good health. The invasive zebra mussel has not been identified in the Turtle River as of yet, however monitoring of the river should be programmed as the mussel has been found in the Red River in Grand Forks in Oct 2015. Targeted species of concern are frequently located here (mussels, amphibians, reptiles, plants, mammals and birds).

Riparian forests can vary in width from a few feet to several hundred feet. Riparian forest differ from upland forests in that they can be expected to flood, and therefore the tree species found here are able to tolerate brief periods of flooding much better than upland tree species. This particular lowland woodland community on GFAFB consists of ash, elm and cottonwood and is one of ten natural communities occurring in Grand Forks County. Some riparian tree species such as cottonwood and willow rely on spring flooding to prepare seedbeds. Healthy wooded riparian areas provide many important benefits. They help reduce flood damage, filter sediment and chemicals from surface and subsurface runoff, and add biodiversity to the landscape. Generally, when riparian woodlands are removed, erosion of riverbanks increases and water quality decreases. The upland areas immediately bordering the Lowland Woodland community are generally above the high-flood level. In this more upland portion of the woodland, species such as bur oak, green ash, basswood or American linden (Tilia americana), and common hackberry are dominant.



Major flood events have altered channel morphology, moved significant quantities of large woody debris and blocked and clogged the Turtle River's water flow while increasing sediment loads into the river. Additionally, unauthorized paintball and ATV activities are occasionally destroying natural vegetation and degrading habitat in this area.

Best management practices for stream or riparian areas such as the Turtle River primarily revolve around reducing and controlling erosion and maintaining native vegetation along the stream's banks. This is accomplished by protecting and, where needed, replacing native vegetation in bare areas; protecting the area from off-road vehicles causing erosion and dispersal of weed seeds; controlling storm water runoff into the stream; improving timber and agricultural practices to reduce erosion and run off, if applicable; and excluding cattle and vehicles of any kind from entering the water.

A Classification of Natural Rivers, (Rosgen 1994) healthy waterways should include the following:

- Maintained stable stream channels (pattern, dimension, and profile) IAW landscape features
- Channel dynamics that allow water to spread laterally rather than vertically through the channel (decrease artificial bank stabilization such as riprap, concrete, tires etc.)
- Maintenance of natural hydrologic cycles (i.e. flooding and seasonality of flow)
- Protection of riparian woodlands, vegetated buffers, associated wetlands and other water bodies
- Minimization of pollution entering riparian areas due to poor human land management practices

Proposed project actions considered for the improvement of this area include designs for tree and shrub plantings to stabilize riverbanks, removal of large woody debris blockages and other trash items as necessary and repairing areas showing minor bank erosion. Bioengineering projects were considered, but are not recommended at this time. This technique would trap sand and sediment falling from a bank above and would attempt to prevent further erosion during flood conditions. Use of these artificial means to stabilize and harden the banks would not be used. The purpose of these efforts is to reduce the sediment load to the Turtle River and improve water quality and that would directly benefit the mussels, common snapping turtle and the plant species of concern located in this area.

Prairie View Nature Preserve

The installation hosts the Prairie View Nature Area as a restored upland prairie with a nature trail, arboretum, interpretive signs, and a butterfly garden promoting environmental education, physical fitness and mental well-being. The upland prairie area was planted with western wheatgrass, slender wheatgrass (Agropyron trachycaulum), big bluestem, little bluestem, Indian grass, switchgrass, and a variety of native wildflowers. It is located on the north end of base housing adjacent to North Dakota County Road B3 providing excellent next-door neighborhood opportunities for base residents to walk, jog and enjoy the great outdoors. Prairie View is conveniently connected to the base-wide multiuse trail system.

The conservation management goals for this area generally support pollinator habitat as well as to provide public environmental educational opportunities.

- Maintain grassland health, plant milkweed, and remove woody encroachment
- Reduce broad-leaved weeds and state-listed noxious plants, and institute prevention techniques
- Use prescribed burning as a grassland maintenance tool
- Maintain trails and interpretive signs
- In the arboretum and shelterbelts areas, employ appropriate tree maintenance, planting and pruning in accordance with the specifications by the International Society of Arboriculture (ISA)

More specifically the following management activities are planned:

1. Spot spray herbicide using a backpack method to target noxious weeds and other unwanted broad-leaf weeds. Do not use an ATV or other off-road vehicle. This will be done annually at least once. A field check will be done to monitor weed growth and spread. A second herbicide application by backpack may be necessary. Herbicides used must be on the DoD approved pesticide list.

2. All nature and running trails will be mowed to at least 2 feet on each side of the aggregate trail. The trail should also be sprayed annually to eliminate vegetation from growing through the aggregate. Herbicide on the trail can be applied with an ATV-boom spray method. The trail should be rototilled and repacked approximately every 5-10 years. The nature trail throughout the prairie view nature preserve should remain as an aggregate compliment the natural setting of the prairie.

3. Burning is scheduled approximately every 3-5 years on a rotation depending on field conditions. Burns must be timed appropriately in the spring to favor prairie grasses, yet protect species of concern.

4. Woody encroachment from volunteer poplars, ash, Russian olive, Chinese elm, Siberian elm, buck brush and other tree/shrub species will be removed annually in all areas to include the restored prairie, shelterbelt systems, and other areas.

5. Shelterbelt system must be checked annually for Dutch elm disease, emerald ash borer, and other infectious, contagious tree diseases. Infected trees must be removed promptly from the installation, sanitized and/or buried in an approved land fill.

6. Dead trees will be removed from the restored prairie area and the arboretum. Dead trees in shelterbelts may be providing needed habitat to cavity nester's, and as such should be evaluated prior to removal. If trees are not causing a hazard or are diseased, their presence may be providing an appropriate nesting area.

7. Shelterbelts will be monitored and evaluated for needed clearing/grubbing activity every 5-10 years. Implement clearing/grubbing work as needed depending on weed conditions and woody encroachment by Russian olive trees.

8. Interseeding and/or reseeding of sections will be accomplished as needed to support grassland health or to reestablish bare areas. Seed varieties and rate must be approved by the NRM. Seeding techniques must follow established reclamation/restoration guidelines. Plant milkweed for monarchs.

9. Planting perennials, trees and shrubs will be considered as needed for replacement in the shelterbelt system, along the nature trail or in the butterfly garden. Species planted should support

pollinator species and must be native or hardy to this region, and listed in the GFAFB Approved Plant List (see Appendix G, Invasive Species Control Plan). Russian Olive and ash trees are not appropriate tree species to plant on GFAFB. Tree care includes watering, mulching, pruning, staking and training to a single leader, and installation of tree guards.

10. Mowing sections of Prairie View Nature Preserve may be required depending on field conditions. Mowing is not an annual event, or a regularly scheduled event. Use mowing only if conditions warrant it. For example, if sweet clover, a biennial plant is especially productive in a given year, the best control for that plant is to mow it. As such, a mow would be scheduled for areas exhibiting sweet clover growth. Prairie grass should never be cut below four inches. Mowing can also be conducted to control for noxious/invasive weeds if needed.

Essentially important to this section regarding INRMP Species of Conservation Priority and habitat are proper maintenance of open grasslands, wetlands and shelterbelts available on GFAFB. Where applicable, projects supporting habitat sustainment and enhancement are vital to conservation of these species. This table of high priority species of concern on GFAFB should be distributed to assist in conservation protection efforts to project managers, NEPA, base community planning, and the community during outreach events. A T&E Species and Species of Concern Management Plan was developed to assist with management of the sensitive species and their base habitats to provide guidance during any potential conflicts (Appendix C).

7.5 Water Resource Protection

Applicability Statement

This section applies to USAF installations that have water resources. This section is applicable to this installation.

Program Overview/Current Management Practices

Water Quality

The overall regional issue for water resources significant to GFAFB is water quality. GFAFB lies within the Turtle River watershed and a portion of the Turtle River flows from southwest to northeast through the northern portion of the base. The concept of watershed protection or watershed management is to consider all land management actions in terms of their impact on the quality and quantity of runoff water from the watershed. GFAFB drains into the Turtle River and Kellys Slough, through drainage ditches.

Floodplain and wetlands management play a key role in preserving the quality of surface waters. Vegetated floodplains and wetlands provide important water quality improvement functions. These land features can serve as the buffer between the developed/managed lands and the receiving waters, either as the intact riparian zone between the stream and an area of disturbance, or as a collection and detention point (rain garden) for natural (biological and physical) processing of the water before it enters the stream. The function of wetlands and floodplains for water quality maintenance, as well as wildlife habitat and other functions and values, is recognized in E.O. 11988 and 11990, and in DoD and Air Force policies which mandate maximum avoidance of these features at all Air Force installations. Floodplains have been mapped along the Turtle River and Kellys Slough. Rain gardens are recommended when applicable to the CE programming and planning functions during design review to help reduce sedimentation and improve water quality of runoff entering the Turtle River and Kellys Slough.

Floodplains of the Turtle River are under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and the North Dakota State Water Commission. The North Dakota State Water Commission requires any structure in the floodplain have its lowest floor above the identified 100-year flood level. In regard to other aspects of floodplain management the State Water Commission defers to USACE. USACE recommends:

- Improve system-wide coordination of floodplain management activities among local, state, and federal entities
- Improve other beneficial uses (i.e. creating green space) related to flood damage reduction
- Increase and improve riparian, floodplain, flood basin, and riverine habitats throughout flood management systems using an ecosystem approach
- Promote stability of native species populations, and the recovery of threatened and endangered species in the systems
- Promote natural, dynamic hydrologic and geomorphic processes in the flood management systems,
- Reduce the impacts of past and current floodplain land use activities on hydrologic, geomorphic, and biological attributes of the river systems
- Preserve agricultural productivity while promoting the ecological value of agricultural land
- Incorporate ecosystem restoration features into the design of federal, state, and local flood management programs.

Any materials which can enter the waterways affect the quality of the waters leaving the base. Materials carried in storm water runoff from the developed areas include fertilizers and pesticides from lawns; fuel, oil, grease, and coolant which drops onto the pavement from vehicles and aircraft; and deicing chemicals applied to roadways, runways, and aircraft. Potentially included are uncontained hazardous materials, such as solvents, from normal Air Force use and from ERP sites.

All actions which affect the vegetative cover and/or soil can potentially affect the quality and quantity of water which runs off the watershed during storm events. Such actions include not only military construction projects (which expose the soil to erosion as well as limit infiltration into the soil by converting permeable surfaces to impermeable surfaces), but land management and grounds maintenance (including fertilization, herbicide application, and turf improvement), outdoor recreation (trail design/construction/maintenance), and pest management (pesticide application). Many of these activities are considered "non-point" sources of pollution, which are difficult to regulate centrally.

Watersheds

GFAFB and surrounding areas are located within the 30,100 square miles of Red River Basin. Land in this basin is very permeable and fertile. Nearly 90 percent of the basin is used for agriculture, while only three percent is deciduous forest. The Red River is located approximately 15 miles east of the base. The Red River originates in northeastern South Dakota, drains nearly 28 percent of North Dakota, and flows northward forming the border between North Dakota and Minnesota. It eventually empties into Lake Manitoba near Winnipeg, Canada.

The Turtle River watershed, which includes the GFAFB area, falls within the Red River Basin. The Turtle River is a tributary to the Red River and drains approximately 311 square miles (USGS

2009). The headwaters (North and South Branch) of Turtle River originate approximately 10 miles west of the western boundary of the base. It flows in an east-northeast direction joining the Red River approximately 25 miles northeast of GFAFB. The Turtle River accounts for only 1.5 percent of the total discharge to the Red River. Stream banks of the Turtle River tend to be steep (with the highest banks being 12-13 feet), highly eroded and subject to slumping. Riparian vegetation is confined to narrow strips consisting mostly of woody shrubs. Aquatic plants grow in shallow areas, but are limited in deeper or more turbid areas.

Management at the watershed level means to consider the location of potential sources of contaminants relative to the surface waters, and to preserve or incorporate methods to minimize those impacts. Education of all personnel, contractors and residents of the base is a basic method of reducing the potential contamination to surface waters. BMPs are implemented with all ground-disturbing activities to prevent soil erosion and to protect surface waters on GFAFB. Most are operational, such as maintaining vegetated buffers (known as riparian zones) between the action and the stream; keeping heavy equipment out of drainage ways, streams, and bodies of water; fueling, maintaining, and washing down equipment away from waterways and drainage swales; ensuring equipment does not leak oils, gasoline, pesticide, and so on; providing for spill containment at construction sites; and minimizing the tracking of mud onto paved surfaces. Requirements for temporary or permanent storm water detention/retention basins, percolation trenches, are addressed in the BMPs. BMPs can include structural methods, such as installing silt fence along the edge of a construction site. Many projects at GFAFB are smaller than 1 acre, and are included in the Base Permit. Projects larger than 1 acre require a State Permit.

Responsibility of watershed management does not fall entirely upon operational personnel. Grounds contractors, MFH residents, facility managers maintaining landscaped areas, and general construction contractors, in addition to the operational personnel, must all take responsibility to prevent soil erosion, to maintain or enhance soil fertility on improved grounds, and to protect surface waters from non-point pollutants including sediments, pesticides and excess nutrients, and other surface contaminants.

Turtle River

Based on a sixteen-year period of record, mean annual discharge in the Turtle River ranges from 14.8 to 94.7 cubic feet per second (cfs). The highest daily mean discharge recorded was 5,000 cfs with the lowest daily mean being nearly 3 cfs. Annual runoff generated in this watershed for Water Year 2009 totaled 59,730 acre-feet (USGS 2009). Surface water quality in the Turtle River often reflects a high saline content associated with discharge of groundwater from bedrock aquifers beneath Pleistocene sediments in the Red River Valley. In addition, an increase in dissolved solids occurs from drainage interacting with saline soils and wetlands in the west- central portion of the valley. Surface waters of the Turtle River are characterized by hard, moderately buffered, alkaline waters (pH minimally varies from 7.7 to 8.3) of moderate productivity (USGS 2009).

In 1998, the Turtle River (from its confluence with a tributary upstream of Turtle River State Park downstream to its confluence with the Red River of the North) was classified by as being an impaired water body (NDDEQ 2010). According to the 2010 *Integrated Section 305(b) Water Quality Assessment Report and Section 303(d) List of Waters Needing Total Maximum Daily Loads (TMDL's),* the Turtle River, from upstream of Turtle River State Park downstream to its confluence with Kelly Slough, requires TMDL monitoring due to the fish and other aquatic biota and recreation designated uses being classified as fully supporting but threatened with cadmium,

selenium, combination benthic/fish bioassessments, and fecal coliform cited as impairments. The Turtle River, from its confluence with Kelly Slough downstream to its confluence with Salt Water Coulee, requires TMDL monitoring because the designated use for fish and other aquatic biota is classified as fully supporting but threatened, citing selenium, cadmium, and sedimentation/siltation as impairments. The Turtle River's confluence with the Salt Water Coulee stream is downstream of GFAFB about one half mile due east of the Turtle's confluence with Kellys Slough stream. The Turtle River at its confluence with Salt Water Coulee, downstream to its confluence with the Red River, requires total maximum daily load monitoring as fish and other aquatic biota, municipal and domestic, and recreation designated uses are fully supporting but threatened. Impairments include cadmium, selenium, chloride, arsenic, sedimentation/siltation, and fecal coliform (NDDH 2010).

The Turtle River has a Class II stream designation from the NDDEQ, which means it may require additional treatment to meet the requirements of drinking water, but can be used for irrigation, propagation of life for resident fish species, and water recreation. Streams in this classification may be intermittent making them less beneficial to uses such as municipal water, fish life, irrigation, bathing, or swimming. Kellys Slough NWR is located approximately two miles east and downstream of GFAFB and is a tributary to the Turtle River.

7.6 Wetland Protection

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

Wetlands are defined as areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support the type of vegetation specifically adapted to living in saturated soil. Wetlands in general are recognized as providing a number of natural and beneficial uses, including groundwater recharge and discharge, important wildlife habitat features, flood flow alteration, bank stabilization, and water quality maintenance. It is national policy to provide for the protection of wetlands to the maximum extent possible.

In accordance with this national policy, EO 11990 requires all federal agencies to provide leadership in the protection of wetlands in acquiring, managing, and disposing of Federal lands; providing Federally undertaken, financed, or assisted construction and improvements; and conducting Federal activities and programs affecting land use. Federal agencies shall avoid undertaking or providing assistance for new construction located in wetlands unless 1) there are no practicable alternatives to such construction (as determined by the Deputy Assistant Secretary of the Air Force in charge of Occupational Safety, Health and the Environment) and 2) the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use. In making a “Finding of No Practicable Alternative” (FONPA), the Deputy Assistant Secretary may take into account economic, environmental and other pertinent factors. DoDI 4715.03, Enclosure 3, 4.b.(1) sets a goal of no-net-loss of wetlands on DoD lands, that is, adverse effects on DoD wetlands should be avoided whenever possible, and reduced or mitigated when unavoidable. Consequently, GFAFB must avoid construction activities in wetlands to the maximum extent possible. Avoidance alternatives must be analyzed for any projects impacting wetlands prior to making any final decision to proceed with the project or to making any

contractual commitment for construction activities. Typically this process begins with the EIAP program on base. Several environmental assessments have been completed that show GFAFB's commitment to evaluate all wetland impacts and alternatives for any given project. Examples of wetlands analysis for avoidance, minimization and alternative siting's to implement wetland conservation include the environmental assessment for constructing the fire station, demolition of the alpha ramp and munitions storage area, the installation development environmental assessment, the digital airport surveillance radar (DASR) project, parking lot at building 314 and the enhanced use lease of 217 acres to Grand Forks County.

All waters of the U.S., including wetlands, streams and some ponds, are also regulated under public law. The CWA of 1977 (PL 95-217 as amended) sets the national goal of eliminating discharge of pollutants into the waters of the U.S. Included in the definition of pollutants is fill material. In accordance with Section 404 of the CWA, a permit must be obtained from USACE (for GFAFB, the Omaha District) for any discharge of dredged or fill material, including incidental discharges, into any water of the U.S. including wetlands. In review of the permit, the area of impact to waters of the U.S. includes the filled area (including dredge material disposal areas) as well as waters adversely affected by flooding, excavation, or drainage as a result of the project. The Section 404 of the Clean Water Act permitting program is jointly administered by USACE and USEPA. The USACE is responsible for administration and permit review and USEPA provides program oversight.

Section 401 of the CWA directs any action (including, but not limited to, construction or operation of facilities) which requires a federal license or permit (such as a Section 404 permit) be certified by the State so the action complies with state water quality criteria. The authority to administer this Section in North Dakota is delegated to the NDDEQ, Water Quality Section. The permit provided by the State under this Section is generally referred to as a 401 Water Quality Certification. Additionally, GFAFB will ensure ND Century Code Chapter 61-32-03 that indicates a permit is required to drain a pond, slough, lake, or sheetwater, or any series thereof, which has a watershed area comprising eighty acres [32.37 hectares] or more is adhered to.

