

**U. S. AIR FORCE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN**  
**Buckley Space Force Base, Colorado**



*(See INRMP signature pages for plan approval date)*

## **ABOUT THIS PLAN**

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

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

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

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## **DOCUMENT CONTROL**

**Record of Review** – The INRMP is updated not less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. In accordance with (IAW) the Sikes Act and AFMAN32-7003, *Environmental Conservation*, the INRMP is required to be reviewed for operation and effect not less than every five years. Annual reviews and updates are accomplished by the base Natural Resources Manager (NRM), and/or an Installation Support Team Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the NR Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of the United States Fish and Wildlife Service (USFWS), state fish and wildlife agency, and National Oceanic and Atmospheric Administration (NOAA) Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signature to the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

**INRMP APPROVAL/SIGNATURE PAGES**

This Integrated Natural Resources Management Plan (INRMP) for Buckley Space Force Base, Colorado, meets the requirements of the Sikes Act (16 U.S.C. 670a et seq.) as amended and has been prepared in accordance with regulations, standards, and procedures of the Department of Defense and the Department of the Air Force. To the extent resources permit, Buckley Space Force Base will implement the actions within this plan and strive to meet its goals and objectives.

Statement of Operation and Effect:

By their signatures below, all parties grant their concurrence and acceptance, having reviewed this plan, and agree that its goals and objectives contribute to the national, regional and local conservation and management of wildlife, grasslands, threatened and endangered species, aquatic and other terrestrial habitats; additionally, provision of outdoor recreation opportunities are sought and provided as practicable and in accordance with the Sikes Act Improvement Amendments of 1997 while ensuring no net loss in the capability of military installation lands to support the military mission occurs.



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MATT MARTINEZ

Area Wildlife Manager, Colorado Parks and Wildlife

12/29/2021

Date



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NICOLE ALT

Colorado Field Supervisor, Ecological Services

United States Fish and Wildlife Service

1/27/2022

Date



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MARCUS D. JACKSON

Colonel, United States Space Force, Commander

3/4/2022

Date

## EXECUTIVE SUMMARY

The Sikes Act Improvement Amendments (SAIA) of 1997 (16 United States Code 670 et seq.) require each military installation in the United States to prepare an INRMP. Preparation of the INRMP is based on AFMAN32-7003, *Environmental Conservation*.

This document outlines a long-term plan for Buckley Space Force Base (BSFB) to manage natural resources in compliance with relevant statutes (to include federal, state, and local regulations), executive orders, Presidential memoranda, Department of Defense (DoD), and Air Force-specific requirements. The INRMP is a component of the base's Installation Development Plan (IDP) and serves as the commander's decision document for natural resources management actions and associated compliance procedures. The INRMP integrates BSFB's Natural Resources Management program with ongoing mission activities in order to provide land sustainability while conserving and protecting natural resources.

BSFB is committed to a proactive, interdisciplinary management strategy focused on an ecosystem-based approach to natural resources management. This strategy includes the Air Force objective to “sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of Air Force lands to support the military mission of the installation” while complying with federal, state, and local standards that protect and conserve wildlife, habitat, and the surrounding watershed. The INRMP outlines a plan to implement this strategy by identifying (1) baseline information on the physical and biotic environment, (2) the military mission and its potential effects on natural resources, (3) recommended goals, objectives, projects, and follow-on monitoring for key natural resources management areas, (4) personnel, funding, and support required for implementation of the INRMP and its recommended projects, and (5) opportunities for consultation with stakeholders in the implementation process.

Buckley Garrison (B GAR), which is the host unit on BSFB and falls under the direction of the United States Space Force (USSF) which ultimately falls under the Department of Air Force (DAF), has a stated mission “to deliver unrivaled combat support to our Joint mission partners and Allies, enabling uninterrupted missile warning, intelligence, and cyber operations.” More largely, B GAR supports the United States Space Force (USSF) is: The USSF is a military service that organizes, trains, and equips space forces in order to protect U.S. and allied interests in space and to provide space capabilities to the joint force. USSF responsibilities include developing military space professionals, acquiring military space systems, maturing the military doctrine for space power, and organizing space forces to present to our Combatant Commands.

Besides being the home of Buckley Garrison, BSFB also hosts Space DEL 4 Missile Warning Delta, the 140th Wing, Colorado Air National Guard (COANG), the Navy Operational Support Center, the Aerospace Data Facility-Colorado, the Army Aviation Support Facility and the Air Reserve Personnel Center. These are also known as the "Big Six" mission partners at Buckley. The COANG demands much attention with respect to the natural resource mission due to the support required in mitigating the Bird/Wildlife Aircraft Strike Hazard (BASH) on the installation.

### *Installation Natural Resources*

BSFB is located on 3,311 acres of flat to rolling uplands on the eastern edge of urbanized portions of the City of Aurora. There is a total of 1,396 acres designated as semi-improved land and approximately 995 acres of the total are within the airfield. The open space within the airfield is not available for conservation due to mission and safety requirements though the Natural Resources Program (NRP) will provide assistance as requested by the BASH working group to alleviate wildlife issues through management projects. There is 1,068 acres designated as unimproved and the NRP is responsible for managing these



acres and they are available for conservation, restoration, and wildlife management that does not conflict with mission and safety requirements. These remaining acres contain a variety of aquatic (i.e., intermittent streams, and an impoundment) and terrestrial (i.e., prairies, bottomland meadows, and cottonwood/willow riparian) habitats. The installation has twenty-three wetlands that are mainly associated with East Toll Gate Creek and Williams Lake. Wetlands associated with Williams Lake and the unnamed creek below Williams Lake were determined to be not jurisdictional by the U.S. Army Corps of Engineers (USACE) in 2001.

Formal biological surveys have been conducted and a wide variety of native flora and fauna have been documented. Native short to mid-grass prairies, one of the most endangered habitats in the United States, are present with birds and mammals being the dominant faunal groups. Because of its location and size, the installation provides habitat for a variety of birds, including waterfowl (e.g., ducks and geese) and raptors (e.g., bald eagles and red-tailed hawks). Small mammals (e.g., black-tailed prairie dogs, rabbits, and mice) and large mammals (coyote and red fox) are common. No federally-listed species under the Endangered Species Act (ESA) are known to reside on the installation. State-listed threatened species known to occur on the installation include the Western burrowing owl (*Athene cunicularia*). Several state-listed species of concern (e.g., bald eagle, ferruginous hawk, common garter snake, and black-tailed prairie dog) are also present.

#### *Natural Resources Management Concerns, Goals, Objectives*

The primary natural resources which could impact or be impacted by the installation's mission are black-tailed prairie dog, western burrowing owl, wetlands, and the native prairie ecosystem. The stated goal of the Air Force Civil Engineer Center (AFCEC) natural resources team is to provide a military landscape that supports the military mission, while protecting the land and its resources. The major natural resources management tasks on BSFB are supporting 460 SE (Garrison Safety Office), to include the United States Department of Agriculture (USDA), in mitigating the BASH as well as implementing conservation efforts so that they're compatible with and ultimately support completion of the military mission. Natural resources management concerns, goals, and objectives address constraints to the installation's mission, conservation of biodiversity, and multiple uses of the installation's natural resources. Projects were subsequently developed to meet BSFB natural resources management goals. BSFB Natural Resources Manager (NRM), the U.S. Fish and Wildlife Service (USFWS) Ecological Services Office, and Colorado Parks and Wildlife (CPW) conducted the interagency review of the proposed INRMP projects.

This INRMP supports the Air Force mission by providing the steps needed to fulfill all compliance requirements related to natural resources and to foster environmental stewardship at BSFB. With that being said, full compliance and sound stewardship are dependent on the implementation of the INRMP through the appropriation of adequate funding for the recommended projects. Additionally, annual reviews with the USFWS and CPW will ensure that the INRMP remains current and relevant.

## **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 DAF. 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 Space Force adaptability in all environments. The Space Force has stewardship responsibility over the physical lands on which installations are located to ensure all natural resources are properly conserved, protected, and used in sustainable ways. The primary objective of the Space Force natural resources program is to sustain, restore and modernize natural infrastructure to ensure operational capability and no net loss in the capability of DAF lands to support the military mission of the installation. The plan outlines and assigns responsibilities for the management of natural resources, discusses related concerns, and provides program management elements that will help to maintain or improve the natural resources within the context of the installation's mission. 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***

The purpose of the INRMP is to direct natural resources management at BSFB, Colorado. The INRMP will define natural resources management goals and objectives that are consistent with and support the military mission. The INRMP shall maintain or restore native ecosystems, natural ecological processes, and the hydrological processes with out impacting the mission as defined in AFMAN32-7003, Environmental Conservation. This INRMP fulfills the Sikes Act Improvement Act (SAIA) of 1997 (16 United States Code (U.S.C) 670 et seq.). The SAIA requires each military installation in the United States to "prepare an INRMP that provides for appropriate management activities to include: (1) conservation and rehabilitation of natural resources on military installations; (2) sustainable multipurpose use of the resources to include hunting, fishing, trapping, and non-consumptive uses; and (3) subject to safety requirements and military security, public access to military installations to facilitate the use."

SAIA states that consistent with the use of military installations to ensure preparedness of the Armed Forces, each integrated natural resources management plan, where appropriate and applicable, shall provide for "(1) fish and wildlife management, land management, forest management, and fish- and wildlife-oriented recreation; (2) fish and wildlife habitat enhancement or modifications; (3) wetland protection, enhancement, and restoration, where necessary for support of fish or wildlife; (4) integration of, and consistency among, the various activities conducted under the plan; (5) establishment of specific natural resources management objectives and time frames for proposed action; (6) sustained use by the public of natural resources to the extent such use is not inconsistent with the needs of fish and wildlife resources management; (7) public access to the military installation that is necessary or appropriate subject to the requirements necessary to ensure safety and military security; (8) enforcement of applicable natural resource laws and regulations; and (9) no net loss in the capability of military installation lands to support the military mission.

### ***1.2 Management Philosophy***

The INRMP validates the Installation Development Plan (IDP). The IDP provides background and rationale for the policies and programming decisions related to land use, resource conservation, facilities and infrastructure development, and operations and maintenance at BSFB. The INRMP supports the mission by identifying the natural resources present on the installation, developing management goals for these

resources, and integrating these management objectives into the military requirements for mission operations support and regulatory compliance.

The INRMP emphasizes ecosystem management at the local and regional level consistent with the military mission. Applicable federal law, DoD and AF regulations, and other regulatory guidance were used in establishing goals and objectives. When feasible and consistent with the military mission, management actions on BSFB are developed to enhance ecosystem functioning, value, and human use of the natural environment.

Management issues and concerns, as well as goals and objectives are developed from analysis of all the gathered information and are reviewed by BSFB personnel involved with or responsible for various aspects of natural resources management. The INRMP was developed using an interdisciplinary approach. This INRMP is based on existing information on the physical and biotic environments, mission activities, and environmental management practices at BSFB. Information was obtained from a variety of BSFB documents, interviews with installation personnel, on-site observations, and communications with both internal and external stakeholders. Coordination and correspondence with these stakeholders is documented and satisfies a portion of the requirements of 32 Code of Federal Regulations (CFR) 989 - Environmental Impact Analysis Process (EIAP). Goals and objectives are to be monitored on a continuous basis and management strategies updated whenever there are changes in the mission requirements, adverse effects observed in the management of the natural resources, or changes in regulations governing management of natural resources. Internal and external stakeholders are presented in Appendix H: Internal and External Stakeholders.

### ***1.3 Authority***

The B-GAR/CC has approved this plan for implementation and use. This plan was developed under and in accordance with the following authorities:

- 16 United States Code (USC) 670 et seq. Sikes Act Improvement Act (SAIA)
- DOD Instruction (DODI) 4715.03, Environmental Conservation Program
- DOD Directive (DODD) 4700.4, Natural Resources Management Program
- Air Force Policy Directive (AFPD) 32-70, Environmental Quality
- Air Force Manual (AFMAN) 32-7003, Environmental Conservation

<b>Installation-Specific Policies (including State and/or Local Laws and Regulations)</b>	

### ***1.4 Integration with Other Plans***

AFMAN32-7003, Environmental Conservation, requires that natural resources management is integrated in cooperation with appropriate stakeholders. Additionally, AFMAN32-7003, section 3.12.3, *Integration with Other Installation Programs*, states, “Coordinate draft INRMP revisions through the installation chain of command and other identified stakeholders involved in INRMP implementation, to include the Bird Hazard Working Group. Ensure that the INRMP, Integrated Cultural Resources Management Plan (ICRMP), Bird/Wildlife Aircraft Strike Hazard (BASH) Plan, Integrated Pest Management Plan, and Air Installation Compatible Use Zone studies are mutually supportive and not in conflict.” The BSFB INRMP

is integrated with the BASH Plan to ensure natural resources management aligns with maintaining continued military flying readiness and actions outlined in the INRMP act to reduce any existing and potential risk for human health and flight safety. In addition, “The INRMP should address habitat management techniques that can reduce the potential for wildlife hazards to aircraft operations.” (AFMAN 32-7003, section 3.64.1). The purpose of INRMP integration with the ICRMP is to assure elements of the natural resources program that may potentially affect cultural resources on the installation are properly identified and addressed. INRMP integration with the IPMP is to safeguard effective strategies for the management of pests and confirm the two plans are mutually supportive in these efforts and not in conflict of each other. The AICUZ study integrates the INRMP to ensure AICUZ guidelines are incorporated into on-base land use planning within the natural resources program. AFI32-1015, Integrated Installation Planning, specifies the INRMP is a key component plan of the Installation Development Plan (IDP). The purpose of INRMP integration with the IDP is to consider natural resources constraints and management strategies in conjunction with base development. Natural Resources Management is also integral to the Installation Facility Standards (IFS) and Readiness and Environmental Protection Integration (REPI). INRMP integration with the IFS aligns natural resources management efforts with established design guidance for standardizing and improving the quality of the total installation environment. Specifically, the IFS’s outlined Landscape Design Standards addressing the natural environment with regard to objectives, guidelines, recommended plant selections, plant spacing, and site furnishings (i.e. approved tree species selection and site specific seed mix requirements) compatible with INRMP goals and objectives. Integration of the INRMP with REPI is to assess existing and future natural resources projects outlined in an approved INRMP for opportunities to merge conservation with land use objectives that benefit the mission.



**2.0 INSTALLATION PROFILE**

<b>Office of Primary Responsibility</b>	460 CES/CEIE has overall responsibility for implementing the Natural Resources Management program and is the lead organization for monitoring compliance with applicable federal, state and local regulations
<b>Natural Resources Manager/POC</b>	Matthew Rodgers, 460 CES/CEIE Environmental Element Chief DSN: 847-7245 or 720-847-7245 matthew.rodgers.7@spaceforce.mil
<b>State and/or local regulatory POCs</b> (For US-bases, include agency name for Sikes Act cooperating agencies)	Pamela Sponholtz, US Fish and Wildlife Service (USFWS) Rickey Jones, USFWS Veronica Reed, USFWS Liisa Schmoele & George San Miguel, Colorado Ecological Services Office, Region 6 USFWS Migratory Bird Office, Region 6 USFWS (fw6_migratorybirds@fws.gov) Matt Martinez, Colorado Parks and Wildlife Travis Harris, Colorado Parks and Wildlife
<b>Total acreage managed by installation</b>	3,311
<b>Total acreage of potential wetlands</b>	16.026
<b>Total acreage of forested land</b>	None
<b>Does installation have any Biological Opinions?</b> (If yes, list title and date, and identify where they are maintained)	No
<b>NR Program Applicability</b> (Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	<input checked="" type="checkbox"/> Invasive species <input checked="" type="checkbox"/> Wetlands Protection Program <input checked="" type="checkbox"/> Grounds Maintenance Contract/SOW <input type="checkbox"/> Forest Management Program <input checked="" type="checkbox"/> Wildland Fire Management Program <input type="checkbox"/> Agricultural Outleasing Program <input checked="" type="checkbox"/> Integrated Pest Management Program <input checked="" type="checkbox"/> Bird/Wildlife Aircraft Strike Hazard (BASH) Program <input type="checkbox"/> Coastal Zones/Marine Resources Management Program <input checked="" type="checkbox"/> Cultural Resources Management Program

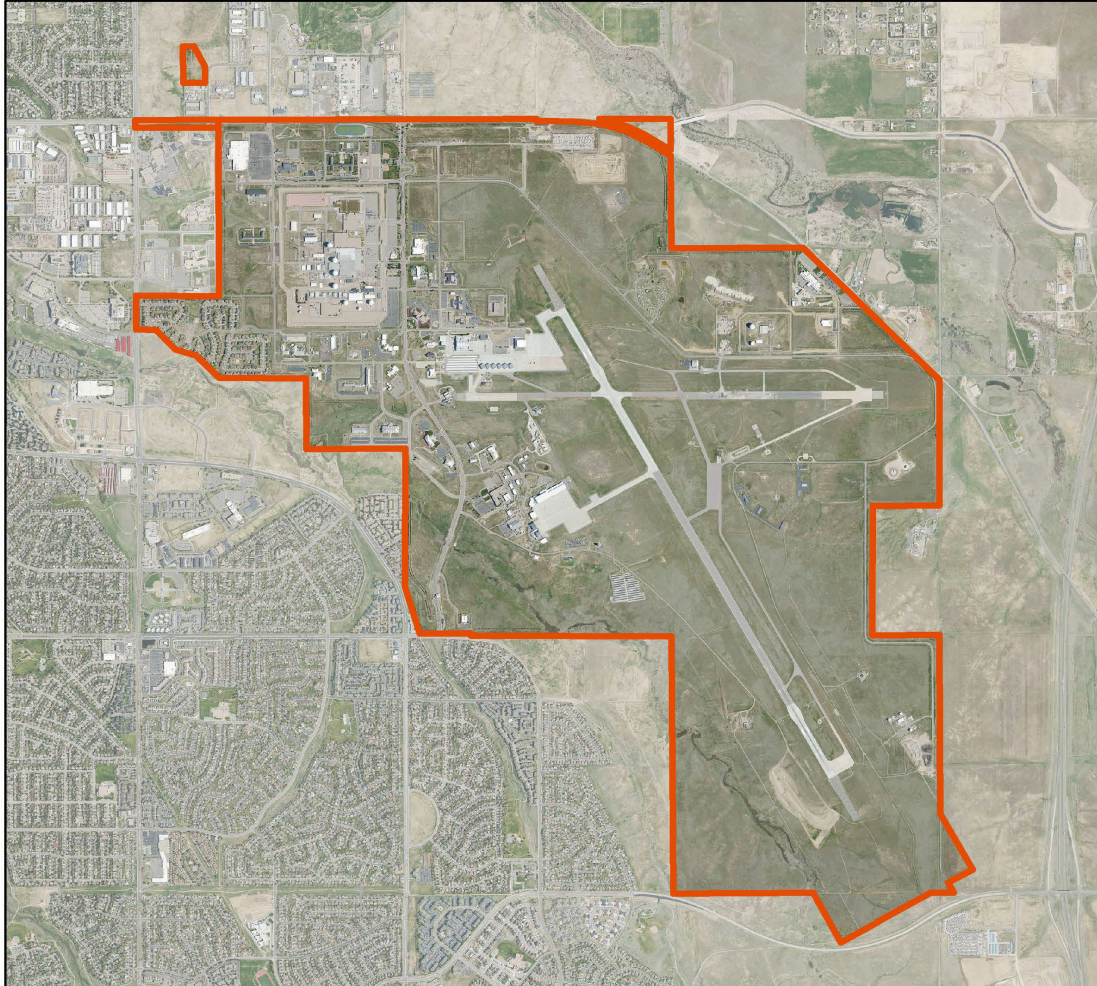
**2.1 Installation Overview**

*2.1.1 Location and Area*

BSFB is located on 3,311 acres of flat to rolling uplands on the eastern edge of urbanized portions of the City of Aurora in Arapahoe County, Colorado (see Figures Aerial View and Map View of BSFB). The installation is approximately 3 miles east of Interstate 225 and 10 miles southwest of Denver International Airport. There is a total of 1,396 acres designated as semi-improved land and approximately 995 acres of the total are within the airfield. This open space is not available for conservation due to mission and safety requirements though the NRP will provide assistance as requested by the Bird Hazard Working Group to alleviate wildlife issues through management projects. There is 1,068 acres designated as unimproved and the NRP is responsible for managing these acres and they are available for conservation, restoration, and wildlife management that does not conflict with mission and safety requirements. These remaining acres contain a variety of aquatic (i.e., intermittent streams, and an impoundment) and terrestrial (i.e., prairies,

bottomland meadows, and cottonwood/willow riparian) habitats. The installation has twenty-three wetlands that are mainly associated with East Toll Gate Creek and Williams Lake.