Nationwide permits are available for a variety of activities such as maintenance, road construction and utility work. These are general permits granted by USACE for activities which will cause minimal adverse environmental effects (33 CFR 330). To date, 50 Nationwide Permits have been authorized by the USACE for actions such as utility crossings, minor roadway crossings, and minor discharges of fill material. Nationwide Permits have been reviewed according to the 404(b)(1) guidelines and found to have minimal individual and cumulative impacts, and generally are permissible without the need for alternatives analysis and public review. Additionally, the NDDEQ has added conditions to the Nationwide Permits, meaning coordination with the NDDEQ may be necessary even though the project otherwise satisfies the conditions of a Nationwide Permit. In any case, EO 11990 requires the Air Force to review alternatives and provide public review of all actions which impact wetlands. Additionally, the Fish and Wildlife Coordination Act requires the USACE District Engineer to contact other federal and State fish and game and water

pollution control agencies for comments for any action which they must review for a permit. Consequently, impacts to wetlands at an installation must still undergo an alternatives analysis and public notice procedure, even if authorized under a Nationwide Permit.

An application to the USACE District Engineer for either a standard or Nationwide permit must include a completed Application for Department of the Army Permit form (ENG Form 4345), a vicinity map, and plan view and cross sectional views of the action including limits of jurisdictional waters (if known), the normal water level, volume of fill material to be discharged below ordinary high water, and the area of waters affected. The limits of jurisdictional waters are the ordinary high water mark in the case of streams or open water bodies, or vegetation, hydric soils, and evidence of hydrology according to the current federal methodology in the case of wetlands.

Individual Permit applications to the USACE are automatically routed to the NDDEQ for review under Section 401 regulations; therefore, a separate application to the NDDEQ is typically not required. However, a separate application to the NDDEQ may be necessary if an action is authorized under a Nationwide Permit by the USACE, but is required to have a separate 401 water quality certification (WQC) by the NDDEQ.

The base natural resource manager researches the most recent guidance prior to implementing activities near wetlands and provides review comment on all project designs and NEPA analysis. Additionally, the natural resource manager coordinates with USACE, USEPA, the state of North Dakota, and any other agency regarding project-specific details. The natural resource manager implements the following process to determine if permitting is required with the USACE, USEPA, or the State of ND, on a project-by-project basis and annually, at the completion of this INRMP. As a general rule, if a project or activity is within 50 feet of a stream, lake, or wetland boundary as identified by the most recent wetland delineation GIS files (most recent available), proceed with the following steps:

1. Review AFMAN 32-7003, Section 3C, Sections 3.17 through 3.21 to ensure compliance with USAF's internal wetland guidance.

2. Field-verify planning level detailed wetland boundaries available in the natural resource GIS database and cross reference proposed project boundaries. Request if needed, a detailed wetland delineation appropriate for jurisdictional determinations following the USACE 1987 manual. These delineations are a proponent cost.

3. Determine if the project or activity might result in any wetland fill; stream diversion, obstruction, or change in surface or subsurface hydrology; or stormwater or pollutant discharge into streams, rivers, lakes, or wetlands.

a. Determine if the project or activity is ditch maintenance. Review, "Exemptions for Construction or Maintenance of Irrigation Ditches and Maintenance of Drainage Ditches Under Section 404 of Clean Water Act"

i. If the proposed activity is ditch maintenance, it is exempt under Section 404 of the Clean Water Act, 33 CFR 232.3c(2) for an individual permit requirement.

ii. Determine if the proposed ditch maintenance activity qualifies under the most recent Nationwide Permit (NWP) #3, Maintenance.

1) If the proposed activity qualifies under paragraph b of NWP #3, the applicant must submit a Pre-construction Notification to the district engineer prior to commencing the activity.

b. If the activity is a proposed project and has potential to affect any of the items listed in #3, then an EIAP action must proceed.

4. If impact to wetland area or wetland function may result, conduct a protection sequence and evaluation of alternatives to first avoid impacts, and then minimize impacts. If impact cannot be avoided, a FONPA must be prepared and attached as part of the EIAP.

a. If it has been determined wetlands will be affected by a project action, conduct a full USACE wetlands delineation, request a jurisdictional determination, and then apply for a Section 404 permit, if required. Appropriate permits will detail any mitigation required on a project by project basis as directed by USACE. Project proponent is responsible to pay for jurisdictional delineations and mitigation activity.

b. If the impact is over 80 acres of wetland a permit must be sought from the state water commission.

c. Cross reference any applicable Nationwide Permits if appropriate and apply as needed.

5. Do not implement the project or activity until the USACE, or other reviewing agencies, have approved the project and have issued any required permit(s).

6. Implement the project, close-out and conduct monitoring as needed.

If wetland permits are received, GFAFB will implement any subsequent mitigation measures required by USACE or NDDEQ for work in jurisdictional wetlands. If affected wetlands by any project are determined as non-jurisdictional, all efforts will be made to avoid and/or minimize impacts to wetlands under EO 11990. There are currently no pending Section 404 and 401 permits on the base and the Rivers and Harbors Act does not apply to GFAFB. However, a nationwide permit #12 for Utility Line Activities detailed by the Sanitary Sewer Force Main Repair and Replace project is currently open under NWO-2008-2903-BIS. The project will destroy a wetland less than 1/10th of an acre in size by digging up the old pipe and replacing it. The ground will be reseeded with appropriate wetland plants after construction work is complete. GFAFB has used several NWP's over the years to include things like installation of culverts, temporary dam construction, maintenance, road and utility repair. Most impacts have been less than 1/10th of an acre in size, and so best management and minimization practices have been implemented.

Many man-made ditches created during installation establishment now meet the definition of a wetland, and several were once assigned a jurisdictional status. Some ditches exhibit all three wetland characteristics to include the presence of water, hydric soils, and wetland vegetation. The ditches discharge directly into Turtle River and Kellys Slough NWR, therefore the USACE took jurisdiction over these waterways at one time. Ditches on base require occasional clean-out and maintenance to remain in compliance with NPDES permits. Proposed maintenance of any ditch should be evaluated to determine if the exemptions for ditch maintenance listed in Section 404(f) of the Clean Water Act and as further outlined in the USACE RGL 02-07 apply to the work.

Nationwide Permit #3 details maintenance activities and indicate when pre-notification for ditch maintenance is required to the district engineer. Currently, ditch maintenance work is ongoing at GFAFB and operating under the assumed section 404(f) exemption of the CWA.

If future project specific jurisdictional wetland delineations are required for programmed operations and maintenance and military construction projects, the proponent is responsible for funding that effort along with any potential mitigation efforts required. Design efforts should practice avoidance, minimization, and mitigation as lawfully required to protect and conserve wetland areas. As such, effective planning and design must be early planning and design to ensure no delays to the mission. Project stops and mission delays could be encountered without such detailed planning efforts due to a lack of a current base wide jurisdictional determination on all wetlands.

GFAFB does not own, manage, or participate in wetland banking. The base is interested in participating in regional wetland banking, as wetland banks often provide greater benefits to the overall ecosystem of an area than small, isolated mitigation sites. Participating in a wetland bank would additionally ease any future mitigation required by installation projects. Exploration into any local opportunities providing this service with private and public groups in greater detail to help facilitate any future mitigation requirements is intended as applicable during the length of this INRMP.

GFAFB has created brochures describing illegal activities in wetlands, and the benefits of wetlands at GFAFB. Wetland benefits include the ecological importance in reduction of flooding, trapping sediments, recharging ground water, and providing habitat for wildlife. No waste dumping of any kind is allowed at GFAFB. Types of dumping can range from lawn waste, tree pruning, old landscape materials, building rubble, and road embankment fill. Water quality in wetlands shall be protected and enhanced in all base areas as long they do not impose mission constraints or airfield safety problems. Wetlands conservation and water quality shall be improved by using avoidance, educational brochures and sign markers, protective buffers, control of invasive/exotic species, proper permitting procedures, and by preventing potentially contaminated runoff from reaching wetlands. Additionally, restoration and enhancement of wetland resources will improve wildlife habitat.

Wetlands and Wildlife

Protecting and complying with wetland laws will benefit wildlife needing marshes and sedge meadows for habitat. By using proper permitting procedures for wetlands, GFAFB shall conserve and protect wetland species. Reptiles and amphibians located at GFAFB are dependent on the health and vitality of the prairie pothole system present. There are many butterflies also dependent on wetland ecosystems as well. Development of rain gardens should be pursued to assist in water quality improvement, but also to additionally provide habitat to butterflies and other urban wildlife. Protecting marshes and prairie potholes from physical damage and pollution will also benefit aquatic and terrestrial invertebrates, which form the basis of the food chain in grassland ecosystems like GFAFB.

7.7 Grounds Maintenance

Applicability Statement

This section applies to USAF installations that perform ground maintenance activities that could impact natural resources. This section is applicable to this installation.

Program Overview/Current Management Practices

The installation cantonment area encompasses 4,830 acres, the sewage lagoons consist of 320 acres, and a variety of easements, leases and licenses occupy 595 acres, totaling 5,745 acres owned and managed by the base. Grounds maintenance categories on installation include improved, semi-unimproved, golf greens, and unimproved areas. Golf course greens are cared for by the golf course management team. All vegetation areas struggle with invasive and noxious weeds, and various mechanical, cultural and chemical techniques are used to provide control. Contractors, the Pest Management shop, USFWS and golf course services personnel regularly may apply fertilizer and herbicides to various grounds areas. GFAFB only applies DoD approved pest management materials. Approved fertilizers/herbicides are applied in accordance with the manufacturer's instructions by licensed applicators only. The type and amount of herbicide and fertilizer used are documented by the applicator and reported to the 319 CES Pest Management shop. To avoid non-point source pollution issues, contractors coordinate with both the environmental management and Pest Management shop to ensure compliance with pesticide/herbicide reporting procedures and federal and state laws.

An emphasis on environmental conservation has been encouraged to reduce grounds maintenance costs, reduce pesticide use, and improve base aesthetics. Landscape design using native plants and other regional hardy cultivars adapted to less water use and maintenance are encouraged and have been implemented on the installation. Plants installed on base should adhere to the INRMP approved and prohibited plant listing (Appendix G). Several success examples include landscaping at the front and south gates, and the cold war heritage plaza. Grounds maintenance costs can be reduced by converting appropriate semi-improved areas to unimproved prairie areas that require minimal maintenance as well.

Improved and Semi-Improved Grounds

Improved ground includes vegetation that is usually a mixture of Kentucky bluegrass and red fescue and these areas are mowed weekly and have intense management. These areas consist of all covered areas (under buildings and sidewalks), land surrounding base buildings, the golf course, recreational ball fields, and the family housing areas. Improved areas struggle with thistle, dandelions and bare areas. Bare areas result from frequent mowing in saline environments in and around the installation.

Semi-improved vegetation is generally composed of Kentucky bluegrass, red fescue and smooth brome grass. Semi-improved areas are mowed less frequently than improved areas, and are maintained with a grass height level between 5-14 inches. Types of semi-improved grounds are those areas that include the fence lines, ditches, and other urban-fringe areas. Semi-improved areas provide a transition corridor between improved and unimproved areas.

The grounds maintenance contract maintains improved and semi-improved ground at GFAFB. In improved areas, the grounds maintenance contractor cuts grass to maintain a grass height between 2 and 4 inches. The contractor is responsible for removal of all natural debris, including leaves, tree limbs, dry brush, rodent habitats, and disposal of all debris at an off-base location in accordance with existing local, state, and federal regulations. Contractor BMPs include maintaining uniform grass, free of skips, gaps, rutting, or scalping. The grounds maintenance contractor is responsible for weed control in all turf areas maintained under the grounds maintenance contract. Herbicides are applied to all

improved areas, landscaping beds, sidewalks, roadways, parking lots, and airfield pavements as necessary to control weeds. Dandelions and thistle are the most problematic weed invaders to improved turf areas and newly landscaped beds. Landscaped beds located at building foundations, intersections, signs and other places have largely been removed to reduce grounds maintenance costs. Standard rock and mulch selections have been made to blend and bring the community area together into a pleasingly aesthetic campus-like setting.

Use of dead soil zones via chemical herbicide application around objects for the purpose of easing mechanical mowing and reducing potential damage by lawn mowers is not acceptable practice. Vegetation in improved areas around such objects as trees, fire hydrants, signs, fences, posts, etc., shall be maintained at the same uniform height to adjacent turf grass at 2-4 inches. Trees often succumb to careless maintenance activity from direct mower hits, motorized trimming techniques that strip bark at the bottom of the trunk, and from herbicide drift and overspray. Maintenance contracts must include tree protection from mowers and spray events and provide replacement trees should the tree require removal or dies. Inclusion of mulching techniques, use of tree guards, and proper staking/guying should be included in grounds maintenance contracts for GFAFB to protect the health and vitality of the urban forest canopy. This technique also offers a buffer around new trees to protect them from mowing activity. The urban forest canopy provides many benefits and a standard level of protection is warranted.

Golf Course Grounds Maintenance

Turf maintenance on the golf course should include integration by thoughtful design where applicable using prairie plants. Prairie grasses and forbs require less water and maintenance and efforts to restore prairie “pockets” in and along the golf course should be made. Small restoration projects like this can benefit pollinator species and provide naturalizing aesthetics to the ecological setting of GFAFB. Designing with prairie plants also advances golf course turf management in the clear zone where vegetation heights are a concern. The clear zone overlaps part of the golf course. Design and planting of trees and other vegetation on the golf course should consider the geographic location of the airfield clear zone intersecting the golf course. Trees planted should not have mature heights over 40 feet. Lightning and other weather-related damage to trees along with accidental hits from mower maintenance is fairly common on the golf course. Deer can occasionally be a problem for young saplings planted on the golf course. Tree protection and pruning along with appropriate landscape maintenance needs implementing to protect any new tree resources. Tree planning, planting, and maintenance must be coordinated with natural resource management.

Unimproved Grounds

Typical unimproved grounds include woodlands/shelterbelts, hay areas, grasslands, and wetlands. These areas generally are located in less developed areas of the installation. Unimproved vegetation receives various grounds maintenance management actions such as haying, occasional mowing, woody

vegetation removal, herbicide treatments, grassland restoration (plowing, disking, reseeding), shelterbelt management and/or prescribed burning actions to provide adaptive natural resources management care. Unimproved areas have a variety of shelterbelts and grassland type assemblages that support several INRMP species of conservation priority to include pollinators. The grounds maintenance contract has limited support to maintain unimproved grounds up to 100 acres annually. Contract modifications and budget dollars need to be sought if work effort exceeds 100 acres in unimproved areas. The majority of maintenance in unimproved areas, not in any agricultural lease, is accomplished by the installations USFWS partners. Grounds maintenance in these areas includes adaptive management with respect to weed control plans and monitoring.

Noxious and Invasive Weeds

There are both federal and state legal drivers that require weed control on federal property. Furthermore, GFAFB is surrounded by highly valued agricultural land where noxious weed control directly affects the local economy. To maintain compliance with local, state and federal regulations and to foster neighborly environmental stewardship, GFAFB has developed an inventory and a noxious weed control program implemented through this INRMP. The noxious weed control plan (Appendix G, Invasive Species Control Plan) is the day to day management tool for the base weed program. The control plan recommends the use of chemical, cultural, and mechanical methods for the eradication of noxious weeds. The surveys of 2003/04, 2008/09 and 2012 found noxious and invasive weeds in all unimproved grounds areas surveyed. Monitoring the presence, spread or decrease of weeds is integral to a successful noxious weed control plan.

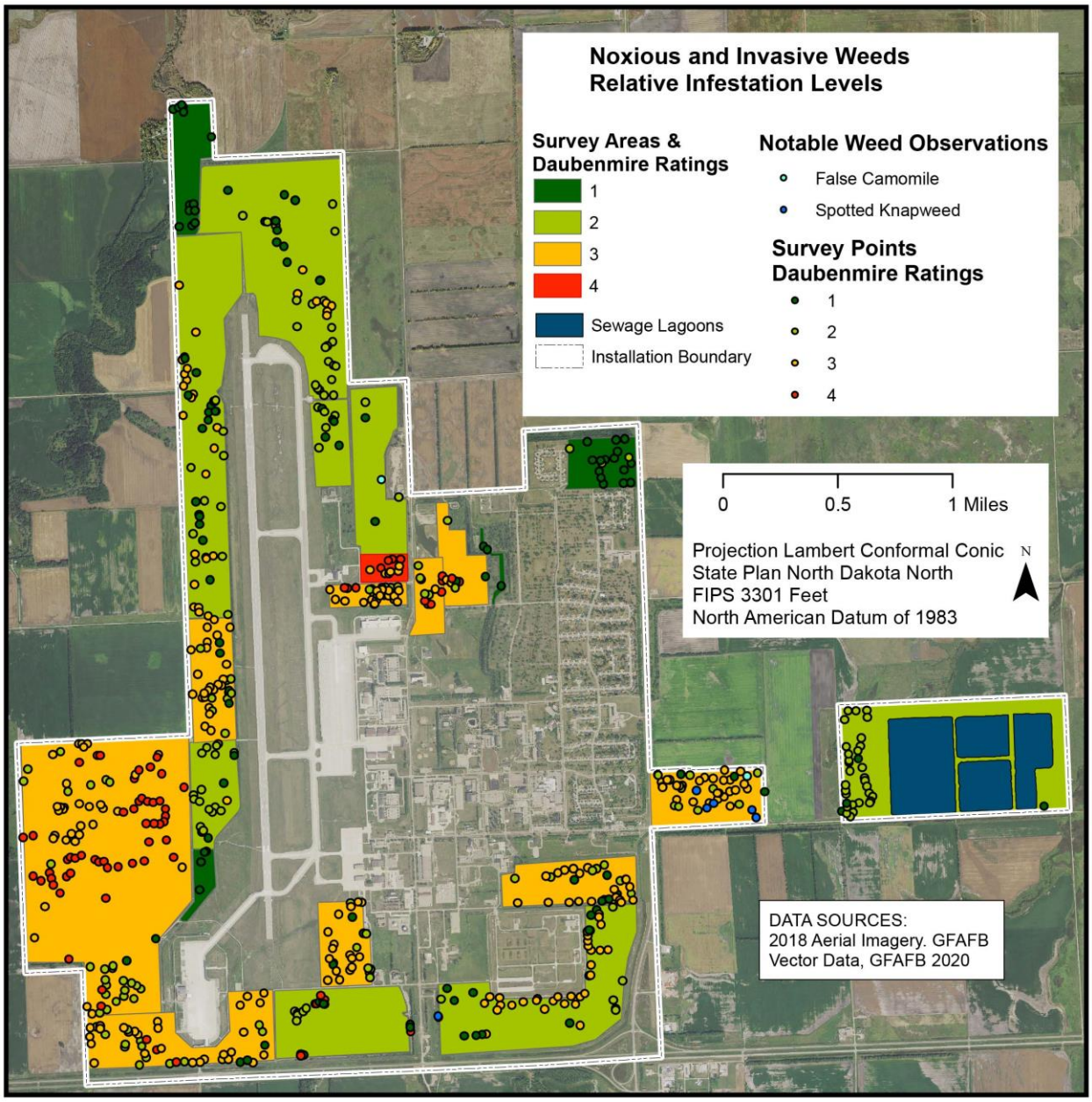
Six noxious and three invasive weeds have been identified on the installation. The noxious weeds are absinth wormwood (Artemisia absinthium), Canada thistle (Cirsium arvense), leafy spurge (Euphorbia esula), musk thistle (Carduus nutans), spotted knapweed (Centaurea stoebe), and kochia (Bassia spp.). The invasive weeds are field bindweed (Convolvulus arvensis), bull thistle (Cirsium vulgare) and perennial sowthistle (Sonchus arvensis). The most prevalent weeds surveyed were Canada thistle, leafy spurge and perennial sowthistle. Canada thistle was found in all survey transects, while leafy spurge was found in 90% of the survey areas. Weeds with less frequent occurrences were absinth wormwood, musk thistle and spotted knapweed, bull thistle and field bindweed. Table Daubenmire Results depicts the relative abundance and distribution of noxious weeds (GFAFB, 2013), and the Map Noxious Weeds Infestation Areas shows the locations of noxious weed species on GFAFB. The weed problem is considered base-wide and a significant threat to base natural resources. Climate change could potentially exacerbate this issue.