**Aerial View of BSFB**



**Legend**

 Installation

**Buckley SFB**

Aerial Imagery, May 2019



**Prepared by:**  
 Center for Environmental  
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 Cooperative Agreement:  
 Number W9126G-18-2-0033



Coordinate System: WGS 1984 UTM Zone 13N  
 Projection: Transverse Mercator  
 Datum: WGS 1984

0.5 0.25 0 0.5 1 Miles

0.5 0.25 0 0.5 1 1.5 Kilometers

Map created for presentation purposes only. Although efforts have been made to verify data, accuracy cannot be guaranteed

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**Installation/GSU Location and Area Descriptions**

<b>Base/GSU Name</b>	<b>Main Use/Mission</b>	<b>Acreage</b>	<b>Addressed in INRMP?</b>	<b>Describe NR Implications</b>
[BSFB]	Combat-ready Airmen providing warning, surveillance and installation operations for America and our allies.	3,311	Yes, throughout INRMP.	Reference all sections within the INRMP.
[GSU 1]	N/A	N/A	N/A	N/A
[GSU 2]	N/A	N/A	N/A	N/A

*2.1.2 Installation History*

Originally owned by the City of Denver during the 1930s, the property comprising Buckley Field was subsequently donated to the federal government as an extension of Lowry Air Corps Technical Training School. Buckley Field was used as an auxiliary field and bomb-loading area supporting student pilots from Lowry Field. In 1942, the Army Air Force Technical Training School was established at Buckley Field to coincide with the expansion of Lowry Field. At this time, Buckley Field was composed of 1,250 acres and was equipped to house 12,000 personnel. The mission of Buckley Field during the 1940s was to prepare armaments for fighter planes and provide specialized training armories for B-17 and B-24 aircraft operations.

During World War II, additional funds were allocated to Buckley Field. These funds were used to expand Buckley Field's training capabilities and included the construction of a hospital, which administered to casualties of war; a railroad spur used to transport building materials, troops, coal, and equipment; and training facilities for armament, basic, and arctic training. In 1945, Buckley Field became a sub-post of Lowry Field and hosted the Chemical Training Center for the Air Force and Camouflage Training Center.

After World War II, Buckley Field became inactive; much of the equipment and buildings were sold as war surplus, and the bombing range was leased for grazing rights. In 1946, the Colorado Air National Guard (COANG) acquired Buckley Field but was unable to financially support the installation. The Department of the Navy took over Buckley Field in September 1947 and renamed it Naval Air Station-Denver, Colorado. During this period, many more buildings were sold or renovated as low-income housing for veterans.

The Naval Air Station was decommissioned in 1959 and control over the installation returned to the COANG. The COANG was the host until the realignment, when the 821st Space Group, under Peterson AFB, became the interim host during the transition prior to standing up as an Air Base Wing. The 460 ABW became the host in the fall of 2001. In August 2004, the 460 ABW was re-designated as the 460 SW. Recently, in June 2021, BAFB was renamed Buckley Space Force Base (BSFB) and the 460 SW was re-designated as the Buckley Garrison (B GAR) in July 2021. The installation is currently composed of 3,311 acres, hosts numerous tenant organizations, and is the hub of transient military air traffic in the Denver metropolitan area.

*2.1.3 Military Missions*

The mission of the B GAR is: "Combat-ready Airmen providing warning, surveillance and installation operations for America and our allies." The mission of the natural resources program at BSFB is to support



the DAF mission through responsible stewardship of America's natural resources utilizing INRM and the principles of ecosystem management to ensure ecosystem viability and biodiversity, while providing compatible multiple uses.”

Along with the B GAR, BSFB is home to a variety of tenants with a range of missions from flight training to support for transient military aircraft and space related initiatives. It is important to understand, B GAR is the host and responsible for maintaining military mission readiness for the COANG 120th Fighter Squadron under the 140th Wing with an active flying mission of: “The 120th Fighter Squadron has operational control and responsibility for the F-16 training mission in the 140th Wing.”

**Listing of Tenants and NR Responsibility**

Tenant Organization	NR Responsibility
<b>HOST ORGANIZATION</b> <b>Space Force</b> Buckley Garrison Aerospace Data Facility-Colorado (ADF-C) Headquarters Air Reserve Personnel Ctr (ARPC)	Buckley Garrison, as the installation host, is responsible for managing tenant’s impact to/by natural resources.
<b>TENANT ORGANIZATION</b> <b>Air National Guard</b> 140 <sup>th</sup> Wing Colorado Air National Guard (COANG) <b>Army National Guard (ARNG)</b> Colorado Army National Guard (COARNG) <b>Navy Reserve</b> Navy Operational Support Center (NOSC) <b>Aerospace Data Facility – Colorado (ADF-C)</b> Multiple smaller tenant comprise ADF-C	Buckley Garrison, as the installation host, is responsible for managing tenant’s impact to/by natural resources.

*2.1.4 Surrounding Communities*

BSFB is on the eastern edge of urbanized portions of the City of Aurora. Encompassing 99,072 acres (154.8 square miles), Aurora is the second largest city in the Denver metropolitan area and the third largest city in the state. Approximately 52 percent of the total acreage composing the City of Aurora is zoned residential. The remaining 48 percent of Aurora's total acreage is composed of industrial and commercial land use as well as open space. Land use directly southwest, west, and northwest of the installation consists mainly of residential with some intermixed commercial land use. Light industrial land use is combined with areas of open space to the north of the installation. The areas northeast and east of the installation are primarily agricultural but are rapidly changing to residential. Dad’s landfill is southeast of the installation and the open space to the south is the Plains Conservation Center.

Aurora's population in 2019 was 388,723, a 15% increase since 2013. The construction of Highway E-470, one-half mile to the east of the installation, the completed extension of Jewell Avenue connecting to Highway E-470, and the 6th Avenue extension connecting to Highway E-470 favor an increase in development and population east of the installation.

### *2.1.5 Local and Regional Natural Areas*

BSFB is near a number of federal, state, and city-owned natural areas. These include the Rocky Mountain Arsenal National Wildlife Refuge (NWR), Barr Lake State Park, Chatfield State Recreation Area, Cherry Creek State Park, the Plains Conservation Center, Aurora Reservoir, and Quincy Reservoir.

The Rocky Mountain Arsenal NWR is approximately 5 miles northwest of BSFB and is roughly 17,000 acres. This NWR is an important resource to many species of wildlife and is a popular wildlife viewing area within a urban setting. The NWR also offers fishing, hiking, biking, wildlife tours, and a visitor's center.

Barr Lake State Park is approximately 14 miles north of BSFB in Brighton, Colorado. This state wildlife refuge comprises 2,583 acres and functions as an important reservoir for agricultural use. In addition, this park offers recreational opportunities for fishing, boating, hunting, winter sports, and a visitor's center.

Chatfield State Recreation Area is approximately 19 miles southwest of BSFB. This recreation area maintains recreational facilities for camping, fishing, swimming, boating, hiking, biking, and winter sports. This park encompasses 5,318 acres.

Cherry Creek State Park is approximately 7 miles southwest of BSFB. Located in Aurora, Colorado, this 4,715 acre park is a popular area due to its proximity to Denver. Recreational activities available include camping, fishing, swimming, boating, hiking, biking, and winter sports.

The Plains Conservation Center is adjacent to BSFB to the south. This area was acquired by the City of Aurora and is managed by the West Arapahoe Conservation District. Management plans for the area appear to be consistent with its past use as a conservation area. Currently, the city utilizes some of the grounds for black-tailed prairie dog relocation.

Aurora Reservoir is a 31,650 acre reservoir located approximately 6 miles southeast of BSFB. The main purpose of this reservoir is to supply the City of Aurora with drinking water. Recreational activities available include scuba diving, fishing, swimming, boating, hiking, archery, and biking.

Quincy Reservoir is a smaller reservoir of about 160 acres located 5 miles south of BSFB. The City of Aurora uses the reservoir primarily for drinking water but is also used for several recreational activities including fishing, swimming, boating, hiking, birding, and biking.

## **2.2 Physical Environment**

### *2.2.1 Climate*

The semiarid climate at and in the vicinity of BSFB is characteristic of the High Plains region. However, the climate in this section of the High Plains is strongly influenced by the Rocky Mountains. The effects of the Rocky Mountains on the regional climate are more predominant in the Rocky Mountain foothills west of the installation. However, these effects are still noticeable at BSFB, particularly when the wind is from the east and upslope conditions occur, or when thunderstorms roll off the Rocky Mountains.

Generally, variations in the regional climate from west to east, include greater average variation in daily and annual temperatures, slightly lower average annual precipitation, smaller amounts of precipitation in the winter, and an increase in the amount and variability of precipitation in the summer. An increase in average wind speed also occurs because wind speeds are reduced in the eastern foothills due to the shielding effect of the Rocky Mountains (Mutel and Emerick 1994, USDA SCS 1971). Arapahoe County also exhibits

climatic differences (e.g., temperature and wind) in a north-to-south gradient, which is caused by the higher elevation in the southern parts of the county (USDA SCS 1971).