Various base groups conduct field weed control across the base to include the grounds maintenance contract, golf course personnel, Pest Management shop, roads/grounds shop and USFWS partners. The USFWS is employed through use of an interagency agreement and implements INRMP projects for weed control. A season-based schedule using multiple methods of weed control along with adaptive management is executed. Mechanical means such as mowing, burning and woody invasive removal are heavily employed. These efforts help focus natural resources management supporting open grasslands free of weeds. These same techniques are used in the shelterbelt systems to provide maintenance as well, except burning. Repeated mowing of an area identified with heavy thistle can help reduce thistle and other weed seed reproduction. Mowing annually can maintain an area free of woody encroachment, like hay lease areas. Depending on the burn time-of-year, prescribed-burning can help reduce leafy spurge and thistle expansion.

Area Number	Absinth Wormwood	Canada Thistle	Leafy Spurge	Musk Thistle	Field Bindweed	Bull Thistle	Perennial Sowthistle
1	1	1-3	1-3	1-2		1	1-2
2		1	1	1			1
3		1-2	1-2	1	1		1
4	1	1-3	1-3	1	1-2	1	1-2
5	1	1-2	3	1		1	1
6		1-2	1-3	1		1	1
7		1-2	1				1
8		2-4	2-3	1-2	1		1
9	1-3	1-2	2-3	1-2		1	1
10	1	1	1-2		1		1
11	1	1	1				
12		1-2	1	1	1		
13	1	1	1-4	1-2			1-2
14		1-3	1-2	1	1		1
15	1	1-4	1	1		1	1
16		2-3	2-3	1		1	1
17		1	1-2				
18	1	1-2	1			1	1-2
19		1-3	3-4			1	1-2
20	1	2-3	1-3		1		1-2
21		2-4	2-3				1
22		1-3	1-3				1-4

Note: Cells with two numbers separated by a dash: the first number is the Daubenmire rating for the overall Area; the second number indicates there are locations within the Area with higher levels of infestation.

Table Daubenmire Results



Noxious Weed Infestation Area Map

Use of biological controls on the base using the leafy spurge beetle is ongoing. During the summer of 2015, approximately 5,000 leafy spurge beetles were released in the west airfield area and areas around the MSA. During the summer of 2019 signs were put up to protect areas with beetles from mowing to allow the beetles to do their work. Beetles were also released along the multi-use trails areas in the housing shelterbelts.

Ground herbicide applications are exclusively used across the base and provide the least amount of environmental damage, consistent with DoDI 4150.7. An EA was completed addressing natural resource actions regarding noxious weed control, and was updated in April 2013 because of the level of effort and herbicide required to accomplish weed control and elimination. Herbicide applications

for weeds are integral to noxious weed control, and are conducted via backpack, ATV and tractors w/boom sprayers. The type of chemical used and spray application is dictated by seasonal specific ground conditions, type of vegetation (grassland, shelterbelt, wetlands, etc) and size of parcel. Using an aerial spray method to apply herbicide is not recommended on the installation because of the high risk associated with natural resource damage caused by drift. In 2005, herbicide was aerially sprayed over the airfield, because the ground was too difficult to cross with equipment. Unfortunately, unintended areas were sprayed and significant untargeted vegetation were killed due to spray drift. Given the location of high-value farmland in the area, this practice is not recommended in this area due to potential crop loss. All chemically sprayed areas are reviewed and follow-up applications or other management actions are rendered as needed.

Monitoring notes have showed that the conditions and spread of weeds, monitoring frequency and intensity needs to be increased given the magnitude and legal duty to control noxious weeds. Basic monitoring efforts should be conducted to measure the success of control methods employed. The control plan provides detailed quantitative maps of each management unit and recommends control for each area. Weed management activities are conducted through designed, programmed, and budgeted projects to further weed control on the installation. Some successful noxious weed control progress has been made as it was found that Canada thistle has decreased in average infestation level. However, it was found that leafy spurge appears to have increased (GFAFB 2013). Some success has been derived from grassland restoration projects using native species implemented under the USFWS interagency agreement conducting INRMP programmed projects. Native species are usually best able to combat the continuous pressure noxious weed invasion presents over other exotics and non-native species. Annual grassland projects including prescribed burning, mowing, herbicide applications and interseeding are planned in various sections of unimproved and semi-improved base areas as INRMP projects.

Fostering an atmosphere of environmental stewardship and compliance with the law is very important. Historically, GFAFB was sued in relation to herbicide application on a previously owned missile site wherein field runoff from the AF affected private agricultural land. GFAFB lost the lawsuit, and paid a significant fine. In 2009, the Grand Forks County Weed Board requested that GFAFB implement weed control in the NW airfield section of approximately 60 acres that was currently inundated with musk thistle. The base immediately cut the noxious weed down, and followed-up with a milestone herbicide application. The following summer in 2010, the same plot was sprayed with herbicide again, and additionally mowed. Spotted knapweed was identified on the installation in 2008/2009 in the Sunflake/Dakota parcel, and is believed to be the first occurrence of this weed in Grand Forks County. It likely was introduced through the bases many construction and/or demolition projects by trucking and/or heavy equipment activity. The survey conducted in 2012 did not find any spotted knapweed on base. As stewards of the environment, best management practices (BMP's) to reduce the likelihood of spreading weeds are encouraged and are included in design reviews by the natural resource manager. Contract specifications and in-house work are obliged to limit possible seed transport from infested areas to non-infested areas by avoiding activities in or adjacent to heavy infestations or removing seed sources and propagules from site prior to conducting activities. Also included in contract specifications is a requirement to wash or otherwise remove all vegetation and soil from equipment before transporting to a new site. If fill material is required, weed free sources should be used. Prevention is the best method to control the spread of noxious weeds. While the Russian olive tree is not a state-listed noxious weed in North Dakota, the use of this tree at GFAFB is prohibited due to their massive

seed production and ability to rapidly overrun an area to the detriment of native species. This tree is not included in any new construction projects.

7.8 Forest Management

Applicability Statement

This section applies to USAF installations that maintain forested land on USAF property. This section is not applicable to this installation. However, the installation maintains approximately 145 acres of functional shelterbelts for wind and snow control.

Program Overview/Current Management Practices

Land capability to support a sustainable commercial forest on GFAFB is severely limited by soil depth and/or precipitation. Scattered clumps of trees exist in the unimproved portions of the Base, including along the banks of the Turtle River, and are representative of eco-tonal transition between forest and prairie. Existing stands of trees, including shelterbelts, and any natural or artificial regeneration of forest species provide many benefits. Therefore, no commercial forestry operations are currently in effect at GFAFB. The main forest types that exist on base are shelterbelts, the urban forest and the bottomland and upland forested areas in the riparian corridor along the Turtle River. The ND Natural Heritage Program consider this riparian area as imperiled in the state and one of ten natural communities occurring in Grand Forks County.

Forest Resources

Dutch elm disease has killed many of the elms in this Turtle River riparian area, in shelterbelts across the installation, and along community streets and in yards throughout base housing. In addition, of significant importance is the threat of emerald ash borer to the installation's forestry resources. No emerald ash borers have been detected in the state of North Dakota as of yet, but in nearby Minnesota there have been a few infestations.

There are 26 acres of bottomland hardwoods and 5.6 acres of upland hardwoods in CE Park/Turtle River Riparian area. A Turtle River Forest Resource Plan was developed as part of the Access and Recommendations for Riparian Stabilization and Restoration of the Turtle River within the GFAFB. Land management objectives for the bottomland hardwoods include maintaining and improving water quality, stabilizing the river banks, and maintaining the area for deer bow hunting. Historically, this forest stand was grazed, but has not been grazed by domestic livestock in the last 50 years. The stand has an almost complete cover of bromegrass both beneath and between the trees. Thistle, cocklebur and stinging nettles are common invasive species as well. Once established, bromegrass is very effective at keeping tree and shrub species from growing. There are very few young trees growing in this stand. GFAFB has the following BMP's to be included in all contracts, base projects, and leases relevant to the riparian area only:

- Protection from destructive practices.
- Minimization or elimination of heavy equipment along river bank. Encouragement of natural regeneration of tree and shrub species.
- Monitoring for insect and disease outbreaks.
- Planting tree and shrub seedlings along top of bank where no natural regeneration exists.
- Monitoring for beaver activity and remove beaver from site as needed.

Tree City USA

GFAFB received a Tree City USA award for 24 consecutive years since 1993. In 2005, the base received the Trees in Government award, and in 2006 received the Sterling Tree City USA award. The program has been disbanded since the natural resources AFMAN 32-7003 no longer requires this program, nor has it been requested by base partners or INRMP compliance stakeholders.

A tree arboretum was developed as part of the Prairie View Nature Preserve. The privatized housing contractor now maintains this area. The arboretum has a variety of tree species with an interpretive sign available to provide information to the public about the arboretum. The arboretum could benefit from installation of individual tree identification signs. In accordance with DoD policy, contractors must adhere to the INRMP.

Urban Forest Management

An Urban Forestry Management Plan and Tree Inventory was developed and provides a baseline inventory in a GIS database for location, condition, size, age, and species on most of the cantonment area. Management recommendations for the urban forest, as well as for individual trees, are included. The Urban Forestry Management Plan and Inventory is located in Appendix E, Forest Management Plans. The most current inventory GIS layers show 10,639 individual trees on base of approximately 95 different species. The most populous species on base are the Colorado spruce and ash, comprising 43% of the urban forest canopy. No funding is available to continue upkeep of the urban tree GIS database. Spatial GIS tree information can provide an avenue to manage tree resources by:

- Proactively removing known hazards and replanting when appropriate to include dead, diseased or hazardous trees.
- Scheduling regular pruning and inspections of trees and maintaining these records for trends analysis. Eliminate wasted funds on trees that need only regular maintenance every couple of years.
- Scheduling regular site visits to pest prone species for evaluation (emerald ash borer)
- Actively and rapidly entering historical data from the field crews.
- Maintaining a photographic record of problematic trees.
- Tracking costs of maintaining the urban forest on a daily, weekly or yearly basis.
- Calculating energy savings to structures from adjacent tree resources

It is recommended to maximize GIS training and support to natural resource management, grounds maintenance QAE and landscape architecture to enhance management of the urban forest. The urban forest is managed away from the airfield to avoid potential airfield and wildlife conflicts.

A large part of urban tree management is appropriate tree maintenance. Tree removal and trimming are performed in the 1) airfield clear zone to ensure clear zone requirements are met, 2) along the perimeter security fence to maintain visibility, 3) urban community annually according to the pruning plan developed by the grounds maintenance contractor and 4) shelterbelts and elsewhere as needed to remove diseased or invasive trees. Unnecessary tree pruning and trimming will be eliminated where appropriate.

All tree trimming shall be accomplished in accordance with the American National Standards Institute ANSI A300 Part 1 industry standards. Pruning shall be required to lift, remove, and/or cut back branches that conflict with normal traffic or safety. In addition, trees shall be pruned or trimmed that pose public safety hazards. Minimum safety clearances are:

- 14 feet over streets
- 12 feet over driveways
- 8 feet over walkways
- 4 feet over buildings
- 1 foot from buildings

Trees that pose threats to structures or buildings shall be removed. It has been recognized that many trees and snags provide wildlife habitat. Tree and snag removal will occur if they present a hazard to human safety or infrastructure. If possible, the removal will occur outside of the nesting season (February 1 to July 15) to avoid impacts to migratory birds. Topping and dehorning are not permitted. Trimming or pruning of tree branches that touch or hang over energized utility poles or power lines is the responsibility of the contractor. GFAFB uses these INRMP specifications and BMPs for inclusion in all contracts, base projects, and leases.

Because of Dutch elm disease, many American elm trees need to be removed annually and properly disposed/sanitized by either burial in an approved land fill, burning, or chipping. Grounds maintenance QAE and natural resource manager regularly mark affected trees for removal. Continued Dutch elm mortality is expected and consequently monitoring of elm populations on base must be ongoing indefinitely. Appendix E, Forest Management Plans, Dutch elm disease, provides additional information.

The emerald ash borer pest is a concern for GFAFB as approximately half of the urban canopy consists of green ash trees. Should the borer infest the installation, the ND Forest Service must be consulted to institute appropriate quarantine and sanitization procedures. The green ash is one of the most abundant trees on base, and as such active monitoring and managing for tree biodiversity is a must to prepare for potential infestations of the emerald ash borer to protect tree resources.

Biophytoremediation

A tree-planting project for bioremediation purposes was established near a fuel storage area on Base. Trees numbering approximately 433 poplar (Siouxland, prairie sky, and imperial) and Russian olive trees were planted on 0.66 acres. Contamination includes chlorinated solvents and fuel from a jet engine test cell (Building 539) used from the late 1950s through 1992. The building was removed in 1996. A petroleum odor was detected in the soils, and samples were found to contain trichloroethylene (TCE) and petroleum hydrocarbons (DRO and GRO). Eleven monitoring wells exist at the site and are sampled annually. Phytoremediation will be used to clean up the site (Area of Concern 539) and provide hydraulic control of the groundwater flow keeping contamination on the site. The tree species were selected because they are capable of drawing relatively large quantities of water from shallow groundwater and associated capillary fringe. The site was also seeded with salt-tolerant, fast-growing, high-water-use grasses including tall fescue, western wheatgrass, sainfoin (Onobrychis vicifolia), and hycrested wheatgrass. The project was funded through Environmental Compliance at an estimated cost of $363,000. Should the existing trees (formerly used for bioremediation) require removal and/or replacement for project purposes, they should be removed from this area and disposed of according to AF and local requirements.

Shelterbelts

Field surveys were conducted in June 2012 during which the overall health of base shelterbelts was assessed. The shelterbelts were located and incorporated into the GFAFB Geographical Information System (GIS). The information provided by the GIS may be used in base operation, management, and development decision. The general health of the existing shelterbelts is good; however, several areas are in need of maintenance in order to restore their quality and efficiency in accomplishing their intended purpose. Currently, the Base does not plant green ash or Russian olive on the installation. Due to the abundance of existing green ash in the urban canopy and the significant threat of the emerald ash borer, natural resource plans direct planting a diversity of hardy cultivars for the region. Russian olive trees are not planted as they are highly invasive, exotic and easily spread to the prairie areas where they are unwanted.

There are approximately 145 acres of shelterbelts on base and they provide many functions such as wind/snowbreaks, carbon sinks and support energy conservation as well as providing wildlife habitat. The general condition of base shelterbelts is seen as a concern, because many were installed in the late 1950s and contain trees reaching physiological maturity. Additionally, some of the shelterbelts have been devastated by Dutch elm disease. Shelterbelts do require some minimal maintenance and species replacement from time to time. Field surveys were conducted in June 2012 during which the overall health of the shelterbelts was assessed. The shelterbelts were located and incorporated into the GFAFB Geographical Information System (GIS). The information provided by the GIS may be used in base operation, management, and development decision. The general health of the existing shelterbelts is good; however, several areas are in need of maintenance in order to restore their quality and efficiency in accomplishing their intended purpose. With this information, a comprehensive shelterbelt plan was developed that summarizes the data collected from those 2012 surveys, presents a management plan for the existing shelterbelts, proposes locations for new shelterbelts, recommends an annual monitoring plan, and discusses future shelterbelt management.

GFAFB has a unique small shelterbelt of Scotch pines that have in the past been thinned, and partially removed. Small lot sale procedures were followed, but no local saw mills made an offer at the time. The Scotch pines removed were penetrating the 7 to 1 imaginary surface approach zone of the airfield. Some remaining Scotch pines are now more than 100 years old according to the ND Forest Service core data from 2005. Several of the volunteer pines from this grove were relocated onto the installation cantonment to develop a new shelterbelt along the installations multiuse trail system.

When planting new trees ensure that the first-year warranty of maintenance is applied to increase the rate of survival. When applicable, plant new shelterbelt trees in cultivated soil. Trees planted in sod tend to have increased competition for water and mineral resources and growth performance is less than those planted in cultivated soil. Woody encroachment and weed invasion can also be problems in shelterbelts. Species such as buckthorn, Russian olive and noxious weeds need to be removed from

shelterbelts located in unimproved grounds areas. Some shelterbelts are in improved grounds maintenance areas where the rows are mowed between and within regularly at 2-4" in grass height. Other shelterbelts are located in semi and unimproved grounds maintenance categories where mowing between and within rows is sporadic.

The concept of strategic placement of shelterbelts for energy conservation, snow management, and wildlife habitats is well proven regionally and will be continued on base. The 2012 shelterbelt plan identifies areas appropriate for shelterbelt placement and enhancement as part of the project planning process. Coordination between the tree board and the installation is necessary to ensure success of natural resource projects and the health of the ecosystem at GFAFB. The Urban Forest Management Plan, Shelterbelt Management Plan and the grounds maintenance contract are folded into this INRMP and follow the umbrella guidance provided in this section. Following this process will provide better species biodiversity management, improved maintenance procedures and efforts, potential cost savings, and enhanced community natural resources. Key coordination with natural resource management on design plans, maintenance schedules, and proposed removals is needed to further the management and enhancement of base forest resources.

Shelterbelts on base need to be maintained with planting appropriate native plants to provide food and shelter for on base wildlife, especially migratory birds relying on these habitats for protection, food, and raising young. The shelterbelts provide important corridors throughout the base connecting habitats, while providing important cover. Monitoring the health of trees and replacement plans are needed to further manage this habitat as several of the belts are now 50 years old. Animals living in base shelterbelts include white-tailed deer, wild turkey, red and gray squirrels, rabbits, and Cooper's hawks.

7.9 Wildland Fire Management

Applicability Statement

This section applies to USAF installations with unimproved lands that present a wildfire hazard and/or installations that utilize prescribed burns as a land management tool. This section is applicable to this installation.

Program Overview/Current Management Practices

GFAFB uses prescribed burning as a natural resources grassland management tool and therefore is required to develop and implement a Wildland Fire Management Plan (WFMP). Risk of wildland fire outbreaks on GFAFB is low, given the geographical nature of the base in the landscape. Adjacent lands around the main base are a patchwork of cultivated farmland, waterfowl production areas and prairie wetlands, offering little dried fuel to feed an ignited spark. A Tier 1 Wildland Fire Management Plan was developed for GFAFB by the AF Wildland Fire Branch (AFWFB) to direct these burning activities (Associated Plans, Tab 1). The base wildland fire history contains 13 wildfires. One documented wildfire of significance occurred in 2005 that burned 15-20 acres near the MSA. Except for known regional concerns, there are no specific identified natural fire hazards within the Base or on adjacent privately owned lands. The typical North Dakota fire season is in the spring, prior to the first rain event and mid-summer months. Dry grasslands caused by low amounts of precipitation may increase the potential risk for wildfires.

Pre-settlement wildfire events in this area occurred typically every 10-30 years and were low intensity/severity grassland fires. At that time, fire and the earth-disturbing activities of animals like bison and badgers combined with the physical constraints of topography and soil type combined to form and maintain the mosaics of habitats making up the grassland ecosystem. It is noteworthy, like the earth-disturbing activities of animals, fire did not burn an area uniformly; some areas never burn and some areas only burn once in a while.

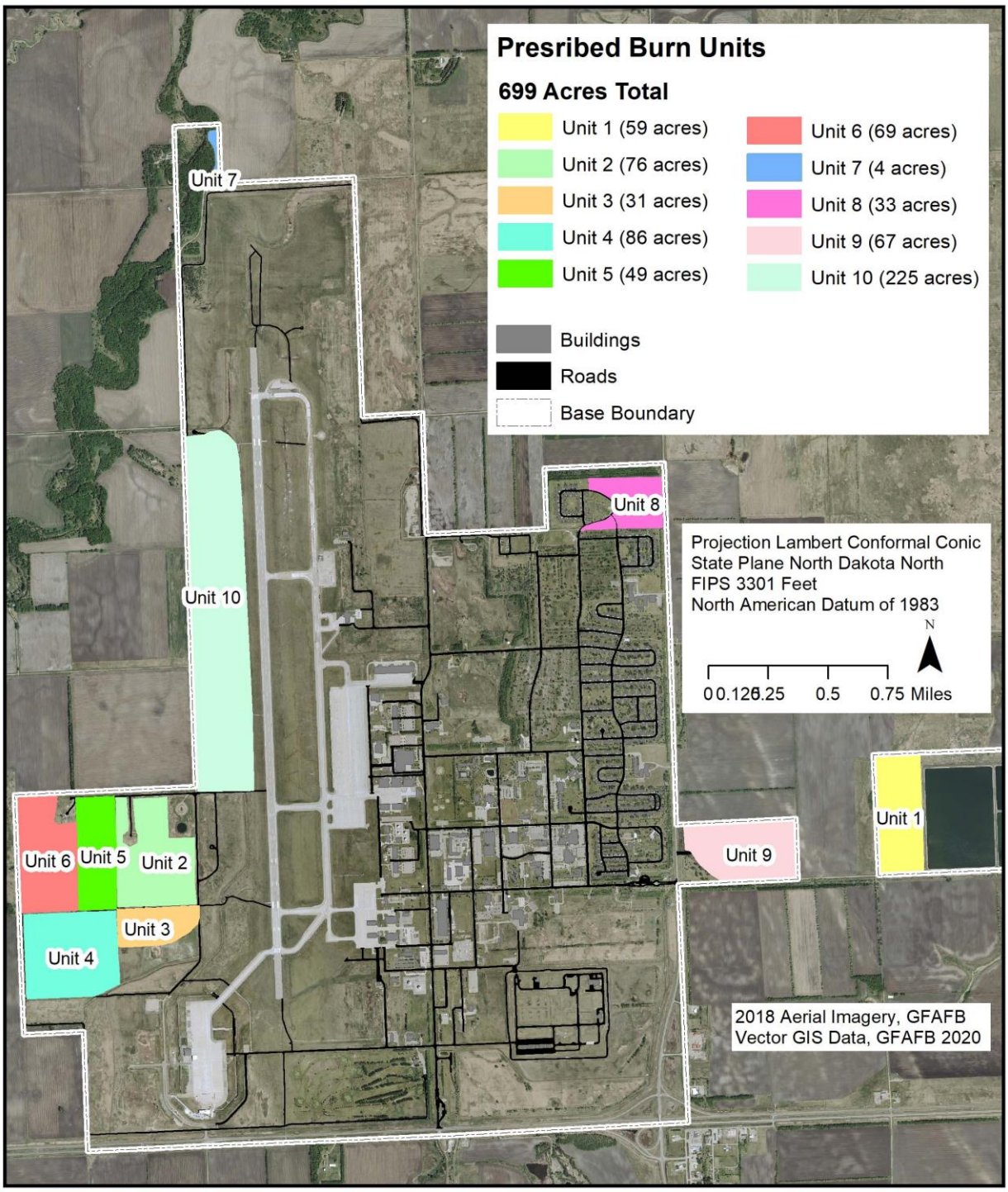
Prescribed fire on base is utilized for ecosystem management to control noxious weeds and improve grasslands. The base follows a prescribed fire plan (available under separate cover). The first base prescribed fire was initiated in 2004 at Prairie View with a successful burn. Subsequent controlled-burns occurred in 2008, 2012 and 2017 at Prairie View and 2010, 2013 and 2018 at the Sunflake/Dakota parcel. Prescribed burning also was conducting on the airfield in 2018 to support operational maintenance on the airfield. Controlled-burning is implemented through the Prescribed Fire Plan, developed by the AFWFB using the Ellsworth Wildland Support Module (WSM), including 10 units covering 639 acres, to support grassland maintenance projects. The following schedule is recommended for prescribed burning and other needed grassland support are shown in the below table and map.

Year	Ellsworth WSM Action	Units	Acres	Time
2020	Rx Grassland Burn	3 & 4	117	Oct (yellow lady slippers)
2020	Russian Olive Shelterbelt Removal	Annual Map	10	Work with Bismarck USFWS
2020	Grassland Tree/shrub Removal	Annual Map	75	Work with Bismarck USFWS
2021	Rx Grassland Burn	2, 5 & 6	194	April/May
2021	Russian Olive Shelterbelt Removal	Annual Map	10	Work with Bismarck USFWS
2021	Grassland Tree/shrub Removal	Annual Map	75	Work with Bismarck USFWS
2022	Rx Grassland Burn	8 & 9	100	April/May
2022	Russian Olive Shelterbelt Removal	Annual Map	10	Work with Bismarck USFWS
2022	Grassland Tree/shrub Removal	Annual Map	75	Work with Bismarck USFWS
2023	Rx Grassland Burn	1 & 7	63	April/May

Table: Grassland management actions needed through the Ellsworth WSM

Often controlled-burning is more cost effective to begin grassland improvements than to use chemical and disking control. Controlled-burning should always be considered in grassland maintenance programs if feasible due to the environmental benefits and cost savings that can be derived. A challenge to implementation of this program has been coordinating a time when conditions present a high potential for success in vegetation management between the WSM out of Ellsworth and the base. GFAFB coordinates with the AFWFB and uses a WSM out of Ellsworth for prescribed fire activities and training. Therefore qualified prescribed burning personnel must travel a distance to GFAFB from Ellsworth

AFB, SD and weather conditions can change rapidly. Smoke management is always a concern regarding the airfield activity, transportation routes, and the base residential area. Ensure smoke



Prescribed Fire Units Map

management rules are followed in the wildland fire management plan. Regarding seasonality and timing to support natural resources programs, burning in late April is usually best for control of brome and Kentucky bluegrass. Fall burns are recommended for units 3 and 4 where there are known orchid

populations sensitive to spring fires. Burns should occur approximately every three to five years, based on detritus build up and prairie conditions. Natural resource management will monitor grasslands and identify land parcels for controlled-burn maintenance to best optimize weed control and grass vitality. The bird breeding season must always be considered prior to burning in the spring time, and should be timed appropriately with natural resource guidance. Burn permits from the NDDEQ are required prior to any burning event on GFAFB.

7.10 Agricultural Outleasing

Applicability Statement

This section applies to USAF installations that lease eligible USAF land for agricultural purposes. This section is applicable to this installation.

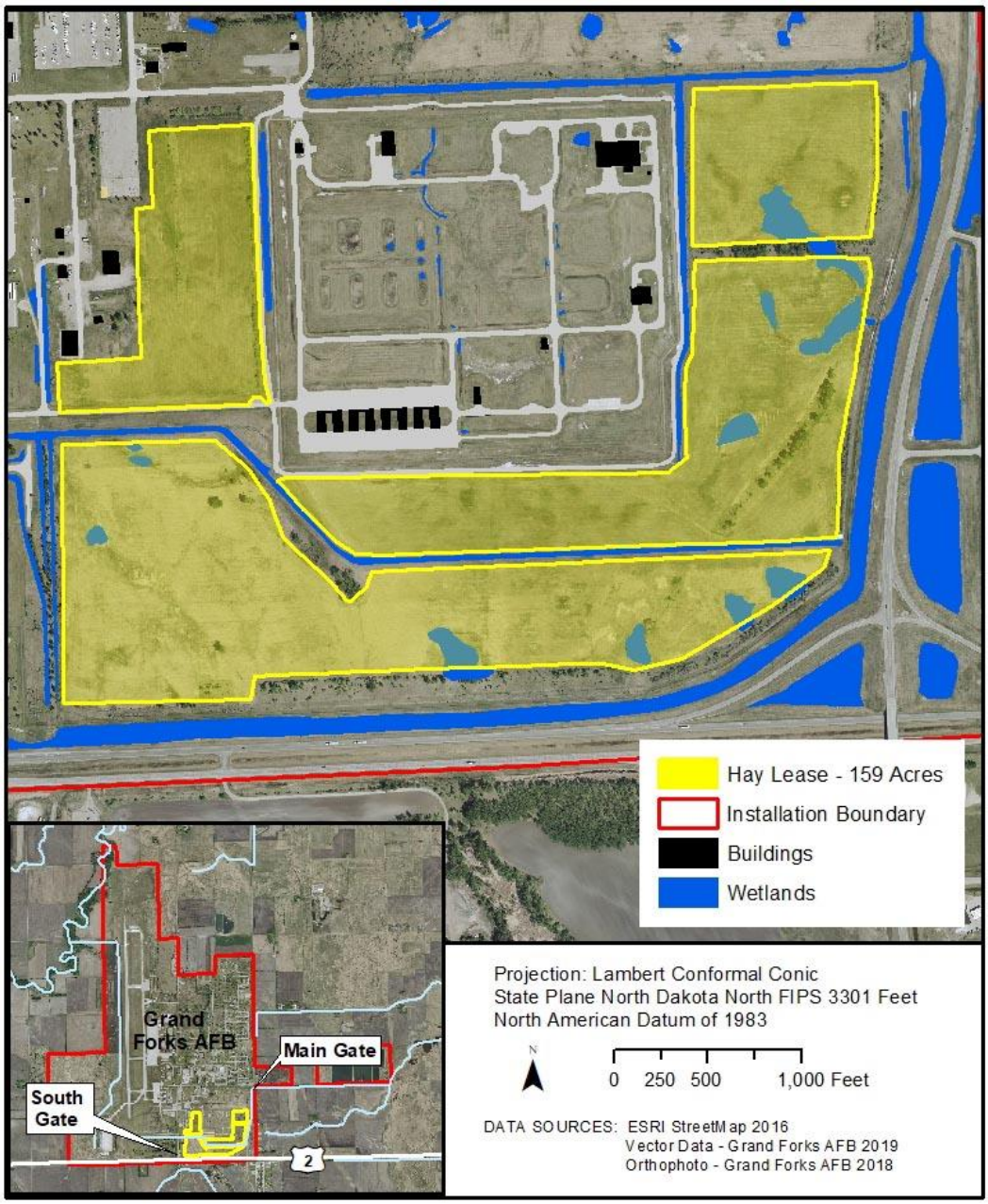
Program Overview/Current Management Practices

Since the 1980s, a hay lease at the recommendation of the natural resources program has been the best management practice for much of base grassland areas (+700 acres). As previously noted, a management tool, like annual haying, allows biomass to grow, assists evapotranspiration drying out the soils, and eventually enables hay equipment maneuvering without rutting and ponding of water in saline prairie areas like GFAFB. In 2003, GFAFB temporarily discontinued the leasing of hay land specifically in an attempt to make improvements on rough field and landscape conditions if possible. Specifically, some areas were covered with tree stumps, gopher holes, and tree seedlings, which made operation of equipment dangerous to operators and costly for equipment maintenance. Projects were funded and a contractor was hired to restore/replant grass in various hay field sections. The work included clearing of debris, leveling where necessary, spraying herbicide, and tilling the proposed area for seedbed. Unfortunately, a section along the west side of the airfield was unable to be worked with a heavy plow due to geology, landforms and local ecotype (glacial beach ridge area). After workable ground preparation was completed, grass seeding for hay was accomplished. No mowing was conducted in these areas in 2006 to allow the grass to grow and establish.

The real estate office administers the agricultural outlease along with USACE, Omaha District. Natural resource management is responsible for land use and monitoring requirements for the agricultural lease. Land use regulations include stipulations about noxious weeds, maintaining vegetation health, soil erosion and protection, rutting, and vegetation damage. These regulations also include basic housekeeping procedures. The most recent 5-year hay lease was signed in March 2016 for 643 acres and then reduced to 159 acres for the 2020 season. The base Safety office requested removal of the hay lease program from airfield areas as the lessee could not meet AFI 91-202 guidelines. Subsequently, all airfield hay areas have been removed from the lease. Refer to Appendix F,

Grazing and Cropland Management Plans, Hay Lease for GFAFB, for details on terms of the lease, recommended adjustments, monitoring requirements, land use regulations, and a contractor checklist.

The current hay lease areas identified as suitable for the active cultivation of wild hay are shown in the Hay Outlease Areas map. Haying is a cost effective way to support the annual management of grasslands by helping to remove volunteer saplings and providing noxious weed control, an INRMP goal. The lease provides some income for the natural resources program, and reduces grounds maintenance costs. It is noted that agricultural outleasing for hay production does constitute farming; however, the base is exempt from the requirements of the FPPA and these agricultural outleased areas are being maintained for base missions and natural resources management, not for farming purposes.



Hay Lease Areas

7.11 Integrated Pest Management Program

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

An Integrated Pest Management Plan (IPMP) is updated annually and is managed by GFAFB's Pest Management shop. The plan is reviewed by the natural resources program as well as other environmental sections to ensure technical competency, environmental compliance, and relevance. The IPMP details the types of pesticides (which include insecticides, herbicides, and fungicides) and equipment used to control pest populations.

DoD policy and guidance is recommended by the Armed Forces Pest Management Board (AFPMB), and their mission is to ensure that environmentally sound and effective programs are present to prevent pests and disease vectors from adversely affecting DoD operations. The DoD takes these recommendations and develops instruction for base pest management programs. The GFAFB pest management program incorporates the provisions of DODI 4150.7. The instruction states, it is DoD policy to establish and maintain safe, effective, and environmentally sound integrated pest management programs to prevent or control pests and disease vectors adversely impacting readiness or military operations by affecting the health of personnel or damaging structures, material, or property.

The IPMP contains policies, standards, and requirements for CE personnel performing all operations in connection with the IPMP at GFAFB and is consistent with DODI 4150.7. Integrated pest management practices employ physical, mechanical, cultural, biological, and educational methods to maintain pests at populations low enough to prevent undesirable damage or annoyance. In addition, if chemicals are needed as a last resort, the least-toxic chemical capable of performing the control will be utilized. Control measures for mosquitoes, crawling insects (ants, crickets, cockroaches, etc.) and spiders, birds, mice, squirrels, and other vertebrate pests which could be detrimental to the health and welfare of personnel and property are described in the IPMP. Control of invasive and noxious weeds is discussed in Grounds Maintenance and detailed in the Noxious Weed Control Plan (Appendix G, Invasive Species Control Plan). These control measures are rolled-up into both the INRMP and IPMP. The Pest Management shop is responsible for managing pesticide application records and reporting on the MOM.

Disease Vectors and Pests

Houseflies (Musca domestica) are a summertime insect pest, especially around food preparation and serving areas. Other pest species include horseflies (Tabanidae) and ticks, bark beetles on certain tree species and white grubs. However, the major pest nuisance and health threat is the mosquito during the summer season. *Aedes dorsalis*, *Aedes vexans*, and *Culex tarsalis* mosquitoes are extremely abundant in the Grand Forks area. *A.dorsalis* breed continuously during the summer in fresh and brackish water marshes such as Kellys Slough. *A.vexans* are floodwater mosquitoes associated with floodplains such as the Turtle River and also with grassy drainage ditches such as those draining surface water from throughout GFAFB. *A. dorsalis* and *A. vexans* feed on a variety of mammals including man, and both of these species may migrate 20 to 30 miles from breeding sites. With the combination of heat, lights, and elevated carbon dioxide concentrations associated with combustion engines and aircraft operations, places such as GFAFB and the city of Grand Forks become highly

attractive areas for mosquitoes moving across open country. In addition, *C. tarsalis* mosquitoes feed primarily on birds and are a vector of western equine encephalitis virus. West Nile Virus (WNV), also carried primarily by *Culex* species, can cause encephalitis which can be transmitted to people. The disease can cause death, but normally people over 50 years of age and those with compromised immune systems are most vulnerable.