### *Climate Change*

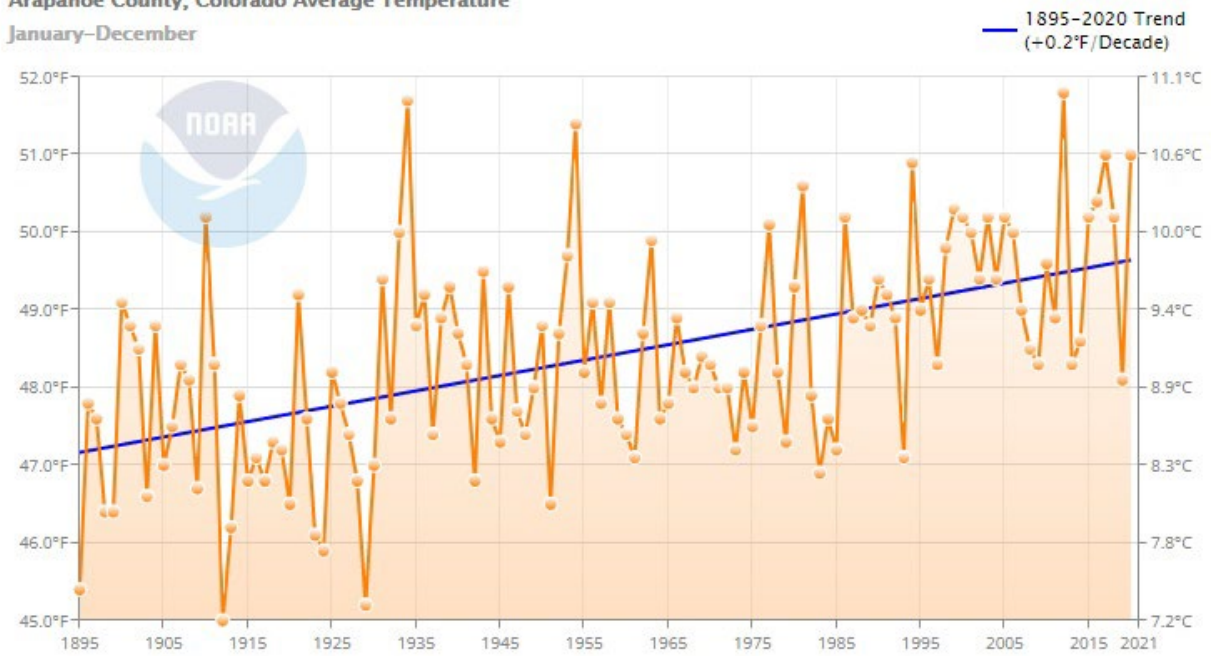
DoD has identified climate change as a critical national security issue and threat multiplier and top management challenge. Climate change will continue to amplify operational demands on the force, degrade installations and infrastructure, increase health risks to our service members, and could require modifications to existing and planned equipment. Extreme weather events are already costing the Department billions of dollars and are degrading mission capabilities. These effects and costs are likely to increase as climate change accelerates. Not adapting to climate change will be even more consequential with failure measured in terms of lost military capability, weakened alliances, enfeebled international stature, degraded infrastructure, and missed opportunities for technical innovation and economic growth (DoD 2021).

At BSFB, climate change may affect the flora and fauna, as well as other natural resources, present on BSFB. BSFB has been classified as shortgrass prairie (Holechek et al. 1989, Stoddart et al. 1975). This type of ecosystem is typically dominated by grass species such as Blue grama and buffalo grass (Holechek et al. 1989). In a study conducted at the U.S. Army Pueblo Chemical Depot, a site similar ecologically to BSFB, Blue grama grasses were observed to be impacted heavily by drought conditions (Rondeau et al. 2016). As a result of climate change, droughts are expected to worsen and become more frequent in the region (Le Houérou 1996). If drought conditions in the area worsen, the native grasses may be significantly impacted adversely along with other untold consequences.

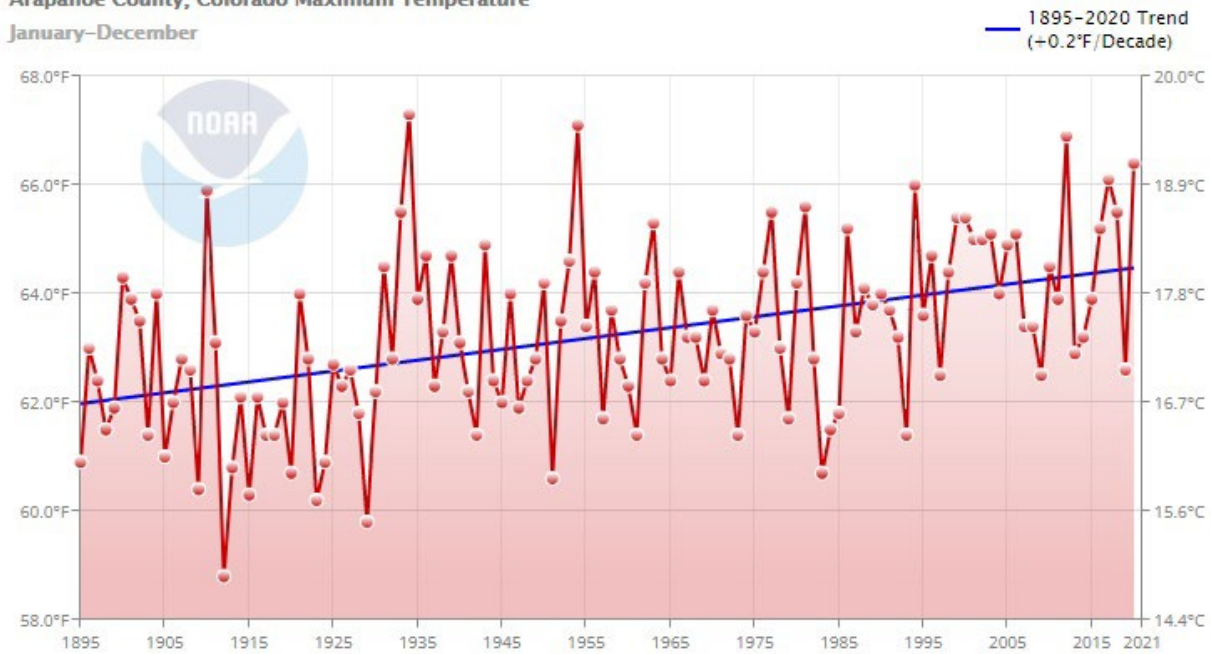
The installation should consider historical regional trends in climate, projections of future climate change vulnerabilities and risk to natural infrastructure and sensitive species using authoritative region-specific climate science. BSFB should consider developing goals and objectives for ecosystem management and biodiversity conservation. These should employ an adaptive ecosystem-based management approach that will enhance the resiliency of the ecosystem to adapt to changes in climate. Further, the ecological impacts associated with climate change do not exist in isolation, but combine with and exacerbate existing stresses on our natural systems. Vulnerability to climate change has been discussed as having three principle components: sensitivity, exposure, and adaptive capacity. Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. Exposure is the nature and degree to which a system is exposed to significant climate variations. Adaptive capacity is the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Climate data summarizing approximately 130 years of annual data for Arapahoe County has been provided in the graphs below for the following parameters: average temperature, maximum temperature, minimum temperature and precipitation (NOAA 2021).

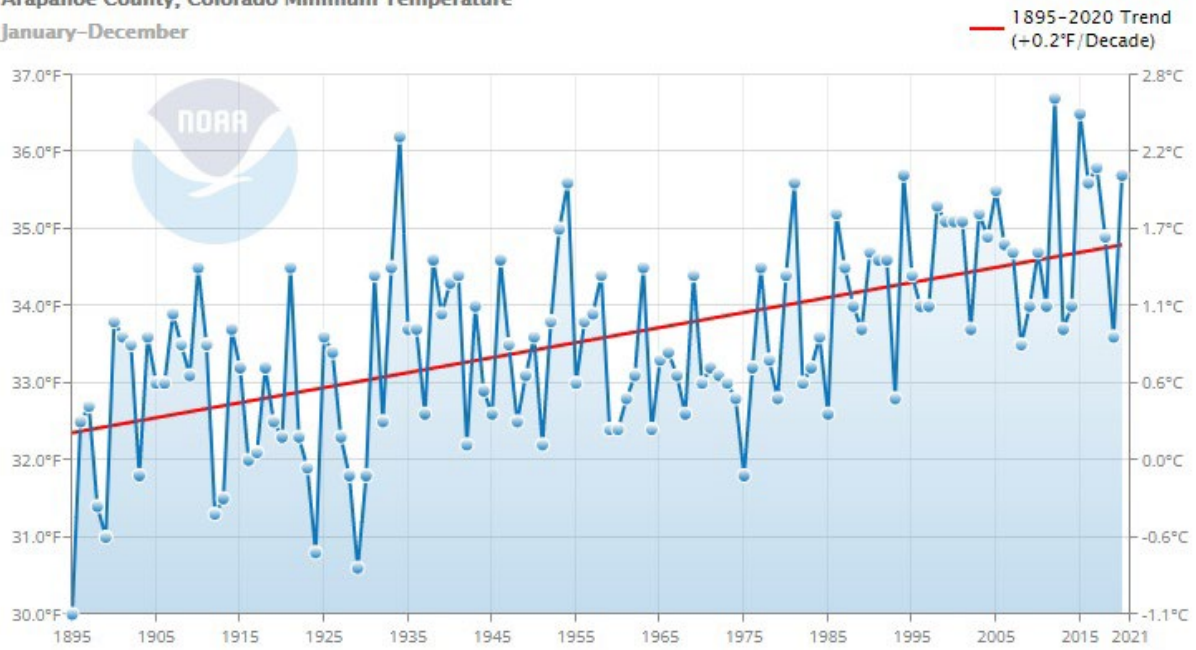
**Arapahoe County, Colorado Average Temperature**  
January–December



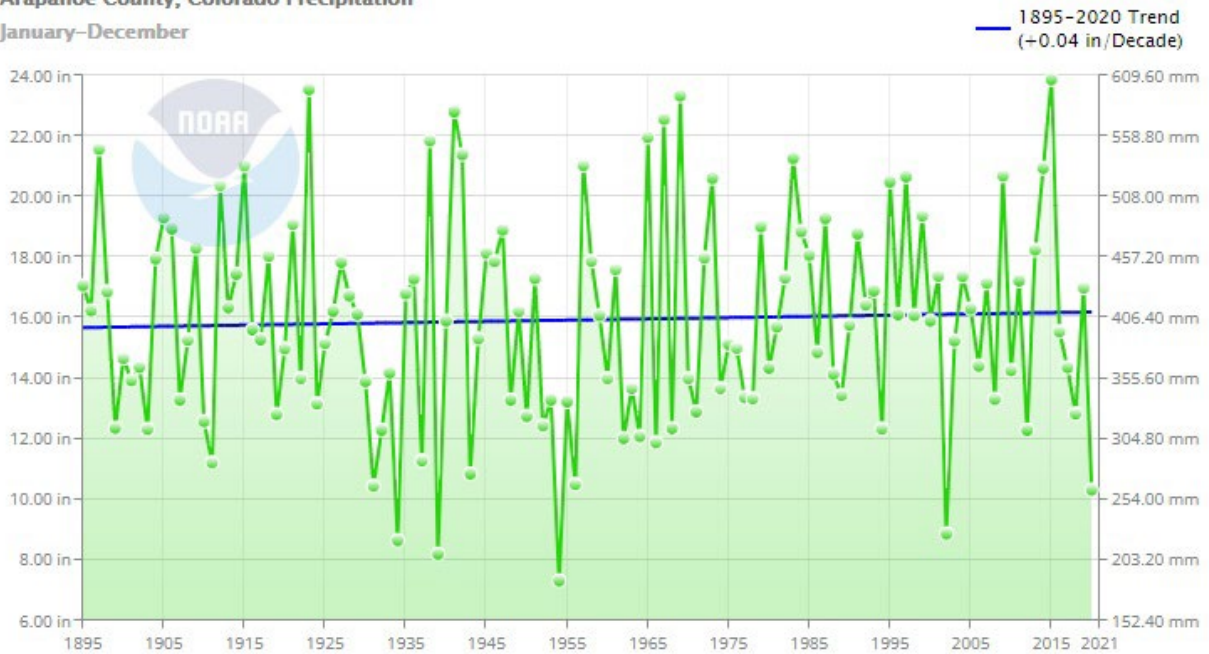
**Arapahoe County, Colorado Maximum Temperature**  
January–December



**Arapahoe County, Colorado Minimum Temperature**  
January–December



**Arapahoe County, Colorado Precipitation**  
January–December



Additional and more comprehensive weather and climate data taken from Buckley proper can be found below (Gold 2021).