The Pest Management shop invests a majority of available labor resources and time to control mosquito populations on GFAFB. It is recommended that the shop review and implement the Mosquito Management Plan (MMP). The plan identifies active and potential larval breeding and mosquito activity areas, provides methods for monitoring and treatment of mosquito-prone areas, recommends treatment for the areas affected or potentially affected by larval breeding and mosquito activity, suggests monitoring the level of breeding and larval and adult mosquito activity, and then recommends to review the effectiveness of the plan periodically and embed a cycle of improvement in the operations of the MMP.

Traditional shop operations begin with larvaciding with both altosid briquettes and pellets. The briquettes are applied once for the season to permanent water areas and as labeled indicate they provide larvacide control for 140 days. The larvacide pellets are applied as needed to intermittent water bodies including puddles and/or appropriate areas identified after heavy rain storms. The altosid pellet control last for a duration of 30 days. The shop begins adulticide control once the mosquito trap count reaches 100 and/or visual evidence and field reporting indicates high mosquito activity. The traps are issued and operated by public health. To apply adulticide, the Pest Management shop fogs with Kontrol 4-4 three times a week. Fogging efforts continue until mosquito activity is reduced in the fall and trap counts are below 100. In the fall this can typically be either October or September. If mosquito activity is abnormally high in any given year, the Pest Management shop can also treat resting areas such as shelterbelt trees with Perm-X 30-30. In addition, for the housing residential area, 17 mosquito magnets are used that attract and trap mosquitoes.

Aerial pesticide sprays of both adulticide and larvacide are conducted by the Youngstown Air Reserve Station on base. The Youngstown group is able to assist the mosquito control effort, as the unit uses GFAFB as a training area. GFAFB is required to pay for the chemical used during the aerial spray mission. The application of microbial and chemical insecticides by aerial dispersal can be effective for a short term as a means to reduce mosquito populations of certain species when timed appropriately to the monitoring of local mosquito breeding seasons. The primary species desired to be controlled are *Aedes vexans, Aedes doralis, Culiseta inornata*, and *Culex tarsalis*. The actual effectiveness of aerial spray on GFAFB has not been evaluated over the long term and thus long term impacts are unknown. Because species like the rusty patch bumble bee, Dakota skipper, poweshiek butterfly and the monarch butterfly are species of conservation priority, monitoring for effectiveness of chemical control should be developed due to concern for impacts to nontarget species. It is recommended to review the MMP steps for monitoring effectiveness and plan review to ensure adequate vector control and address/reduce potential adverse impacts to nontarget natural resources. To do so, sufficient inventory of insects are needed on GFAFB to support plan review.

No incidence of Lyme disease, rabies or equine encephalitis among domestic animals or wildlife on base have been identified. There have been several skunks tested positive for rabies in the Grand Forks and western Minnesota area. Wildlife species the most susceptible to rabies are raccoons, skunks, bats, coyotes and foxes. All of these species are present on and around GFAFB. It is unknown whether this disease existed in the U.S. prior to European settlement. During the 1800s in Europe, rabies was very common among dogs and many human deaths occurred. It is thought the rabies virus was introduced when Europeans brought over their dogs and introduced the red fox to the U.S. for British-style foxhunts. With vaccinations of pets, incidence of rabies in domestic animals has been replaced with an

increase of rabies in wildlife species. Base personnel are required to vaccinate their pets so rabies should not affect pet dogs and cats at GFAFB. Additionally, horses owned by base personnel and housed on base must be vaccinated for equine encephalitis. The Pest Management shop has the responsibility to trap and remove animals that have become a nuisance.

There have been reports of birds testing positive for West Nile virus. This disease may present a serious threat to wildlife management as almost any species of bird, including declining grassland and other rare bird species, can contract the disease. West Nile virus is especially lethal to members of the crow family, including blue jays, crows, and ravens, as well as horses. West Nile virus can be fatal to birds, horses, and people. The Natural Resources Manager and the Pest Management Shop should be vigilant for signs this disease is present on the base, such as large numbers of dead birds being found.

Feral Animals

Cats destroy millions of native songbirds and other types of birds every year, and dogs running in packs can be dangerous to people attempting to utilize natural areas. Preventing stray and feral cats from impacting migratory bird populations is a component of an MOU signed by DoD and USFWS, per EO 13186. GFAFB shall control free roaming and feral cats and dogs on the installation through pest management personnel by removal to shelters and/or return to owners located on base. Dogs are tracked and captured with a "catch pole," a long pole with a loop which is placed around the animal's neck. These efforts will protect migratory birds and other beneficial native small wildlife. Base residents should not leave dog or cat food or bowls of water outside for wildlife use and acclimation.

Richardson's Ground Squirrels

The pest management plan considers the Richardson's ground squirrel (RGS) as a nuisance species on the installation. On base, the RGS can cause structural damage by burrowing under buildings, infrastructure systems, landscape plantings and damaging improved turf areas to include the golf course and other athletic fields. However, they are a Level II Species of Conservation Priority listed by the ND Game and Fish Department. According to the GFAFB Biological Survey of 2010, a well-established colony of Richardson's ground squirrels is present on base, and does not require conservation efforts at this time. This indicates a lack of natural predators of the squirrel, such as the extirpated black-footed ferret. Prairie grassland predators such as the badger, the ferruginous and other hawks, coyotes, bobcats, and swift foxes formerly kept the numbers of this burrowing rodent in check. Natural predators, where feasible, should be left where they do not conflict with human use. Some badger and fox have been observed in the south and western portions of the base and at the lagoons.

Base Entomology plans to continue removal of RGS in the manicured areas of housing and industrial areas to remove large groupings of these squirrels where damage to property may occur. The Pest Management shop will control RGS by using tomahawk live traps. On any given day, the shop can be using 100 of these traps. In addition, the Pest Management shop intends to deploy usage of a rodenticide, Ditrac, in pellet form. The pellets will be placed in a ground squirrel bait box (T-Shape), and the box will be staked to the ground and located in highly populated and visible areas of the base for trapping RGS. The RGS will need to digest multiple pellets for effectiveness. This same method is used to control mice on base during the winter. The Pest Management shop after deployment of bait boxes are required to monitor and check the status of each box.

The housing privatization lessee, BBC, desires to exterminate RGS in housing areas using the resources of both the base Pest Management shop and their grounds contractor. BBC issues a work request for assistance from the Pest Management shop when needed. A RGS control plan was

developed by BBC for use at both Minot and Grand Forks AFBs in the summer of 2019. The plan has three legs: 1) gas cartridges, EPA Reg# 56228-61, 2) tunnel flooding and 3) rodenticide use. An environmental assessment accomplished in 2002 for GFAFB proposed that gas canisters were more humane, more species-specific, more cost effective and more time efficient than the use of poisoning and shooting. The use of gas cartridges occurred on GFAFB to control RGS in the early 2000s, but was discontinued after a time. BBC intends to deploy gas cartridges to control RGS beginning in 2020 using their grounds contract. All personnel using the gas cartridges will be certified and their certifications will be provided to the Pest Management shop. The gas cartridge label will be followed at all times. BBC will also provide the Pest Management Section with all gas cartridge usage monthly.

Tunnel flooding is the second leg of the RGS control plan. The RGS control plan indicates that their grounds contractor will conduct tunnel flooding procedures, but it also encourages GFAFB residents to also conduct tunnel flooding by following these steps:

- As much as they (RGS) are a pest to you, being a pest to them will help to push them to move away from your home.
- Keep your garage doors closed.
- Do not leave bagged trash in your garage, put it in your refuse bin. Do not place bagged trash on the ground at your curb for bulk trash.
- Keep your yard clear of clutter.
- Water your lawn on a regular basis to establish good turf. Damp soil is harder for ground squirrels to dig.
- Flood them out - put a garden hose down their holes and turn on your water. You should do this on a regular basis and flooded holes need to be filled as soon as possible. Dirt is available at our maintenance facility for you to use. And use the mounds of dirt the ground squirrels leave behind from their tunneling efforts.

The third leg of the RGS control plan is use of rodenticides. No available rodenticides for use near and around housing have been currently authorized. In email communication (GFAFB 2019), the use of Prozap was specifically discussed with both USFWS and NDGFD and usage of this product was not recommended basewide due to secondary and tertiary effects to non-target wildlife species. The signed RGS control plan is desirous to find approved pesticides for use to eliminate RGS in housing areas. The base Pest Management shop does not plan to deploy use of Ditrac bait boxes in the housing areas. Ditrac bait boxes are planned for usage in the industrial areas only. More discussion and guidance is needed from the INRMP stakeholders regarding rodenticide use on GFAFB and for control of Richardson's Ground Squirrels. All depredation of RGS and other resident wildlife species are to be recorded and submitted to the base NRM monthly for environmental compliance under the base's issued NDGFD Resident Wildlife Depredation Permit.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

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

Bird strikes to aircraft are a serious economic and safety problem in the United States. The number of air strikes annually reported to the FAA has increased from 1990-2018. The increase in reporting is

partly due to education initiatives by the FAA and technology upgrades making the act of reporting easier. The number of damaging strikes has declined during this same time. It is noteworthy that the percentage of damaging wildlife strikes has averaged 8 percent for the 29-year period (1990-2018), this number has declined from 20 percent in 1990 to 4 percent in 2018. It is suggested the decline is due to mitigating efforts made at airports. Nationwide, waterfowl, gulls, and raptors are the species groups of birds with the most damaging strikes. Management actions at airports should be prioritized based on the hazard level of species observed in the aircraft operating area (FAA and USDA 2019). Gull species account for over 20% of strikes at both GFK International Airport and all ND airports. Unknown bird species strikes account for the largest category of strikes in North Dakota.

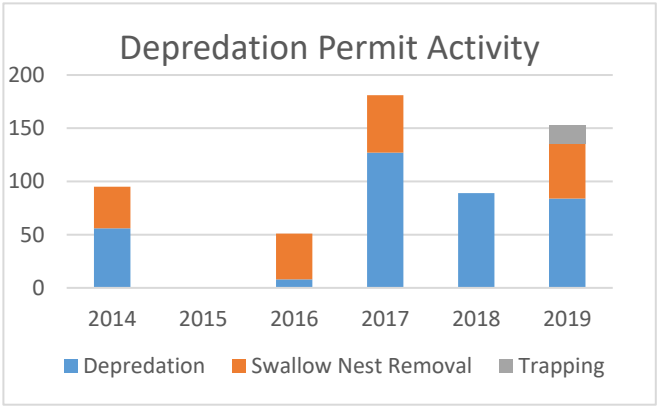
Species of Bird	All ND Airports Reported Strikes	GFK Airport Reported Strikes
Unknown Bird Species	22%	27%
Ring-billed & Other Gulls	14%	9%
Franklin's Gull	9%	12%
Western Meadowlark	7%	10%
Waterfowl	7%	8%
Swallows	5%	3%

Table – FAA Most Common Bird Strikes for ND & GFK Intl Airport, 2010-2020

GFAFB holds a Migratory Bird Depredation Permit (Appendix B) from the USFWS Migratory Bird Permit Office in Denver, CO. According to the permit, the taking of birds should only occur when absolutely necessary for immediate safety and health reasons. Prevention practices must be instituted prior to and during any taking procedures to maintain permit compliance. In accordance with the issued Migratory Bird depredation permit, an annual depredation report is compiled and submitted to USFWS by the NRM. As such, monthly reports delivered to the NRM from Safety, Airfield Operations and CE Pest Management are integral to maintain appropriate record keeping and track compliance monitoring. The annual report must include the following:

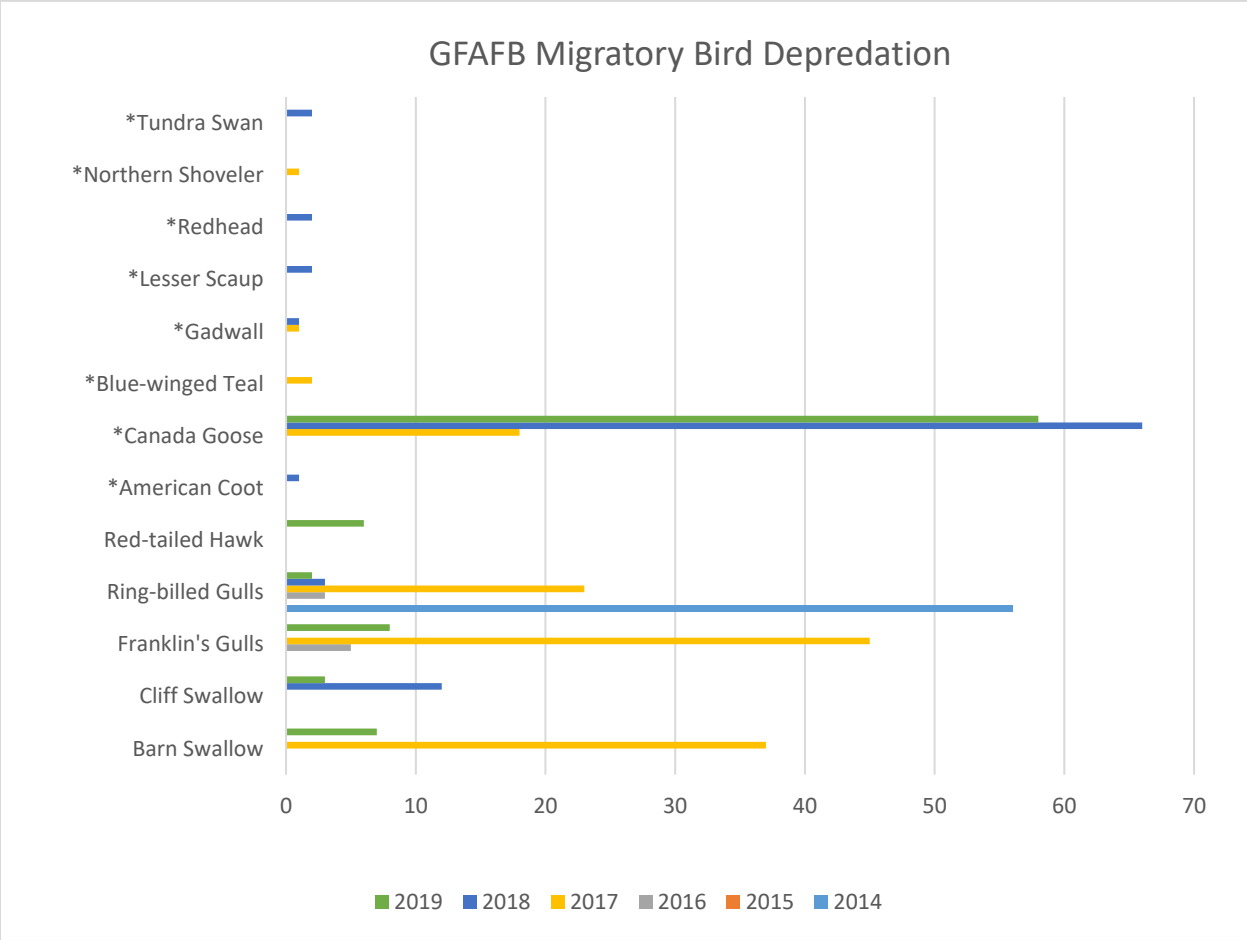
- Number of eggs or young taken (active nests)
- Number of birds by species and month taken
- Where/how depredated birds were disposed
- Prevention actions and initiatives

Bird and wildlife hazard program activities are detailed in the installations' BASH Plan (Associated Plans, Tab 2). In 2017, the Safety office hired a USDA biologist to manage GFAFB's BASH program. The USDA personnel is tasked to develop a Wildlife Hazard Plan, conduct harassment and depredation actions. BASH prevention via bird harassment includes the use of 15mm screamer and bangers and 12 gauge crackershot to scare birds, as well as live



ammo. In 2019, the BASH program was able to add permitted trapping of raptors to the BASH prevention toolkit as well, and they were able to trap and relocate 17 raptors in the first year. Flight take-off and landings are restricted by migration phases and administered by the BASH working group to protect pilots and aircraft during peak bird migration flows. Per the direction of AFI 91-202, the safety office has proposed three wildlife exclusions zones (WEZ). The following zones are currently being evaluated as Zone 1- airfield area, Zone 2 - base property, and Zone 3 - 5 mile buffer zone from the airfield. Further definition of these zones is being developed for desired BASH management actions.

A review of base permit activity from 2014-2019 shows that swallows, gulls and Canada geese have been the most depredated species. A total of 142 Canada geese were depredated at the sewage lagoons from 2017 -2019 and are listed in the base permit, but are also covered under 50 CFR 21.49 (Control order for resident Canada geese at airports and military airfields). Only airports and military airfields in the lower 48 States and the District of Columbia are eligible to conduct and implement the various resident Canada goose control and management program components. Resident Canada geese are those considered as nesting and breeding in the lower 48 states. Airports and military airfields should use nonlethal goose management tools to the extent they deem appropriate.



*Species depredated at sewage lagoons

GFAFB Migratory Bird Depredation from 2014-2019

Gulls and Swallows are considered the most problematic airfield bird species at GFAFB, and gulls account for the largest percentage of strikes at GF Intl Airport. Gulls like to loaf on the warm open airfield pavements especially during the fall season, and cause disruptions to airfield operations. In addition, many cliff and barn swallow mud nests are located on the sides of hangars and other base buildings. These species are listed on the base migratory bird depredation permit. From 2014-2019 a total of 59 swallows and 188 swallow nests have been removed, and 145 gulls have been depredated. Consistent swallow nest removal is needed to improve prevention of nest building, and any swallow deterrents must be installed by April when migrating birds begin to return to the area. Some nets and spikes have been added to flight buildings to help with that effort, but prevention efforts need annual manpower to harass and remove nests. Lastly, a Bald Eagle Harassment permit was issued to the base during the fall of 2018 and expires in 2023. During the summer of 2019, two young bald eagles were harassed and flew away from inside the secured airfield fenced area.

All BASH work tasks (fence repair, nest removal, prevention efforts, grounds maintenance tasks) that require CE implementation are requested through a work order process. In this way, resources available will be reviewed and assigned as appropriate or moved to project programming if the annual maintenance budget cannot accommodate given requests. Vegetation as defined by AFI 91-202 within the Aircraft Movement Area (AMA) airfield areas is desired to be monotypic, unattractive to wildlife and maintained at a uniform grass height between 7 and 14 inches. The interior airfield vegetation and 200 feet from taxiways are maintained under the grounds maintenance contract and mowed between 7 and 14 inches of height to eliminate seed heads attractive to birds and other wildlife. The west airfield area has unique environmental landscape challenges. There is a glacial lake beach ridge running through it, filled with rocks, holes, uneven terrain, ditches, wetlands and various scattered debris making conventional maintenance and mowing very difficult. Additionally, in years past heavy equipment training and earth moving were frequent activities in this area causing excessive earth disturbance. As such, existing vegetation is weedy and uneven due to soil disruption combined with the saline and hydric environmental conditions. Regular mowing is not occurring in these areas.