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

<b>LOCATION ID</b> ICAO_KBKF	<b>STATION NAME</b> BUCKLEY AFB, CO	<b>PERIOD OF RECORD (POR)</b> Mean: 2011/01/01 - 2020/12/31 Extreme: 1944/03/01 - 2021/09/30	<b>UTC TO LST</b> -7
<b>LOCATION(DEGREES)</b> N 39.701 W 104.751		<b>ELEVATION(FEET)</b> 5662	<b>PREPARED BY</b> 557WW /14WS & Buckley Weather
<b>YEAR(S)</b> Period of Record (see detailed POR >>>)		<b>DETAILED POR</b> 1944, 1961-1970, 1973-2020	

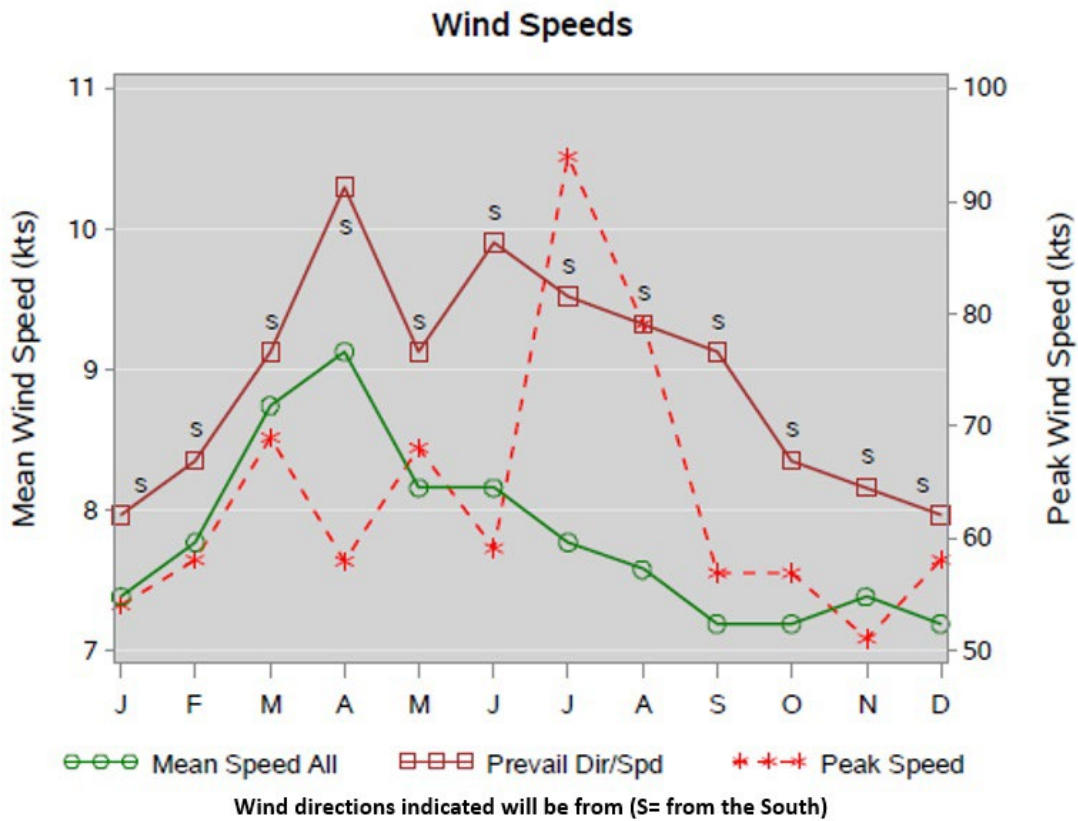
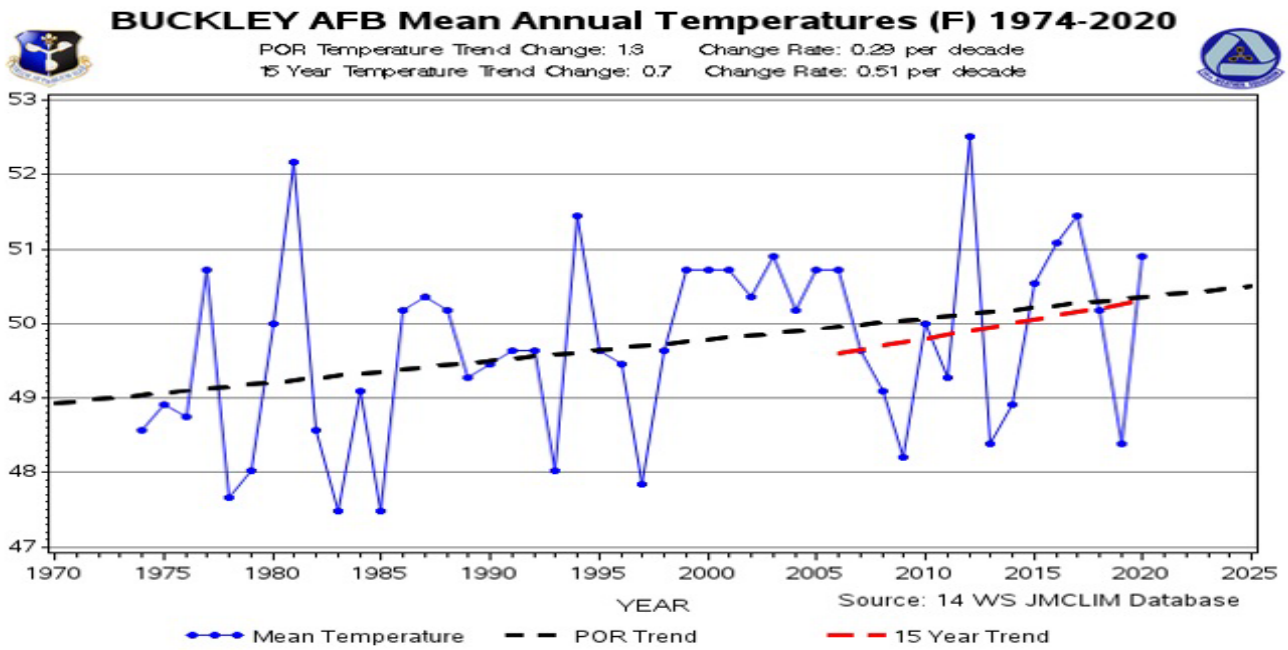
AUTHORITATIVE CLIMATE SUMMARY - DATA QUALITY AND QUANTITY SUFFICIENT TO PRODUCE ACCURATE CLIMATOLOGICAL VALUES

**Temperatures**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Temperature <b>Extreme Maximum</b> (°F)	73	79	82	88	93	103	<b>107</b>	102	99	86	79	76	107
Temperature Mean Maximum (°F)	46	46	58	63	70	85	89	87	81	66	55	45	66
Temperature Mean (°F)	32	31	41	46	54	69	73	72	65	49	40	31	50
Temperature Mean Minimum (°F)	22	22	31	36	44	56	61	60	53	39	30	22	40
Temperature <b>Extreme Minimum</b> (°F)	<b>-30</b>	-17	-7	3	19	34	42	43	18	2	-11	-25	-30
Temperature Maximum Range (°F)	56	54	52	52	47	49	41	43	54	54	49	56	56
Days With Temperature >= 90°F	0	0	0	0	0	8	15	12	3	0	0	0	38
Days With Temperature <= 32°F	28	24	18	11	2	0	0	0	0	8	19	28	139
Days With Temperature <= 0°F	2	1	0	0	0	0	0	0	0	0	0	2	5

**Precipitation**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Precipitation Period Maximum (In)	1.4	2.1	4.8	5.3	7.3	7.4	7	5.9	<b>13.9"</b>	4.2	2.7	2.8	25.1
Precipitation Period Mean (In)	0.5	0.6	1.2	1.7	2.5	1.7	2	1.6	1.3	1	0.8	0.6	15.4
Precipitation Period Minimum (In)	0	0	0	0	0.1	0	0.1	0.1	0	0.1	0	0	7.5
Precipitation Period Daily Maximum (In)	1.3	0.8	2.2	2.6	3.8	3.7	<b>4"</b>	2.5	1.6	1.4	1	1.9	4
Snowfall Period Maximum (In)	18.6	16.7	<b>35.6</b>	18.3	15.3	0.2	0	0	18.7	<b>41.8"</b>	25.6	23.4	114.7
Snowfall Period Mean (In)	6.2	5.5	9.8	6.7	1.6	T	0	0	1.8	3.7	7.7	6	48.8
Snowfall Period Daily Maximum (In)	13.3	8.5	<b>19</b>	16.2	13.3	0.2	0	0	12.3	13.8	13.2	<b>19.1"</b>	19.1
Days with liquid >= Trace	*	*	*	*	*	*	*	*	*	*	*	*	*
Days with liquid >= 0.01"	5	5	7	8	10	8	9	9	6	5	5	5	82
Days with liquid >= 0.5"	*	*	1	1	2	1	1	1	1	*	*	*	8
Days with snow >= Trace	*	*	*	*	*	*	*	*	*	*	*	*	*
Days with snow >= 0.05"	5	5	6	4	1	*	0	0	1	2	5	4	31
Days with snow >= 1.5"	1	1	2	1	*	0	0	0	*	1	2	1	10