Airfield trees, shrubs and boulders are removed with in-house labor from CE roads and grounds personnel, as time and manpower allow, to eliminate areas for birds to perch and loaf. Volunteer tree regeneration (cottonwood, willow, Russian olive etc.) is prevalent throughout the airfield, and specifically along the West ditch where regular mowing is compromised. Trees in this area can be a violation of airfield approach lighting visibility criteria, and as such should be removed. Any tree removals, specifically larger groves of trees, similar to the scotch pine grove in the north airfield must be evaluated for forest product sale. Procedures for selling trees are outlined in AFMAN 32-7003. If feasible, it is always recommended to relocate tree resources to other more appropriate areas to eliminate airfield obstructions.

Safety inspections identified GFAFB airfield vegetation as noncompliant with observations of vegetation measured as both too short and too long outside of the 7-14 inch height requirement according to AFI 91-202. A permanent waiver for the short vegetation located in improved building areas, golf course and athletic fields was granted. A temporary waiver request for longer noncompliant airfield vegetation was denied by the AF Safety Center. Included with the temporary waiver request, was a plan developed by GFAFB containing project programming, a request for funds to conduct a study, environmental assessment, project design, wetland mitigation and project construction. The plan is a multi-step process developed to follow the National Environmental Policy Act and remedy

the airfield hydrology (wetlands and drainage issues), vegetation, rough terrain, hydric and saline soil issues in order to comply with AFI vegetation height guidelines. Currently airfield vegetation remains noncompliant with limited tools and resources to conduct any maintenance given difficult local site conditions.

White-tailed deer are a potential hazard to aircraft operations. NDGFD suggested that a comprehensive survey for deer entry points to the base with respect to available habitats both base-wide and exterior to the base be examined. As such, the airfield fence and gate system is the number one priority to exclude deer from entering the airfield. Recent Safety inspections have noted some gate gaps and holes in the airfield fence infrastructure. All airfield gate closure systems have been reinforced with steel flashing to keep gates closed properly. Eighty one work orders for fence holes or frost heave occurrences were issued to CE from Safety to repair in FY19. CE, during repair work noted 24 more deficiencies. Therefore a total of 105 fence repairs were made in which 25 holes were filled (holes under fences), and 80 frost heave issues were fixed (fence was pushed downward to level ground). Deer can gain entry to the airfield beneath fencing where erosion has washed away soil or when gates have been left open. Airfield fences must be the proper height for deer exclusion and be maintained for frost heave and erosion events that remove soil under fence lines. All holes should be repaired, and gates closed at all times to exclude deer. Automatic closing gates shall be maintained and operated properly to eliminate deer entry. According to the FAA, a 10-foot fence with 3-strand barbed wire outriggers is recommended to provide adequate deer exclusion from an area (FAA 2016). In some cases, an airport may be able to use an 8-foot fence with 3-strand barbed-wire outriggers, depending on the amount of deer activity in a local area. In addition, deer drives or pushes by ATV's or other off road vehicles are not recommended to remove deer from the airfield. This practice is dangerous for both ATV drivers and deer with potential for serious accidents. Should deer enter the airfield, depredation actions are recommended as appropriate under the guidelines of the NDGFD Resident Wildlife Depredation Permit. Reviewing the annual permit data below from 2014-2019, one deer in 2019 breached the airfield fence and was depredated. Deer are further discussed in section 7.1. Of note, Richardson's Ground Squirrels are the most depredated animal on installation with 2,959 animals removed from 2014-2019. These squirrels dig many holes and are mostly removed from housing and base areas. Typically, Richardson's ground squirrels do not like the longer grass found on the airfield.

NDGFD Wildlife Resident Permit	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Beaver			2			
Coyote			2	2	1	2
Deer Mice						2
Eastern Cottontail		3				
House Mouse						8
Jackrabbit				5	2	
Red Fox			1			
Red Squirrels						15
Richardson's Ground Squirrel		12	97	310	354	2186
River Otter			1			
Rock Pigeon	15	16	2			
Skunk				5	5	3
White-tailed Deer			20			6

Woodchuck						1

Table of NDGFD Resident Wildlife Permit Depredations

Migratory waterfowl such as Canada geese and ducks are attracted to open water such as Kellys Slough NWR, GFAFB sewage lagoons, and small prairie potholes. These larger birds present a potential hazard to aircraft should a damaging strike occur. Airfield operations and flight safety personnel monitor populations of these waterfowl in the regional area so flight crews can be advised of current bird watch conditions. The base sewage lagoons are the largest open water impoundment located on installation property approximately 2.5 miles west of the runway. There are no other large surface water impoundments on GFAFB. Most drainage ways and wetlands are filled with cattails leaving little open water as desired waterfowl habitat. However, the north end swale of the West ditch has pooling effects creating open water, especially during spring melt, and is an aviation safety concern.

Previous to 2017, no depredation or harassment occurred at the base sewage lagoons, but both actions are now being conducted using occasional pyrotechnic and shotgun techniques. The BASH program has made survey observations of birds at the lagoons and states that harassment and depredation are necessary to reduce BASH risk to the GFAFB airfield. This supersedes the previous recommendation of a USDA field investigation conducted in 2003 regarding the sewage lagoons that suggested letting the lagoon waterfowl loaf and use the area was preferred over trying to divert them away (Pugh 2003). Immediately adjacent to the sewage lagoons is the Kellys Slough NWR Complex encompassing a 6800+ acreage (an area larger than GFAFB property) wherein the management goal is waterfowl and shorebird production. The BASH program recommends known active diversions at the sewage lagoons versus passive unknown bird flight activity. It is imperative that when birds are harassed that airfield management is notified of the potential to aviation flight risk.

Sustained long-term prevention measures are not programmed or implemented at the lagoon system. Given the location of the lagoons and availability of base adjacent habitats with rich regional wildlife populations, it should be considered that existing lagoon operations may not significantly decrease local airfield risk. The effort needed to successfully harass and depredate at the lagoons should be considered against the level of hazard and risk abatement possible in context with available manpower, equipment and resources. Thus, perhaps there are changes in the level of effort and/or prevention implementation that would be better suited to deal with the lagoon wildlife hazard. The 2019 Safety SAV did note that GFAFB could maybe benefit from adding a technician to the BASH program staff to assist and aid in field work.

It is advised that a long-term study and evaluation of bird movements in and between the base, lagoons and other regional areas be conducted to determine typical bird movements and evaluate any lagoon BASH issues. Base Safety via the installations USDA-BASH Program manager is developing a year-long hazard wildlife assessment to identify and help address the wildlife hazards at GFAFB. A natural resources management project plans to evaluate the landscape scale effects of vegetation management on migratory bird use at and around the GFAFB with a focus on waterbirds, grassland birds, swallows, forest songbirds and non-native passerines (e.g., House Sparrows) to be able to better predict bird-strike risks and support the BASH program. In addition, it is recommended that the BASH program identify the need for a study of lagoon prevention measures such as flags, balls, netting, etc. to provide appropriately sustained and measured risk abatement at the sewage lagoons with consideration to the level of hazard evaluated. This would support subsequent authorized programming and budgeting to be initiated and implemented. Project programming for study and planning would effectively propose

and justify expenditures for any needed BASH mitigation measures with respect to GFAFB geography, ecology and personnel resources.

These plans that evaluate wildlife hazards and bird movements with existing species populations will provide needed plan guidance and recommendations based on data and subsequent analysis. Prevention is a compliance requirement to the base migratory bird depredation permit, and the lack thereof is a concern for permitting issues. It is recommended that the lagoon habitat be added to the programmed Airfield BASH mitigation environmental assessment, so that any proposed actions can be sufficiently analyzed for natural resources adverse effects and collective local stakeholders can be given the opportunity to provide input. It is further suggested to suspend continued depredation actions at the sewage lagoons to safeguard permit compliance until these concerns are addressed. This approach would facilitate a shared natural resource management plan moving forward to support BASH efforts and GFAFB missions.

7.13 Coastal Zone and Marine Resources Management

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

NA

7.14 Cultural Resources Protection

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

Management of base cultural resources is described in detail in the ICRMP (Associated Plans, Tab 4).

All buildings on GFAFB previously determined to be eligible for the NRHP have been demolished. No historic buildings remain on the installation. Building 213, 217, 221, 222, 231 and 232 are noted as "mitigated" historic resources under the Program Comment for Cold War Era Unaccompanied Housing (1946-1974), authorized by the Advisory Council for Historic Preservation in 2006.

The base does have one historic facility that serves as mitigation for the demolition of Building 306, and it is an outdoor interpretive board walk. This area is known as the "Cold War Heritage Plaza" and has 20 story boards depicting the history of GFAFB during the Cold War.

Several archaeological surveys have been accomplished over the years. Of special interest is the "*Grand Forks Air Force Base Cultural Resource Survey Class III Intensive Archaeological Survey*" accomplished in September 1996. The east terrace of the Turtle River has a potential for undiscovered archaeological sites and needs protection from earth disturbing activities. GFAFB will consult with the State Historical Society of North Dakota (SHSND) concerning the necessity for any additional studies in archeologically sensitive areas prior to any proposed undertaking in the area. In addition, the east terrace is vulnerable to erosion and roughly one foot of the southernmost archeologically sensitive portion of the

river bluff was lost to erosion after the flood of 2000. Strategies to prevent damage to this area include establishing and maintaining native vegetative cover along the river terraces. The National Park Service and National Clearinghouse for Archeological Site Stabilization offer specific guidance on site stabilization. By revegetating vulnerable areas and preserving existing native plants, both natural and cultural resources will benefit.

Cultural material most likely to be found on the installation are historic remains from old farmsteads; however, Native American artifacts, either in the paleosols near the Turtle River or around the edges of the former Lake Agassiz (beach ridges), may also be present. GFAFB has not identified any Native American sacred sites or Properties of Traditional Religious and Cultural Importance on base property. However, further communication with Native American groups having traditional ties to GFAFB lands is needed to determine whether such properties exist.

GFAFBs policy in the event of any inadvertent discovery is as follows: (1) cease work until further notice, and (2) the discoverer will immediately contact the Cultural Resource Manager (CRM). There have been no potential impacts or conflicts with natural resource management and cultural resource management identified on GFAFB.

7.15 Public Outreach

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

Occasionally, the natural resources program works with public affairs to promote public outreach events through press releases, published articles, TV news spots and photo documentation to enhance public trust and support. Brochures and educational materials may be distributed through the Outdoor Recreation Office, Library, public events or the base website to promote environmental awareness. GFAFB also participates in the community by assisting organizations, if requested, to organize conservation projects or conduct speaking engagements. Other natural resource initiatives involving the public include the Prairie View Nature Preserve (now referred to as Prairie View), nature trail, arboretum and a butterfly garden.

Prairie View is a restored 60-acre grassland site in the northeastern corner of the installation. Approximately 18 acres have been restored to tallgrass prairie and 14 acres to short/mixed grass prairie. Grasses planted include blue grama and buffalo grass, western and slender wheatgrass, Canada/Beardless wildrye, switchgrass and a wildflower mix. Edging Prairie View are approximately 19 acres of shelterbelts that serve as living barriers to snow, wind and erosion. The nature trail in Prairie View connects to the larger base multi-use trail system providing further access to exercise paths and opportunities.

The ~2 mile nature trail in Prairie View, connected arboretum and butterfly garden have six interpretive signs with information regarding base wetlands, prairie ecosystems, wildlife, pollinators, trees and weeds. These areas were designed as public outreach tools for the base community to learn about and experience on a small scale the grassland vegetation covering this region prior to European settlement. Prairie View is intended to raise community environmental awareness about the Air Force's commitment to ensuring biodiversity on its property, maintaining ecological value and providing an

outdoor educational venue for all Airmen. Open spaces of nature like these provide platforms for public outreach as well as maintaining Airmen health and fitness for duty. Mental health is more than ever a concern for all people, and spaces like these are needed to provide solitude, hiking and picnicking for mental well-being.

The arboretum provides an excellent opportunity for people to see several different species of trees and learn about their importance in prairie ecosystems. This area is approximately 6 acres in size and has approximately 37 species, many of them native, including American linden, common hackberry, green ash, eastern cottonwood, box elder, and river birch. It has great potential as a "living classroom" to teach children and others about the ecological and aesthetic value of trees in an urban setting.

The arboretum requires different management techniques than the majority of Prairie View and is maintained as improved ground by the privatized housing contractor. The arboretum tree species are not fire tolerant. Although signs are posted identifying the arboretum, tree species are not individually identified on signs for public education, which makes tree identification for the public difficult. Individual tree signs are needed to further enhance this area.

The existing butterfly garden attracts pollinators and other insects to aid in the pollination of plants. The butterfly garden has succumb to inconsistent maintenance, but an interpretive sign marks the location, and there are a few plants, some rocks and a bench. The area still does provide pollinator habitat, and important objective with programmed projects in the INRMP. Visitors may enjoy the butterflies that are easy to see here in the spring and summer months.

Wildlife Education Collection

GFAFB has some wildlife paraphernalia available for use in conservation education programs. There is a mobile taxidermy mount of a black bear (NDGFD permitted), and a bald eagle mount (USFWS permitted). An educational sign is posted near the mount of the Black Bear. The bear was depredated in 2003 on the GFAFB golf course. The Black Bear permit is available on file with the NRM and also attached to the bear case. The Bald Eagle is also under a permit from the USFWS. The NRM reports annually on the Bald Eagle as required by the permit. The bald eagle was originally a loan from the USFWS in 1978 as a mascot for the “Screaming Eagles” flying squadron of tankers at GFAFB. The displays are intended for educational use to teach the public about the diversity of wildlife in the GFAFB area. Both the Black Bear and the Bald Eagle are public displayed in the narthex of the Outdoor Recreation Building, 622.

7.16 Climate Change Vulnerabilities

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

North Dakota will experience an increase in the unpredictability of droughts, floods and pests. Climate change models show that ND will have more extreme weather events coupled with drier drought conditions. Flood magnitudes have been increasing since the 1920s in the Red River watershed of

North Dakota. Flooding regularly can recharge aquifers, transport nutrients, and provide habitat for some wildlife species, but greater intensity of run-off events will also decrease retention of organic matter and flush out aquatic organisms in wetlands (USDA, USFS 2020). The extent and duration of open water in wetlands is expected to decrease even in regions where precipitation is expected to be higher, because of the greater evaporation expected with warmer temperatures. Greater evaporation also increases salinity.

Drought in ND can have corrosive effects on infrastructure by drying the clay material substrates. The clay will shrink and can lead to cracked sidewalks, driveways and streets (University of Maryland 2008). Drought also reduces soil permeability, wherein flash flooding becomes an increased hazard with more extreme weather events. Maintenance budgets for GFAFB infrastructure and direct support to the mission may be affected by climate change in this way. Economic impacts will occur across the nation to include strains on public sector budgets, like GFAFB.

Change in land use as a result of climate change could affect natural resources on Grand Forks AFB. The model shown in the Fourth National Climate Assessment depicts that North Dakota will lose approximately 220,000 acres of grassland to cropland conversion (USGCRP 2018). Cropland areas will be increased in land area due to warmer temperatures and longer growing seasons, and subsequently reducing grassland areas. As a result grassland wildlife will be forced to relocate to areas with grasslands, wherein Grand Forks AFB may be affected by increased demand by local wildlife for base natural resources.

7.17 Geographic Information Systems (GIS)

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

A GIS is used to manage and catalogue information acquired in natural resources research and management. The GIS assists in planning by charting areas of environmental concern and providing a baseline for analyzing the potential impacts of any proposed natural resources management action. Managers can use the capabilities of GIS to watershed, wetlands, wildlife, and various other natural resource applications.

Data layers specific to natural resources management planning and decision making include:

- Wetlands: helps preserve existing functions, permitting and identifying candidates for mitigation.
- Sensitive species: helps monitor locations of species and focus management actions on sensitive species and their habitats.

- Historic and archeological sites: aids management of the cultural heritage at GFAFB, and identifies areas for avoidance.
- Soil surveys: helps manage the influence of soil types on wildlife and other natural resources.
- Land use: assists management of land use category for undeveloped areas and identifies potential for future wildlife development and prairie restoration areas.
- ERP area and sites: limits degradation of natural resources through knowledge of contaminated areas and management of ERP sites.
- Special flora species (including invasive species): aids monitoring of locations, spread of undesirable species, and facilitates management actions.
- Urban Forest Inventory: assists landscape management prioritization of tree removal, planting, and pruning needs.
- Hay lease areas: assists in re-seeding and management actions of areas specified for hay production.
- Hunting area: assists with the management of the resident base deer population and expanding the deer management program.

Appropriate office-based hardware and software are required for use of this specialized equipment. The NRM uses ArcMap daily to manage data, provide information and make decisions. General planning efforts should use the same data source as the INRMP map documents to ensure continuity and data integration between programming and environmental documents. Using this approach compliments each plan and improves accuracy. Although several data sets were developed using GIS, maps in the current and future INRMP's may become quickly outdated. INRMP figures and maps need to be reviewed and updated annually to ensure the most current information is available in the INRMP and associated integrated planning documents.

8.0 MANAGEMENT GOALS AND OBJECTIVES

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

At GFAFB, the ecosystem consists primarily of grasslands, agricultural land, wetlands, and some forestland and/or shelterbelts. The natural resources program has three overarching goals encompassing grassland conservation management, floodplains and wetlands, fish and wildlife, T&E, species of concern, public outreach, data management and INRMP maintenance.

Goal 1 -- Provide an integrated and effective holistic grounds conservation program that sustains an ecosystem framework of management while supporting the mission and control for invasive and noxious species under EO 13112.