Note: Period of Record (POR): 2010-2019

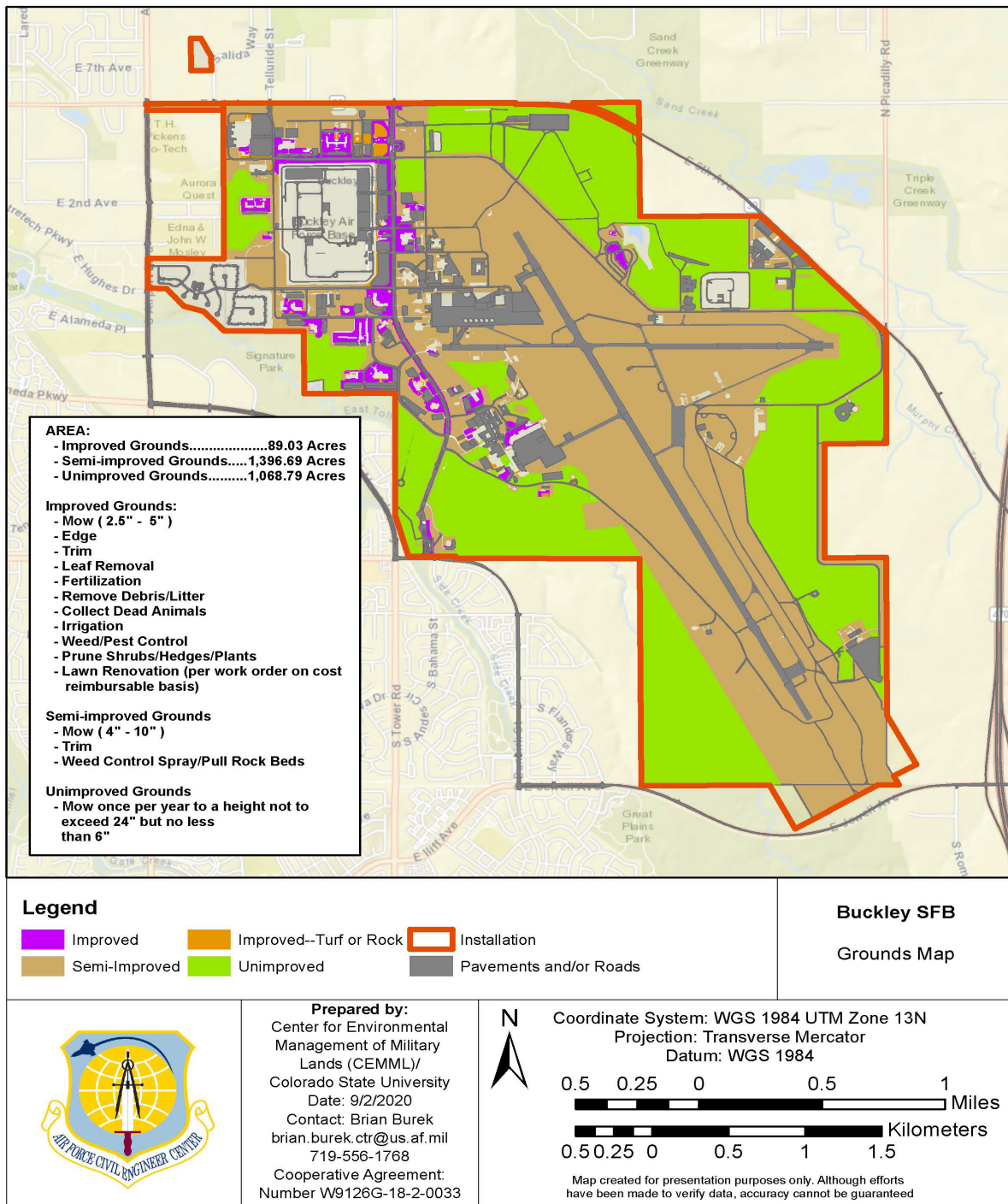
Extremes POR: 1944-2020

### 2.2.2 Landforms

BSFB encompasses approximately 3,311 acres. It is located on the outskirts of the City of Aurora in an urban/industrial/agricultural environment. Approximately 68 percent of the installation's grounds have been developed (e.g., streets, sidewalks, and buildings), are improved, or semi-improved (see Figure Improved and Semi-improved Grounds Map). Improved grounds, which cover approximately 89 acres of the installation, are the developed areas that have lawns and landscape plantings that require intensive maintenance. Semi-improved grounds, which occupy approximately 1,397 acres on the installation, are areas where periodic ground maintenance activities are performed for operational or aesthetic reasons. The airfield runway and apron areas consist of approximately 1,450 acres, 995 acres of this is semi-improved. Unimproved grounds account for approximately 1,069 acres of the installation, and may include areas that are designated as open space, recreation, or other areas not planned for development due to safety, operational requirements, and other natural resources management considerations.



**Figure: Improved and Semi-improved Grounds Map**



BSFB is west of the Great Plains within the western portion of the Central High Plains of Colorado. The region is surrounded on three sides by higher terrain areas including Palmer Lake Divide to the south, the Front Range of the Rocky Mountains to the west and Cheyenne Ridge to the north. The topography of

BSFB is composed of both relatively flat land and rolling upland. Elevations range from 5,650 feet in the southeastern corner to 5,500 feet in the northwestern corner of the installation.

### *2.2.3 Geology and Soils*

#### **Geology**

BSFB is within the Denver Basin approximately 50 miles east of the Continental Divide. The Denver Basin is a structural depression that is 300 miles long and 200 miles wide. This depression was created during a mountain-building event referred to as the Laramide Orogeny.

The Denver Basin consists of geologic layers in excess of 13,000 feet thick that range in age from Late Pennsylvanian through Quaternary. Five principal stratigraphic units are present within the Denver Basin: Fox Hills Sandstone, Laramie Formation, Arapahoe Formation, Denver Formation, and Dawson Arkose. The basal (compact) unit of the Denver Basin is the Pierre Shale that underlies the Fox Hills Sandstone (Robson 1983). Surficial material consists of several layers of unconsolidated alluvial gravels, sands, clays, and eolian material (i.e., material deposited as a result of wind processes) that were deposited in response to glacial and interglacial events.

Coal reserves are present beneath the surface of BSFB; however, these reserves are economically non-recoverable due to their low quality and depth beneath the surface. Although mineral reserves (i.e., sand and gravel) are present in the area, economically desirable reserves do not exist on BSFB. No other significant mineral resources are present at BSFB.

#### **Soils**

The major soil-mapping units present on BSFB include the Fondis-Weld, Alluvial Land-Nunn, and Renohill-Buick-Little associations. Other areas on the installation have been identified as gravel pits, rock outcrop complexes, sandy alluvial land, and terrace escarpments.

The Fondis-Weld association mapping unit, composed of the Fondis and Weld soil series, covers the most surface area at BSFB. This association consists of deep loamy soils that formed mainly in silty material deposited by the wind (loess). The Fondis soils are gently sloping (1 to 5 percent slope), well-drained, fertile upland soils with a high water-holding capacity (0.25 inch per inch of soil) and moderately slow permeability (< 0.63 inches per hour), and are susceptible to wind and water erosion. The Weld soil series consists of deep, well-drained, level to gently sloping (0 to 3 percent slope) soils that occur mainly in uplands. The Weld soils have a moderate rate of water intake and a high available water-holding capacity (0.20 to 0.25 inch per inch of soil). The most common soils in the BSFB area are the Fondis silt loam and the Fondis-Colby silt loam.

The Alluvial Land-Nunn association consists of soils that have moderate permeability (0.63 inches per hour) and high water-holding capacity (0.20 inch per inch of soil), and are typically found along floodplains and terraces. On the installation, these soils are found along East Toll Gate Creek and are deep, nearly level, loamy, and sandy soils. These soils support crops well, but flood protection is needed to prevent erosion and gully formation. The most common soil types in this association are the Nunn-Bresser Ascalon and the Nunn Loam series, both of which have moderate permeability (0.63 to 6.3 inches per hour) and high water-holding capacity (0.20 inch per inch of soil). Both are typically well-drained, gently sloping soils (0 to 3 percent slope).

The Renohill-Buick-Little association is composed of moderately deep, well-drained, loam to clay soils. The most common soil series within this association are the Renohill-Little complex and the Renohill-Buick

loam. Renohill soils are characterized as being moderately fertile with moderate internal drainage, steep slopes (3 to 30 percent slope) moderately slow to slow permeability (less than 0.63 inches per hour), and moderate water-holding capacity (0.15 inch per inch of soil) [USDA SCS 1971].

#### 2.2.4 Hydrology

In compliance with Executive Order (EO) 11990, Protection of Wetlands, May 24, 1977, the DAF will seek to preserve the natural values of wetlands while carrying out its mission on both USAF lands and non-DAF lands. To the maximum extent practicable, the DAF will avoid actions which would either destroy or adversely modify wetlands (AFMAN32-7003 Chapter 3.17). However, AFMAN32-7003, Chapter 3.65.3 asserts:

“Wetland areas near an airfield may create potential hazards to aircraft operations. Innovative techniques to manage wildlife in wetlands should be explored and implemented. Explore and pursue legally defensible actions to reduce or eliminate wetlands on the airfield to the maximum extent possible when their presence attracts wildlife that threatens the flight mission. While “no net loss” of wetlands is an important aspect of EO 11990, Protection of Wetlands, flight safety is an Air Force imperative that may require removal or modification of wetlands in accordance with regulatory procedures”

Disturbance of jurisdictional wetlands and waters of the United States is regulated by the Clean Water Act (CWA), and construction and training in or near these sensitive areas could require BSFB to acquire permits. The permitting process can be time consuming and could increase the cost of projects and delay these activities, especially if mitigation is required.

#### **Surface Water**

Surface water resources on and in the area of BSFB are scarce because of the geographic location and the semiarid climate. The only perennial surface water resource on the installation was Williams Lake, though it was drained in 2011 as described directly below. With that being said, all surface water drainage on the installation is ephemeral, resulting from the occurrence of precipitation events (i.e., stormwater runoff). This runoff is controlled largely by a man-made stormwater drainage system composed of ditches, curbs, gutters, culverts, pipelines, and detention ponds. The system discharges runoff into natural drainage channels or other man-made drainage features at specific points, which are termed outfalls, located on the installation boundary. This drainage system is operated by the B GAR under the USEPA's MS4 permit as described in Sections 2.4.3 and 7.5.

Much of the precipitation infiltrates naturally and discharge of runoff from the installation occurs only in response to larger events (e.g., thunderstorms and snowmelt from major storms) or during seasonally wetter periods when the ground is saturated. Runoff discharges are more frequent in the more heavily developed parts of the installation (i.e., the northwestern portion).

Williams Lake was created by constructing an earthen embankment across a natural drainage channel, which was a tributary to Sand Creek. Water was supplied to the lake from an on-installation water supply well and supplemented by stormwater runoff from the associated watershed of about 90 acres. The well was turned off in 2011, resulting in the lake drying up completely by 2018 after major potable water leaks associated with the Family Camp site RV hookups were identified and fixed. Historically, when Williams Lake was full, it was used primarily for recreational purposes and occasionally for military mission activities such as helicopter water bucket training. There are plans to have the dam removed and to restore the natural drainage to reduce BASH concerns. The Environmental Assessment (EA) to restore Williams Lake was completed in 2012 and the engineering design plan for the natural drainage was completed in

2014. Please be advised that BSFB is expecting the dam removal construction project to be funded in FY 2024. Construction will commence once this money is received and a contract is subsequently awarded.

Surface drainage on BSFB is in either the Sand Creek drainage basin (generally includes the eastern portion of the installation) or the Toll Gate Creek drainage basin (generally includes the western portion). The divide between these two basins is oriented southeast-northwest, generally along the alignment of the primary runway. About 60 percent of the area of the installation, including the developed areas and most of the airfield operation facilities, is within the East Toll Gate Creek basin and the remaining 40 percent, mostly undeveloped areas, is within the Sand Creek basin. Drainage basin boundaries are controlled by development activities including streets and stormwater system components in many locations on the installation.

Within the Toll Gate Creek drainage basin, surface drainage on BSFB is in either the East Toll Gate Creek subbasin, which includes the southwestern portion of the installation, or the Granby Ditch subbasin, which includes the northwestern portion of the installation. Within the Sand Creek drainage basin, surface drainage on BSFB is in either a subbasin of Sand Creek, which covers a portion of the northeastern part of the installation including Williams Lake, or the Murphy Creek subbasin, which includes the eastern and southeastern portions of the installation. Table 4.3, which is titled “Total Areas & Impervious Surface Areas by Drainage Basin & Subbasin Drainage Basins” presents the total and impervious surface areas, for the drainage basins and the surrounding area, is generally from southeast to northwest in intermittent drainages. Sand Creek is located to the north-northeast of the installation and Murphy Creek is a tributary of Sand Creek. East Toll Gate Creek, which crosses the southern part of the installation, is the only named surface water drainage feature located on the installation. It is a tributary of Toll Gate Creek about 1.4 miles northwest of the installation, at its confluence with West Toll Gate Creek. Toll Gate Creek is a tributary of Sand Creek where it joins about 3.3 miles further downstream, in the area southwest of 1-225 and 1-70. These named drainages are all classified as "waters of the United States".

**Total Areas & Impervious Surface Areas by Drainage Basin & Subbasin Drainage Basins**

**Table 4.3 Total Areas & Impervious Surface Areas By Drainage Basin & Subbasin Drainage Basins**

Basins & SubBasins	Total Areas		Total Impervious Surface Areas	
	Acres	Percentage	Acres	Percentage
<b>Toll GateCreek Basin</b>	<b>1,914</b>	<b>61</b>	<b>420</b>	<b>22</b>
E. Toll Gate Creek	1,390	44	250	18
Granby Ditch	524	17	170	32
<b>Sand Creek Basin</b>	<b>1,240</b>	<b>39</b>	<b>103</b>	<b>8</b>
Sand Creek	692	22	76	11
Murphy Creek	548	17	27	5
<b>Totals</b>	<b>3,154</b>	<b>100</b>	<b>523</b>	<b>17</b>

Sand Creek is a tributary of the South Platte River approximately 12 miles northwest of BSFB. This portion of the South Platte is designated as the U.S. Geological Surveys (USGS) watershed Middle South Platte-Cherry Creek and hydrologic unit code 10190003.

Granby Ditch is a mostly man-made drainage feature (composed of open channel ditches, broad vegetated swales, detention basins, and storm sewer pipelines) that flows into Toll Gate Creek. Its flow path is through completely developed, urbanized portions of the City of Aurora.

The total area of the East Toll Gate Creek drainage subbasin is 11.1 square miles (7,100 acres) and the main channel is 14 miles long. The part of the East Toll Gate Creek drainage subbasin on BSFB is a minor part of this entire basin, as follows:

Where the main channel crosses off-installation at the western boundary, near outfall 1E the total drainage basin area is about 4,000 acres and only about 24 percent (950 acres) is associated with the areas located on the installation. These areas are mostly undeveloped, but do include portions of the 460 CES shop operations, the COANG facilities, and the southern one-half of the primary runway and associated features.

The drainage area upstream of the installation crosses to the installation, (i.e., start and stop) at two locations on the southern boundary. The majority, about 2,700 acres, is associated with the main channel of East Toll Gate Creek and the remainder with an unnamed tributary, about 400 acres, at a point on the southern boundary west of the main channel crossing. The total upstream drainage area of about 3,100 acres is more than 300 percent larger than the on-installation drainage area.

This large portion of the subbasin upstream of BSFB results in a significant volume of surface water runoff flowing onto the installation in response to major precipitation events. The upstream drainage area is mostly undeveloped, but commercial and residential developments have been constructed and future developments are expected.

Downstream of Outfall No. 1, drainage from another part of the installation discharges into East Toll Gate Creek at Outfall No. 2. This area is about 500 acres and includes activities associated with the 140th COANG mission such as the main apron and the north one-half of the primary runway, the COANG mission activities such as hangars and main apron operations, and portions of the 460 CES shop operations.

Downstream of Outfall No. 2, there are two discharges from the installation housing area into East Toll Gate Creek, with a total drainage area of about 100 acres. Overall, the area of the East Toll Gate Creek drainage subbasin, where the installation housing discharges are located, is about 6,200 acres and the total of the four on installation drainage areas is about 1,550 acres, or about 25 percent of the entire subbasin area.

Characteristics of the Granby Ditch drainage subbasin areas are mostly developed including military mission activity facilities and operations, portions of the 140th COANG mission support operations, and most of the base commercial and general-type support facilities. Discharges from the drainage areas occur primarily at Outfall No. 3 and 7.

Characteristics of the Sand and Murphy Creek drainage subbasins are markedly different than the East Toll Gate Creek and Granby Ditch drainage areas. The Sand and Murphy Creek drainage subbasins are predominantly undeveloped, well-vegetated, and characterized by lengthy and poorly developed flow paths. These conditions result in a large rate of natural infiltration and consequently small and infrequent runoff discharge flows that reach and actually cross the installation boundary. In addition, the flow paths between the installation boundary and the drainage channels are also lengthy and poorly developed, which further increases the likelihood that little, if any, runoff discharge from these on-installation drainage basins actually reach a natural drainage channel.

As of June 2016, all EPA impairment listings for both East and West Toll Gate Creek have been lifted. Sand Creek (EPA waterbody ID: COSPUS16a\_00) is identified by the State of Colorado as a 303(d) listed

impaired waterway for 2021 with both selenium and *Eschericia coli* (E. Coli) listed as impairments; the EPA indicates that a TMDL is needed for both of the aforementioned impairments.

Identification on the 303(d) list is based on the state's assessment of water quality conditions for all uses designated for an individual water body.

For Sand Creek, the state designated use and corresponding attainment status are as follows (CDPHE 2021):

- Recreation Primary Contact - Impaired
- Agriculture - Good
- Aquatic Life Warm Water, Class 2 - Impaired

460 CES/CEIE memo, dated 16 Jun 2016, subject Impaired Waters Monitoring East Toll Gate Creek – Selenium Levels Due to Background geology. Memo references Scientific Investigate Report 2007-2018, which demonstrates selenium is the result of naturally occurring geological rock via decomposition and, consequently, all selenium testing at BSFB has been ceased.

## **Groundwater**

BSFB is within a groundwater basin known as the Denver Basin. Four of the five major bedrock aquifers that exist within the Denver Basin underlie the installation: the Denver, Upper Arapahoe, Lower Arapahoe, and Laramie-Fox Hills aquifers (Lautenschlager 1998). A series of interbedded sandstones, siltstones, and shales composed the Denver Basin. The aquifers are located in zones of sandstones and siltstones and are separated by beds of shale with low permeability.

Surficial aquifers at BSFB are associated with present and ancestral surficial stream and river valleys. The aquifer systems (20 to 100 feet thick) are the result of alluvial deposition from erosion of upland bedrock areas. The alluvial aquifer identified on BSFB is associated with Toll Gate and Sand Creek and consists of primarily coarse-grained materials. These aquifer systems are the water source for the riparian vegetation that occurs along the creeks on the installation. Groundwater is recharged to this aquifer through direct infiltration of precipitation and irrigation water and by lateral and upward seepage of groundwater. Groundwater is discharged from the alluvial aquifer through seepage to streams, evapo-transpiration, downward seepage into underlying bedrock aquifers, and extraction via pumping wells.

Groundwater flow in these surficial aquifers at BSFB and within the surrounding area is generally in a north-northwesterly direction along the creek beds, towards the South Platte River, north of Denver.

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

### ***2.3.1 Ecosystem Classification***

BSFB is in the Great Plains-Palouse Dry Steppe Province Ecoregion (Bailey 1995). This ecoregion has also been classified by other researchers as a shortgrass prairie ecosystem (Holechek et al. 1989, Stoddart et al. 1975). Cool winters and warm summers are predominant in the ecoregion. Precipitation ranges between 12 inches and 20 inches, with 60 to 70 percent of the precipitation falling during the growing season (130 to 180 days). Summer precipitation is usually evenly distributed.

Shortgrass prairie is frequently dominated by grasses such as blue grama (*Boureloua gracilis*) and buffalo grass (*Buchloe dactyloides*) (Holechek et al. 1989). Sandy soils can be occupied by mixed grasses such as little false bluestem (*Schizachyriwn scoparium*), and clay soils can be occupied by western wheatgrass (*Pascopyrum smithii* = *Agropyron smithii*). A mixture of blue grama, buffalo grass, and various shrubs occur on aridisols (i.e., desert soils).

### 2.3.2 Vegetation

The historic and current vegetation associations for the ecological units within and surrounding BSFB are described in this section of the INRMP.

#### 2.3.2.1 Historic Vegetative Cover

BSFB is presently in a development phase. The largest remaining areas of natural habitat are located at the southern end of the installation and north and northeast of the runway. These natural habitat areas total 1,069 acres.