- **Objective 1.1:** Monitor and control noxious and invasive species as identified in the annual work plans following the guidance of the adaptive noxious weed inventory, management and control plan.
    - **Project 1.1.1:** Manage noxious and invasive weeds, shrubs and trees to eliminate spread, reduce weed populations and maintain compliance using chemical, physical, and/or biological control methods to include herbicide application, vegetation clearing, and release of leafy spurge beetles on ~135 acres annually. Work efforts shall be executed at priority areas, parcels with quantified high weed infestation levels, or other unimproved areas assessed that have a high risk for spread or impact to native vegetation. Base noxious and invasive weeds identified include nine species (Canada thistle, Leafy Spurge, Perennial Sowthistle, Spotted Knapweed, Field Bindweed, Absinth Wormwood, Bull Thistle, Wavyleaf thistle, and Musk thistle). Major project deliverables include actual field work/labor, equipment and supplies for weed eradication and control activities and to provide a GIS record and update for weed treatments and inventory IAW the installation dataset.
    - **Project 1.1.2:** Provide for weed monitoring on grassland and unimproved areas to evaluate and determine effectiveness of control measures executed. Monitoring protocol is to be functional and integrated with the existing Noxious Weed Control Plan. The intent is to maximize use of a multi-year inventory of treatment model efficacy and incorporate results into the adaptive master treatment plan. Monitoring data collected shall be updated into the installation GIS database as a deliverable.
    - **Project 1.1.3:** Reassess the adaptive noxious weed inventory, management and control plan by quantitatively measuring weed infestation levels on all management plots, reviewing the monitoring weed model and updating plans based on treatment effectiveness of the control measures.
- **Objective 1.2:** Provide an agricultural outlease program to assist with maintenance of appropriate hay areas identified by the INRMP and reassess areas as needed to reduce grounds maintenance costs.
    - **Project 1.2.1:** Inspect the hay lease areas during allotted cutting times and after the hay has been cut to ensure compliance with the terms and conditions outlined in the lease and contact the real property officer if needed as soon as it is determined that lessee is in non-compliance annually.
    - **Project 1.2.2:** Assess the grassland/hay lease areas of the installation for success and renew the hay lease as appropriate every five years.

- **Objective 1.3:** Use fire management to assist with maintenance of open grasslands to eliminate habitat fragmentation, to remove woody encroachment, and to assist removal of invasive tree or shrub species cost effectively.
    - **Project 1.3.1:** Annually review both the wildland fire management and the prescribed burn plan to maintain open grassland. The required review is accomplished during the annual review of this INRMP as an Associate Plan. Implement annual rotational controlled burns on units 1-9 in the Prescribed Burn Plan to provide cost-effect maintenance of open grasslands, help facilitate weed control and support grassland wildlife species habitats in the early spring or fall. There are 9 conservation units, and each unit should be burned at least once during a 5 year term (Unit 1 [59 Acres], Unit 2 [76 Acres], Unit 3 [31 Acres], Unit 4 [86 Acres], Unit 5 [49 Acres], Unit 6 [69 Acres], Unit 7 [4 Acres], Unit 8 - Prairie View Nature Preserve (33 acres) and Unit 9 -- Sunflake/Dakota parcel [67 acres]).

Goal 2 -- <u>Comply with federal, state and local laws to provide for the conservation, protection, and management of base fish and wildlife resources to include threatened, endangered, candidate, species of concern and their habitats while supporting the base mission.</u>

- **Objective 2.1:** Continue to remain in compliance with EO 13186 Memorandum of Understanding (MOU) between the DoD and the USFWS to promote the conservation of migratory birds through monitoring and surveying efforts to include potential threatened, endangered, candidate and species of concern birds.
    - **Project 2.1.1:** Monitor every 5 years during all calendar seasons both migrating and breeding bird populations with an emphasis on bird species of concern identified by the NDNHI, USFWS Breeding Birds of Concern, ESA, and the 115 North Dakota Species for Conservation as noted in the <u>State Wildlife Action Plan</u>. Spring monitoring should occur all spring, but focus in early May for emphasis on migratory species and again in late June for species breeding or nesting in and around GFAFB. Winter monitoring should occur the first part of December. Information collected will adequately record bird population and location to measure abundance, species diversity and richness on base habitats. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing bird surveys and to provide a GIS record and update for survey efforts. All raw data survey information must also be submitted in table form and lists for Species of Concern shall be updated. Management recommendations shall be a deliverable for INRMP inclusion.
    - **Project 2.1.2:** Survey for bald or golden eagle nests on base annually, between March 1 and May 15, and coordinate with NDGFD if nests are discovered.
    - **Project 2.1.3:** Conduct a study to understand bird use and movement at the GFAFB in comparison to the larger landscape. Determining best management practices that reduce aviation bird strikes, while maintaining other land use objectives on base considering seasonality and migration characteristics and the location of GFAFB is needed. The study effort shall include surveys of vegetation, birds and small mammals. Survey data shall be used to assess and evaluate the impacts of vegetation management on habitat use and develop bird movement tracking models that reflect daily and seasonal movements. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, a report with results and findings in map and tabular form with management recommendations of

such quality to be inserted into the INRMP. GIS data shall be a deliverable to the base of work effort findings (all survey data). All raw data survey information must also be submitted in spreadsheet form as well.

- **Objective 2.2:** Ensure 100% archery hunting compliance with base regulations, biennially update the base hunting instruction and ecologically manage the base deer population to avoid disease, overuse of habitat and prevent airfield encroachment.
    - **Project 2.2.1:** NRM shall issue deer archery permits in compliance with the base instruction for urban deer archery and maintain a database of permits sold along with deer harvested on the installation annually.
    - **Project 2.2.2:** Research and implement, where applicable, methods to increase white-tailed deer harvest rates by hunters for the base hunting program in an effective, yet safe way for the base aviation mission. In addition, conduct a base wide survey of white-tail deer, evaluate and map deer habitats both inside and outside of base property to identify pressure zones and access entry areas by deer through the base fence and perimeter areas. Lastly, recommend requirements and management actions needed to accomplish and sustain deer exclusion base-wide effectively. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, results and findings in map and tabular form with recommendations of such quality to be inserted into the INRMP. GIS data shall be a deliverable to the base of work effort findings (deer surveys, proposed harvest areas, entry points, habitat areas, etc). All raw data survey information must also be submitted in spreadsheet form as well. Management recommendations shall be a deliverable for INRMP inclusion.
- **Objective 2.3:** Maintain and monitor grasslands to sustain biodiversity, support grassland, pollinator and species of concern where practical and consistent with the military mission. Specifically, manage for existing monarch and regal fritillary butterfly populations and listed federal species of the rusty patch bumble bee, Dakota skipper and poweshiek skipperling by using an integrated ecosystem approach.
    - **Project 2.3.1:** Determine the extent, location and population of milkweed. Milkweed data should be collected to easily contribute to the USFWS model. Monitoring and mapping of base plants is needed during specific blooming periods. Field survey efforts will spatially measure the plant areas or species locations with GIS/GPS, count individual plants or species, and quantitatively evaluate vigor/health. Deliverables expected include in report format the survey, results, maps and recommendations for subject species and vegetation transects. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, report with finds/recommendations and an updated GIS layer with vegetation findings.
    - **Project 2.3.2:** Sustain pollinator and grassland habitats by cultivating, disking, seeding, removing woody encroachment, planting conservation plugs and/or conduct interseeding of milkweed, warm season grasses and forbs. Grassland parcels shall be targeted for interseeding after timely completion of Rx Burns as planned. If Rx burns are not executed, adaptive management shall occur with mowing and scarifying as necessary. Prairie areas such as the butterfly garden, Prairie View Nature Preserve, front gate meadow, family camping and the sunflake/Dakota parcel shall be worked and adaptively identified based on INRMP priorities. GIS data shall be updated for each work parcel to record treatment and inventory and made as a deliverable.
    - **Project 2.3.3:** Complete all apoidea and lepidoptera evaluations by 2022. Survey should target the rusty patch bumble bee and other recently listed, proposed or candidate species (Dakota Skipper and Poweshiek Skipperling) in unimproved areas to develop an

inventory. Inventory and map monarch and regal fritillary butterfly populations to contribute to USFWS models and INRMP inclusion. Monitor bird and insect populations between burned and unburned grassland units. The survey should consider seasonality and pesticide spray events. Deliverables shall include development of a timeline for completion of survey work and evaluation of habitat and species occurrence. Develop a strategy for grassland management based on apoidea findings; to include survey recurrence interval recommendations for the INRMP. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, a report of methods, results, and management recommendations. Recommendations for these species should be of such quality to be inserted into the INRMP. Deliverables shall include a GIS update for data layers. All raw data survey information must also be submitted in spreadsheet form and lists for Species of Concern shall be updated.

- ****Old Project 8.3.5.1:** Determine the status of plant species of concern and grassland habitat health by quantitatively monitoring existing vegetation transects, calculate and compare the floristic quality index between sampling years and, using GIS, update the 2010 map illustrating the base-wide distribution of the identified plant species of concern (orchids, Dutchmen breeches, and prickly gooseberry). Monitoring and mapping of base plant habitat is needed during specific blooming periods. Field survey efforts will spatially measure the plant areas or species locations with GIS/Global Positioning System (GPS), count individual plants or species, take photographs and evaluate vigor/health. All field work is complete as of Mar 2020, waiting on final deliverables.

- **Objective 2.4:** Manage base forestry resources to include shelterbelts, the riparian forest and the urban tree canopy to protect against biological threats (Dutch elm and emerald ash borer disease), manage for biodiversity, provide snow and windbreaks, create energy savings, enhance multi-use trails, community areas and facilitate longevity where practical and consistent with the military mission.
  - **Project 2.4.1:** Maintain 20% of the 140 acres (approximately 7 miles) annually of base shelterbelts in accordance with the shelterbelt assessment plan and provide for new plantings as needed to serve as wind and snow breaks, wildlife habitat, shade, dust control, noise abatement, and erosion control. Improve habitat and stand health of shelterbelts to include removal of non-native species, removal of diseased or at-risk trees, snag tree development, pruning of hazards, and replanting native stock. Priority treatment areas are identified in each respective work plan shelterbelt management map.
- **Objective 2.5:** Provide conservation management for aquatic, herptile, and mussel species of concern by implementing the Aquatics and Herptile Survey, Report, and Management Plan and Species of Concern Management Plan.
  - ****Old Project 8.3.4.1:** Monitor mussel and amphibian species of concern identified as present in the Turtle River and other aquatic base habitats to ensure adequate management and protection procedures are safeguarding the species.
- **Objective 2.6:** In accordance with state and federal law, protect and provide for conservation management of mammals to include big game, furbearers, and small mammals.
  - ****Old Project 8.3.7.1:** Conduct a furbearer baseline survey to identify species present on the installation and target species of concern, such as the fisher, previously sited on the base and augment survey efforts with purchase and installation of survey equipment to include trail cameras. Assessment report, updated GIS information. Inventory updated, to include evaluation of other surveys from Universities, Pest Management, and USDA-WS. Project was funded, but incomplete.

Goal 3 -- <u>Maintain the INRMP with regulatory stakeholders and ensure compliance with all permits as required by Executive Orders, federal and state law. Use and update GIS data to support natural resource decision making, foster partnerships, and provide opportunities for public outreach and education.</u>

- **Objective 3.1:** Maintain and update the base INRMP with stakeholders, and update GIS spatial data to support the natural resources program and comply with AFMAN 32-7003 and the Sikes Act.
    - **Project 3.1.1:** Conduct annual review of the INRMP and update new information to include developing the annual work plan
    - **Project 3.1.2:** Incorporate survey information collected through design, planning or conservation projects into the AF GIS to support natural resource decision making as needed.
- **Objective 3.2:** Maintain compliance with EO 11990, EO 11988, the Clean Water Act and all state and federal bird and general wildlife depredation permit requirements to protect natural resources while supporting installation operations.
    - **Project 3.2.1:** NRM shall maintain records and review compliance with all depredation permits, submit annual reports, and renew permits annually or as they expire with both state and federal agencies.
    - **Project 3.2.2:** Follow the wetlands and floodplain permitting process with the USACE and the ND state NDDEQ as outlined in this INRMP to provide compliance, inspect and review projects, apply for permits, and track progress in a local database and close out permits as needed.
- **Objective 3.3:** Promote agency partnerships, public outreach, community conservation education and support quality outdoor recreation experiences while maintaining ecosystem integrity.
    - **Project 3.3.1:** Manage the ~2 mile aggregate nature trail, associated interpretive signs and butterfly garden (410 sq yards) at Prairie View Nature Preserve to include maintenance of trail condition, garden, replacement of signs, or installment of new signs.
    - **Project 3.3.2:** Participate in available community service opportunities that promote environmental education and outreach with youth organizations, university professionals and students, or other agencies as occasionally needed.
    - **Project 3.3.3:** Maintain public exhibition of wildlife taxidermy mounts, comply with eagle exhibition loan agreement, comply with state permit to possess big game, and submit annual reports as needed for the bald eagle mount located at outdoor recreation on installation property.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

The INRMP is a "living" document based on several short-, medium-, and long-term planning

goals. Short-range goals include activities planned to occur in 0 to 5 years, while medium-range goals include activities in a 6- to 10-year period. Long-range goals are usually scheduled beyond 10 years. A majority of the goals and objectives discussed in this INRMP are based on short- term natural resources management goals contributing to the success of the long-term management goals. Because an INRMP is a "living" document, goals may be revised over time to reflect evolving environmental conditions. In addition, medium- and long-range planning goals could eventually become short-range activities that also require implementation.

The point of contact for maintaining this INRMP is the NRM. The Environmental Safety Occupational Health Council (ESOHC) has reviewed and approved this document, and the Wing Commander has signed it. To ensure this INRMP properly addresses all aspects of the natural and cultural resources present on the installation and proposes actions in accordance with USAF goals and objectives, this Plan and all its components are subject to approval by the Wing Commander.

9.2 Monitoring INRMP Implementation

Monitoring implementation of the INRMP, both in the field and office, is conducted through internal reviews through the Environmental Safety and Occupational Health Compliance Assessment and Management Program, and through the Annual Report to Congress AF Measures of Merit data call. Monitoring criteria for each INRMP goal is included in Management Goals and Responsibilities. These criteria are metrics in which goal and objective attainment is evaluated. This evaluation is the framework for the accomplishment metrics reported annually.

9.3 Annual INRMP Review and Update Requirements

The INRMP is continually being reviewed by base personnel as program objectives are budgeted for and implemented. Multiple agencies are targeted for coordination specific to goals relating to their area of influence and expertise, such as the NDNHP for vegetation management, Grand Forks County Weed Board for weed and invasive species management, USDA-Animal and Plant Health Inspection Service (APHIS) for wildlife and bird hazards and NDGFD for deer population management. Implementation project planning seeks input from all sources of expertise and experience including state and federal agencies to design the most effective and successful project possible. All base stakeholders are invited annually to review the INRMP, and comments are accepted and incorporated as applicable. This process will allow the plan to remain up-to-date and effective in managing natural resources at GFAFB. Additionally, the INRMP relies accurate GIS data, which contains resource and planning maps and information needs to be kept up-to-date to further enhance the plan's effectiveness.

Correspondence with an attached copy of the INRMP, project accomplishments and work plan in spreadsheet format will be sent annually to the official stakeholders (NDGFD and USFWS) with a request for signatures and updates. Additionally, USFWS and NDGFD will be invited annually to conduct a field review and discuss INRMP objectives. The overall INRMP is effective until it is superseded or revoked and requires all tripartite signatures every five years.

10.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans are included in this section. These projects are listed by fiscal year, including the current year and four succeeding years. For each project and activity, a specific timeframe

for implementation is provided (as applicable), as well as the appropriate funding source and priority for implementation. The work plans provide all the necessary information for building a budget within the 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.

The 5-year work plan is available below and includes time lines and project priorities. The projects outlined in this INRMP were identified as important for the management of natural resources found on the installation. Adaptive management strategies are used to accommodate the ever changing conditions of base resources. These tables require modification annually to ensure the tasks are current and relevant as part of this INRMP.

EXECUTION **PROGRAM TITLE**	**PLAN YEARS**	**INRMP PROJECT NUMBER AND DESCRIPTION**	**RANK**	**SWAP and/or SPSOC LINK**	**NOTES**
Goal 1 -- Provide an integrated and effective holistic grounds conservation program that sustains an ecosystem framework of management while supporting the mission and to control invasive and noxious species under EO 13112.					
Objective 1.1 -- Monitor and control noxious and invasive species as identified in the annual work plans following the guidance of the adaptive noxious weed inventory, management and control plan.					
USFWS MGT, INVASIVE SPECIES, NOXIOUS WEEDS	2020-2024	**Project 1.1.1:** Manage noxious and invasive weeds, shrubs and trees to eliminate spread, reduce weed populations and maintain compliance using chemical, physical, and/or biological control methods to include herbicide application, vegetation clearing, and release of leafy spurge beetles on ~135 acres annually. Work efforts shall be executed at priority areas, parcels with quantified high weed infestation levels, or other unimproved areas	Medium	No	

		assessed that have a high risk for spread or impact to native vegetation. Base noxious and invasive weeds identified include nine species (Canada thistle, Leafy Spurge, Perennial Sowthistle, Spotted Knapweed, Field Bindweed, Absinth Wormwood, Bull Thistle, Wavyleaf thistle, and Musk thistle). Major project deliverables include actual field work/labor, equipment and supplies for weed eradication and control activities and to provide a GIS record and update for weed treatments and inventory IAW the installation dataset.			
	2020-2024	**Project 1.1.2:** Provide for weed monitoring on grassland and unimproved areas to evaluate and determine effectiveness of control measures executed. Monitoring protocol is to be functional and integrated with the existing Noxious Weed Control Plan. The intent is to maximize use of a multi-year inventory of treatment model efficacy and incorporate results into the adaptive master treatment plan. Monitoring data collected shall be updated into the installation GIS database as a deliverable.	Medium	No	
	2022	**Project 1.1.3:** Reassess the adaptive noxious weed inventory, management and control plan by quantitatively measuring weed infestation levels on all management plots, reviewing the monitoring weed model and updating plans based on treatment effectiveness of the control measures.	Low	No	
	2019	***** Old Project:** Conduct weed status inventory on 650 acres of open space. Compare treatments. AFCEC Enterprise project.	Low	No	

Objective 1.2 -- Provide an agricultural outlease program to assist with maintenance of appropriate hay areas identified by the INRMP and reassess areas as needed to reduce grounds maintenance costs.					
NRM IN-HOUSE	2020-2024	**Project 1.2.1:** Inspect the hay lease areas during allotted cutting times and after the hay has been cut to ensure compliance with the terms and conditions outlined in the lease and contact the real property officer if needed as soon as it is determined that lessee is in non-compliance annually.	Medium	No	
USACE	2021	**Project 1.2.2:** Assess the grassland/hay lease areas of the installation for success and renew the hay lease as appropriate every five years.	Medium	No	
Objective 1.3 -- Use fire management to assist with maintenance of open grasslands to eliminate habitat fragmentation, to remove woody encroachment, and to assist removal of invasive tree or shrub species cost effectively.					
AF WILDLIFE FIRE CENTER	2020-2024	**Project 1.3.1:** Annually review both the wildland fire management and the prescribed burn plan to maintain open grassland. The required review is accomplished during the annual review of this INRMP as an Associate Plan. Implement annual rotational controlled burns on units 1-9 in the Prescribed Burn Plan to provide cost-effect maintenance of open grasslands, help facilitate weed control and support grassland wildlife species habitats in the early spring or fall. There are 9 conservation units, and each unit should be burned at least once during a 5 year term (Unit 1 [59 Acres], Unit 2 [76 Acres], Unit 3 [31 Acres], Unit 4 [86 Acres], Unit 5 [49 Acres], Unit 6 [69 Acres], Unit 7 [4 Acres], Unit 8 - Prairie View Nature Preserve (33 acres) and Unit 9 -- Sunflake/Dakota parcel [67 acres]).	Medium	Yes (burning affects are not well known on the orchids)	Review of these plans are accomplished annually and inconjunction with the INRMP review.

Goal 2 -- Comply with federal, state and local laws to provide for the conservation, protection, and management of base fish and wildlife resources to include threatened, endangered, candidate, species of concern and their habitats while supporting the base mission.					
Objective 2.1 -- Continue to remain in compliance with EO 13186 Memorandum of Understanding (MOU) between the DoD and the USFWS to promote the conservation of migratory birds through monitoring and surveying efforts to include potential threatened, endangered, candidate and species of concern birds.					
USFWS MGT, SPECIES, MIGRATORY BIRDS	2024	**Project 2.1.1:** Monitor every 5 years during all calendar seasons both migrating and breeding bird populations with an emphasis on bird species of concern identified by the NDNHI, USFWS Breeding Birds of Concern, ESA, and the 115 North Dakota Species for Conservation as noted in the State Wildlife Action Plan. Spring monitoring should occur all spring, but focus in early May for emphasis on migratory species and again in late June for species breeding or nesting in and around GFAFB. Winter monitoring should occur the first part of December. Information collected will adequately record bird population and location to measure abundance, species diversity and richness on base habitats. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing bird surveys and to provide a GIS record and update for survey efforts. All raw data survey information must also be submitted in table form and lists for Species of Concern shall be updated. Management recommendations shall be a deliverable for INRMP inclusion.	Medium	Yes	
NRM IN-HOUSE	2020-2024	**Project 2.1.2:** Survey for bald or golden eagle nests on base annually, between March 1 and May 15, and coordinate with NDGFD if nests are discovered.	Medium	Yes	

Cooperative Agreement MGT, HABITAT, GRASSLANDS/ PRAIRIE	2020-2021	**Project 2.1.3:** Conduct a study to understand bird use and movement at the GFAFB in comparison to the larger landscape. Determining best management practices that reduce aviation bird strikes, while maintaining other land use objectives on base considering seasonality and migration characteristics and the location of GFAFB is needed. The study effort shall include surveys of vegetation, birds and small mammals. Survey data shall be used to assess and evaluate the impacts of vegetation management on habitat use and develop bird movement tracking models that reflect daily and seasonal movements. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, a report with results and findings in map and tabular form with management recommendations of such quality to be inserted into the INRMP. GIS data shall be a deliverable to the base of work effort findings (all survey data). All raw data survey information must also be submitted in spreadsheet form as well.	Medium	Yes	Project was discussed for study and research with UND during the fall 2019 on site field tour.
Objective 2.2: Ensure 100% archery hunting compliance with base regulations, biennially update the base hunting instruction and ecologically manage the base deer population to avoid disease, overuse of habitat and prevent airfield encroachment.					
NRM IN-HOUSE	2020-2024	**Project 2.2.1:** NRM will issue deer archery permits in compliance with the base instruction (GFAFBI32-4004) for urban deer archery and maintain a database of permits sold along with deer harvested on the installation.	Low	No	

State MGT, HABITAT, GRASSLANDS, / PRAIRIE	2022	**Project 2.2.2:** Research and implement, where applicable, methods to increase white-tailed deer harvest rates by hunters for the base hunting program in an effective, yet safe way for the base aviation mission. In addition, conduct a base wide survey of white-tail deer, evaluate and map deer habitats both inside and outside of base property to identify pressure zones and access entry areas by deer through the base fence and perimeter areas. Lastly, recommend requirements and management actions needed to accomplish and sustain deer exclusion base-wide effectively. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, results and findings in map and tabular form with recommendations of such quality to be inserted into the INRMP. GIS data shall be a deliverable to the base of work effort findings (deer surveys, proposed harvest areas, entry points, habitat areas, etc). All raw data survey information must also be submitted in spreadsheet form as well. Management recommendations shall be a deliverable for INRMP inclusion.	High	No	Increasing deer harvest rates and researching habitat and fence vulnerabilities was suggested by NDGFD during the Fall 2019 stakeholder meeting.

Objective 2.3 -- Maintain and monitor grasslands to sustain biodiversity, support pollinator species and species of concern where practical and consistent with the military mission. Specifically, manage for existing monarch and regal fritillary butterfly populations and listed federal species of the rusty patch bumble bee, Dakota skipper and poweshiek skipperling by using an integrated ecosystem approach.

USFWS MGT, HABITAT, GRASSLANDS	2020-2021	**Project 2.3.1:** Determine the extent, location and population of milkweed. Milkweed data should be collected to easily contribute to the USFWS model. Monitoring and mapping of base plants is needed during specific blooming periods. Field survey efforts will spatially measure the plant areas or species locations with GIS/GPS, count individual plants or species, take photographs and evaluate vigor/health. Deliverables expected include in report format the survey, results, maps and recommendations for subject species and vegetation transects. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, report with finds/recommendations and an updated GIS layer with vegetation findings.	Medium	Yes	Milkweed mapping was added to support USFWS effort as discussed during the Mar 2019 meeting.
	2020-2024	**Project 2.3.2:** Sustain pollinator and grassland habitats by cultivating, disking, seeding, woody encroachment removal, planting conservation plugs and/or accomplish interseeding of milkweed, warm season grasses and forbs. Grassland parcels shall be targeted for interseeding after timely completion of Rx Burns as planned. If Rx burns are not executed, adaptive management shall occur with mowing and scarifying as necessary. Prairie areas such as the butterfly garden, Prairie View Nature Preserve, front gate meadow, family camping and the sunflake/Dakota parcel shall be worked and adaptively identified based on INRMP priorities. GIS data shall be updated for each work parcel to record treatment and inventory and made as a deliverable.	Medium	Yes	Planting milkweed was discussed at the fall 2019 stakeholder meeting.

	2020-2022	**<u>INRMP PROJECT 2.3.3</u>:** Complete all apoidia and lepidoptera evaluations by 2022. Survey should target the rusty patch bumble bee and other recently listed, proposed or candidate species (Dakota Skipper and Poweshiek Skipperling) in unimproved areas to develop an inventory. Inventory and map monarch and regal fritillary butterfly populations to contribute to USFWS models and INRMP inclusion. Monitor bird and insect populations between burned and unburned grassland units. The survey should consider seasonality and pesticide spray events. Deliverables shall include development of a timeline for completion of survey work and evaluation of habitat and species occurrence. Develop a strategy for grassland management based on apoidea findings; to include survey recurrence interval recommendations for the INRMP. Major project deliverables include actual field work/labor, equipment and supplies for accomplishing surveys, a report of methods, results, and management recommendations. Recommendations for these species should be of such quality to be inserted into the INRMP. Deliverables shall include a GIS update for data layers. All raw data survey information must also be submitted in spreadsheet form and lists for Species of Concern shall be updated.	Medium	Yes	Apoidea inventory was requested at the 31 Jan 2018 INRMP annual review meeting by USFWS. Mapping monarchs was discussed during the Mar 2019 stakeholder meeting.

USFWS MGT, SPECIES, PLANT SPECIES AT RISK	2017	**<u>***Old Project 8.3.5.1</u>** -- Determine the status of plant species of concern and grassland habitat health by quantitatively monitoring existing vegetation transects, calculate and compare the floristic quality index between sampling years and, using GIS, update the 2010 map illustrating the base-wide distribution of the identified plant species of concern (orchids, Dutchmen breeches, and prickly gooseberry). Monitoring and mapping of base plant habitat is needed during specific blooming periods. Field survey efforts will spatially measure the plant areas or species locations with GIS/Global Positioning System (GPS), count individual plants or species, take photographs and evaluate vigor/health. Known species of concern orchid coverage is 27 acres on base. Many of these species identified are specific to the tallgrass prairie ecosystem where GFAFB is located.	Medium	Yes	Lady Slipper surveys completed as of June 5, 2018. Report to be completed once field work is done to include Floristic Quality Index assessments. GIS polygons updated once field work is done. GIS polygons updated and reports to be completed April 2019. Not received report yet. Potential for reprogram depending on mgt recommendations.
Objective 2.4 -- Manage base forestry resources to include shelterbelts, the riparian forest and the urban tree canopy to protect against biological threats (Dutch elm and emerald ash borer disease), manage for biodiversity, provide snow and windbreaks, create energy savings, enhance multi-use trails, community areas and facilitate longevity where practical and consistent with the military mission.					
USFWS MGT, HABITAT, SHELTERBELTS	2020-2024	**<u>Project.2.4.1:</u>** Maintain 20% of the 140 acres (approximately 7 miles) annually of base shelterbelts in accordance with the shelterbelt assessment plan and provide for new plantings as needed to serve as wind and snow breaks, wildlife habitat, shade, dust control, noise abatement, and erosion control. Improve habitat and stand health of shelterbelts to include removal of non-native species, removal of diseased or at-risk trees, snag tree development, pruning of hazards, and replanting native stock. Priority treatment	Medium	Yes	

		areas are identified in each respective work plan shelterbelt management map.			
Objective 2.5 -- Provide conservation management for aquatic, herptile, and mussel species of concern by implementing the Aquatics and Herptile Survey, Report, and Management Plan and Species of Concern Management Plan.					
USFWS	2018	**<u>***Old Project 8.3.4.1</u>:** Monitor mussel and herpetofauna species of concern identified as present in the Turtle River and other aquatic base habitats to ensure adequate management and protection procedures are safeguarding the species.	Medium	(maplerid ge, creek heelsplitte r, Candadian toad, snapping turtle)	Funded at year end, Sept 2018. Incomplete as of Mar 2020. Potential for other project programming depending on mgt recommendation s.
Objective 2.6 -- In accordance with state and federal law, protect and provide for conservation management of mammals to include big game, furbearers, and small mammals.					
USFWS	2018	**<u>***Old Project 8.3.7.1:</u>** Conduct a furbearer baseline survey to identify species present on the installation and target species of concern, such as the fisher, previously sited on the base and augment survey efforts with purchase and installation of survey equipment to include trail cameras. Assessment report, updated GIS information. Inventory updated, to include evaluation of other surveys from Universities, Pest Management, and USDA-WS.	Low	Yes	Project was funded, but incomplete. Potential for other projects depending on findings and mgt recommendation s.
Goal 3 -- Maintain the INRMP with regulatory stakeholders and ensure compliance with all permits as required by Executive Orders, federal, and state law. Use and update GIS data to support natural resource decision making, foster partnerships, and provide opportunities for public outreach and education.					
Objective 3.1 -- Maintain and update the base INRMP with stakeholders, and update GIS spatial data to support the natural resources program and comply with AFMAN 32-7003 and the Sikes Act.					
NRM IN-HOUSE	2020-2024	**<u>Project 3.1.1:</u>** Conduct annual review of the INRMP and update new information to include developing the annual work plan.	High	No	

AFCEC GIS CONTRACT	2020-2024	**Project 3.1.2:** Incorporate survey information collected through design, planning or conservation projects into the AF GIS to support natural resource decision making as needed.	Low	No	
Objective 3.2 -- Maintain compliance with EO 11990, EO 11988, the Clean Water Act and all state and federal bird and general wildlife depredation permit requirements to protect natural resources while supporting installation operations.					
NRM IN-HOUSE	2020-2024	**Project 3.2.1:** NRM shall maintain records and review compliance with all depredation permits, submit annual reports, and renew permits annually or as they expire with both state and federal agencies.	Medium	Yes (some SWAP species are listed on permits)	
NRM IN-HOUSE	2020-2024	**Project 3.2.2:** Follow the wetlands and floodplain permitting process with the USACE and the ND state NDDEQ as outlined in this INRMP to provide compliance, inspect and review projects, apply for permits, and track progress in a local database and close out permits as needed.	Low	No	
Objective 3.3 -- Promote agency partnerships, public outreach, community conservation education and support quality outdoor recreation experiences while maintaining ecosystem integrity.					
USFWS MGT, HABITAT, GRASSLANDS	2020-2024	**Project 3.3.1:** Manage the ~2 mile aggregate nature trail, associated interpretive signs and butterfly garden (410 sq yards) at Prairie View Nature Preserve to include maintenance of trail condition, garden, replacement of signs, or installment of new signs.	Low	No	
NRM IN-HOUSE	2020-2024	**Project 3.3.2:** Participate in available community service opportunities that promote environmental education and outreach with youth organizations, university professionals and students, or other agencies as occasionally needed.	Low	No	

NRM IN-HOUSE	2020-2024	**Project 3.3.3:** Maintain public exhibition of wildlife taxidermy mounts, comply with eagle exhibition loan agreement, comply with state permit to possess big game, and submit annual reports as needed for bald eagle mount located at outdoor recreation on installation property.	Medium	No	

Swap = State Wildlife Action Plan
SPSOC = State Plant Species of Concern
NRM = Natural Resources Manager
MGT = Management
AFCEC = Air Force Civil Engineer Center
AFI = Air Force Instruction
USFWS = US Fish and Wildlife Service
USACE = US Army Corp of Engineers
***Old funded projects at are incomplete and in review awaiting INRMP and stakeholder recommendations

11.0 REFERENCES

11.1 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*

11.2 Installation References

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12.0 ACRONYMS

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

- *Add installation content or refer to location of related documents.*

13.0 DEFINITIONS

13.1 Standard Definitions (Applicable to all USAF installations)

- Natural Resources Playbook – Definitions Section

13.2 Installation Definitions

- *Add unique state, local, and installation-specific definitions.*

14.0 APPENDICES

14.1. Standard Appendices

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

Federal Public Laws and Executive Orders	
National Defense Authorization Act of 1989, Public Law (P.L.) 101-189; Volunteer Partnership Cost-Share Program	Amends two Acts and establishes volunteer and partnership programs for natural and cultural resources management on DoD lands.
Defense Appropriations Act of 1991, P.L. 101-511; Legacy Resource Management Program	Establishes the "Legacy Resource Management Program" for natural and cultural resources. Program emphasis is on inventory and stewardship responsibilities of biological, geophysical, cultural, and historic resources on DoD lands, including restoration of degraded or altered habitats.
EO 11514, *Protection and Enhancement of Environmental Quality*	Federal agencies shall initiate measures needed to direct their policies, plans, and programs to meet national environmental goals. They shall

Federal Public Laws and Executive Orders	
	monitor, evaluate, and control agency activities to protect and enhance the quality of the environment.
EO 11593, *Protection and Enhancement of the Cultural Environment*	All Federal agencies are required to locate, identify, and record all cultural resources. Cultural resources include sites of archaeological, historical, or architectural significance.
EO 11987, *Exotic Organisms*	Agencies shall restrict the introduction of exotic species into the natural ecosystems on lands and waters which they administer.
EO 11988, *Floodplain Management*	Provides direction regarding actions of Federal agencies in floodplains, and requires permits from state, territory and Federal review agencies for any construction within a 100-year floodplain and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities for acquiring, managing and disposing of Federal lands and facilities.
EO 11989, *Off-Road vehicles on Public Lands*	Installations permitting off-road vehicles to designate and mark specific areas/trails to minimize damage and conflicts, publish information including maps, and monitor the effects of their use. Installations may close areas if adverse effects on natural, cultural, or historic resources are observed.
EO 11990, *Protection of Wetlands*	Requires Federal agencies to avoid undertaking or providing assistance for new construction in wetlands unless there is no practicable alternative, and all practicable measures to minimize harm to wetlands have been implemented and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.
EO 12088, *Federal Compliance with Pollution Control Standards*	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (US EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 12898, *Environmental Justice*	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13112, *Exotic and Invasive Species*	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*	The 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.

Federal Public Laws and Executive Orders	
United States Code	
Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468)	Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects.
Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c	This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Clean Air Act, (42 U.S.C. § 7401– 7671q, July 14, 1955, as amended)	This Act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country which do not meet federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.
Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq.	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669i; 50 Stat. 917) (Pittman-Robertson Act)	Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782	Requires management of public lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archaeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering.

Federal Public Laws and Executive Orders	
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	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.

Federal Public Laws and Executive Orders	
Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.
Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)	Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land, 10 U.S.C. § 2665	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other federal and local programs.
Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees. NOTE: AFMAN 32-7003 3.11. INRMP Implementation. In accordance with DoDI 4715.03, installations will use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.11.1. Outsourcing Natural Resources Management. As stipulated in the Sikes Act, 16 USC § 670 *et seq.*, the Office of Management and Budget Circular No. A-76, *Performance of Commercial Activities*, 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, they may, in accordance with the Sikes Act (16 USC § 670a(d)(2)), obtain inherently governmental services from federal agencies having responsibilities for the conservation and management of natural resources. (T-0).
DoD Policy, Directives, and Instructions	
DoD Instruction 4150.07 *DoD Pest Management Program* dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.

Federal Public Laws and Executive Orders	
DoD Instruction 4715.1, *Environmental Security*	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment, and are given appropriate consideration along with other relevant factors.
DoD Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.
OSD Policy Memorandum – 17 May 2005 – *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands*	Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.
OSD Policy Memorandum – 1 November 2004 – *Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews*	Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review, and public comment on INRMP review.
OSD Policy Memorandum – 10 October 2002 – *Implementation of Sikes Act Improvement Act: Updated Guidance*	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process.
USAF Instructions and Directives	
32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process (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 32-7062, *Air Force Comprehensive Planning*	Provides guidance and responsibilities related to the USAF comprehensive planning process on all USAF-controlled lands.
AFMAN 32-7003, *Environmental Conservation*	Implements AFPD 32-70, *Environmental Quality;* DoDI 4715.03, *Natural Resources Conservation Program*; and DoDI 7310.5, *Accounting for Sale of Forest Products*. It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards.

Federal Public Laws and Executive Orders	
AFMAN 32-7003, *Environmental Conservation*	This manual implements AFPD 32-70 and DoDI 4710.1, *Archaeological and Historic Resources Management.* It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.
AFPD 32-70, *Environmental Quality*	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

14.2. Installation Appendices

Appendix B. State and Federal Permits

Appendix C. Threatened and Endangered and Species of Control Management Plan

Appendix D. Fish and Wildlife Management

Appendix E. Forest Management Plans

Appendix F. Grazing and Cropland Management Plans

Appendix G. Invasive Species Control Plan

Appendix H. Wetlands Management

Appendix I. Migratory and Breeding Bird Surveys and Checklists

15.0 ASSOCIATED PLANS

Tab 1 – Tier 1, Wildland Fire Management Plan

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

Tab 3 – Integrated Cultural Resources Management Plan (ICRMP)

Tab 4 – Integrated Pest Management Plan (IPMP)