Since no original vegetation data is archived, climatic conditions, soils, and native fauna are assumed to have been the drivers for vegetation development. The climax vegetation at BSFB is therefore assumed to be shortgrass prairie. Based on the previous discussion, the historical vegetation at BSFB probably included the following vegetation types: western wheatgrass with pockets of buffalo grass, blue grama, and other grama species (*Boureloua* spp.). This vegetation is still evident in areas that have not been historically seeded with crested wheatgrass (*Agropyron crisarum*) or where the vegetation has reverted to a more native stand. Holechek et al. (1989) reported that other historically important species would include the shrub winterfat (*Krascheninnikovia lanata*) and the forb scarlet globemallow (*Sphaeralcea coccinea*). In disturbed and overgrazed areas, grasses would typically be replaced by twisted-spine prickly pear cactus (*Opunria macrohiza*), snakeweed (*Gurierrezia sarothrae*), and fringed sagewort (*Arremesia frigida*). All of these species have been observed at BSFB.

Guennel (1995) provided a list of additional common shortgrass prairie species: needlegrass (*Stipa* spp.); sunflower (*Helianthus* spp.); locoweed (*Oxytropis* spp.); prickly pear cactus (*Opuntia macrorhiza*); yucca (*Yucca glauca*); and many wildflower species, including blazingstar (*Nullallia nuda*) and white prickly poppy (*Argemone polyanthemos*). Scattered shrubs such as sagebrush (*Seriphidimn canum*), snakeweed (*Gurierrezia sarothrae*), and rabbitbrush (*Chrysothamnus nauseosus*) provide additional cover along this grassland eco-system. Trees along the shortgrass prairies are restricted to riparian corridors. Typical trees of the plains regions include plains cottonwood (*Populus sargentii*), willows (*Salix* spp.), and box elder (*Acer negundo*).

#### 2.3.2.2 Current Vegetative Cover

Native fauna habitat areas include the mixed-grass blue grama prairie, mixed-grass western wheatgrass prairie, crested wheatgrass prairie, bottomland meadows, cottonwood and willow vegetation communities, weedy disturbed areas, and landscaped areas. Areas with significant vegetation cover such as a dense yucca or rabbitbrush stands were also noted; however, both stand types were dominated by blue grama and associated species. Since the introduction of crested wheatgrass, this species has become widely established and is considered naturalized for this review. Therefore, with the exception of the landscaped areas, all other areas can be considered native. These large areas of open grass prairie, the riparian corridor associated with East Toll Gate Creek and Williams Lake on BSFB provide a diversity of habitats that support many animal species. While the area around Williams Lake currently provides additional habitat and diversity to BSFB, the development of this feature as part of a recreational area impacts wildlife usage of this area. Wildlife typical of the Colorado high plains are present at BSFB. Appendix E: Fish and Wildlife Management, provides a list of animal species that are known to occur on or in the vicinity of the installation.

In general, the mixed grass blue grama and western wheatgrass prairies are the most diverse plant habitats on BSFB and occur primarily on upland areas. Typically, the blue grama areas contain grama grass

interspersed with forbs such as scarlet globemallow, prickly pear, and snakeweed. Other common grasses include tumble grass (*Schedonnardus paniculatus*) and three-awn (*Aristida fendleriana*, *Aristida longiseta*). Areas that receive slightly more moisture (i.e., depressions or gullies) are dominated by fringed brome grass (*Bromus ciliatus*). Since there is no grazing pressure at BSFB, crested wheatgrass prairies are more uniform and have few other species associated with them.

Two vegetation types generally occupy riparian corridors at BSFB. Bottomland meadows are generally wider and flatter and, in some cases, exhibit wetland characteristics. A dominant species in these areas is fringed brome grass which occurs in a wide variety of habitats and in all soil moisture conditions especially wetlands. Areas at BSFB that are dominated by this fringed brome include potential wetlands because of this species' reported affinity to moist soil conditions (the USFWS has classified fringed brome as a facultative wetland species in the Western Great Plains). The cottonwood/willows vegetation type dominates parts of the riparian corridor that appear to be more moist and steeper than areas with fringed brome. Species in these areas include sandbar willows (*Salix interior* = *Salix exigua*), peach leaf willows (*Salix amygdaloides*), shining willows (*Salix lucida*), and plains cottonwood (*Populus deltoides* = *Populus sargentii*). All four woody species are indicators of wetland conditions.

Beginning in 2004 and concluding in March 2006 the Center for Environmental Management of Military Lands (CEMML) at Colorado State University performed a floristic survey of the East Toll Gate Creek riparian corridor and the triangular piece (approximately 120 acres) of the creek in the very southwestern corner of the installation. This area has seen minimal disturbance in recent years and is probably representative of most of the undeveloped portions of BSFB. This survey found 175 taxa of the 224 taxa the Colorado Herbarium reports for Arapahoe County. Of the 175 taxa recorded, 133 were native to east central Colorado. Forty-two taxa (24%) were nonnative introductions. A complete list of BSFB identified floristic species from this survey can be found in Appendix F: Floristic Species.

### **2.3.2.3 Turf and Landscaped Areas**

Approximately 1,397 of the 3,311 acres on BSFB are classified as semi-improved areas that are minimally maintained. The vegetation in these semi-improved areas includes a mixture of non-native and native shortgrass and mixed grass prairie. 89 acres are classified as improved grounds which includes turf grass, rock, and plant beds within the BSFB Grounds Maintenance Contract.

Turf grasses are the predominate vegetation type planted in improved and landscaped areas on BSFB. Grass varieties consist of common introduced species, including Kentucky bluegrass (*Poa pratensis*), common Bermudagrass (*Cynodon dactylon*), wintergrass (*Poa annua*), and Alta fescue mixes (*Festuca* spp.). A variety of shrubs and trees are also present in the landscaped areas on the installation, including green ash (*Fraxinus pennsylvanica*), honey locust (*Gleditsia tracanthos*), Colorado spruce (*Picea pungens*), ponderosa pine (*Pinus ponderosa*), Siberian elm (*Ulmus pumila*), Gambel's oak (*Quercus gambelii*), and buffalo juniper (*Juniperus Sabina*).

### *2.3.3 Fish and Wildlife*

#### **Migratory Birds**

Enacted in 1918, the Migratory Bird Treaty Act (MBTA) is an enduring cornerstone of the nation's wildlife conservation laws (USFWS - Migratory Bird Conservation: A Trust Responsibility, ECS 2102, April 2006). The United States has treaties with Canada, Mexico, Japan, and Russia which provide protection for birds that are known to be endemic to these countries and cross international boundaries during migration. Most birds found at BSFB are protected under the MBTA, the exceptions being rock pigeons (common pigeons),



English sparrows, and European starlings. It is unlawful to take, possess, capture, kill, or transport any bird, or any part, nest, or egg, without a permit. Permits are granted for hunting of specific species such as waterfowl and for special purposes such as research, education, and where human health and safety could be affected. BSFB annually applies for a Migratory Bird Depredation Permit to allow protected birds to be taken base wide as necessary to reduce aircraft strikes. These takes are reported at the end of each permitted year to the USFWS, Migratory Bird Office. Executive Order 13186 states that to the extent allowed by law, subject to budgetary limits, and in harmony with agency missions; federal agencies shall support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities when possible and by avoiding or minimizing adverse impacts to the extent practicable. In addition, agencies should restore and enhance the habitat of migratory birds and prevent or abate pollution or detrimental alterations of the environment for the benefit of migratory birds.

For historical reference, observational data gathered for the 1989 Integrated Land Use Management Plan (ILUMP) and as part of the original preparation of this plan indicate a diverse array of avian species occupies the base year-round. The most abundant species on the installation include the Horned Lark (*Eremophila alpestris*), Common Grackle (*Quiscalus quiscula*), Say's Phoebe (*Sayornis saya*), Western Meadowlark (*Sturnella neglecta*), American Robin (*Turdus migratorius*), Black-Billed Magpie (*Pica hudsonia*), , Western Kingbird (*Tyrannus verticalis*), , European Starling (*Sturnidae*), House Finch (*Carpodacus mexicanus*), Mourning Dove (*Zenaidura macroura*), Red-Tailed Hawk (*Buteo jamaicensis*) and Rock Pigeon (*Columba livia*). The riparian areas on the installation, especially just south of Williams Lake and East Toll Gate Creek, attract species such as Mallard (*Anas platyrhynchos*) and Red-Winged Blackbird (*Agelaius phoeniceus*). Appendix D: Migratory Bird Species List, contains a list of bird species identified in the vicinity of BSFB and those identified as being present on the installation at one time or another.

### **Songbirds**

Comprehensive seasonal songbird surveys on BSFB began in 2013 and have continued annually. Songbird surveys were conducted by the USFWS, Colorado Fish and Wildlife Conservation Office, Region 6 personnel until 2018. Starting in 2019, the Natural Resource Program and USFWS set up an agreement with the Bird Conservancy of the Rockies to conduct songbird surveys. Partnering with the Bird Conservancy of the Rockies allows data collected on BSFB to be combined with a much larger survey effort across the Midwest allowing for population estimates of individual species to be determined and used to show management needs and treatment effectiveness. In 2020, the Bird Conservancy of the Rockies detected 58 avian species. Currently, 2021 data has been collected and the data analysis and written report are being prepared by the Bird Conservancy of the Rockies

### **Raptors**

Raptors (i.e., birds of prey) are commonly observed on the installation, especially during winter months. Three road transect surveys were conducted during the winter of 1988-1989 as part of the 1989 ILUMP. The most common wintering raptor observed on BSFB during these surveys was the Ferruginous Hawk (*Buteo regalis*) which had an estimated on-installation population of 30 to 40 individuals. Ferruginous Hawk are infrequently seen on BSFB in more recent survey reports 2013-2020. The Red-Tailed Hawk (*Buteo jamaicensis*), Northern Harrier (*Circus cyaneus*), and Bald Eagle are common migrants currently inhabiting the installation. Rough-Legged Hawks (*Buteo lagopus*) and Golden Eagle are more common winter residents. Birds of prey observed nesting on BSFB include: Western Burrowing Owl, Red-Tailed Hawk, Swainson's Hawk (*Buteo swainsoni*), Great Horned Owl (*Bubo virginianus*), Barn Owl (*Tyto alba*), and American Kestrel (*Falco sparverius*). Northern Harrier also possibly nest on the base.

Comprehensive seasonal raptor surveys began on BSFB in 2013 (Schorr) and have continued annually. Raptor surveys are currently conducted by USFWS Colorado Fish and Wildlife Conservation Office, Region 6 personnel on BSFB in the fall/winter. Observations are conducted at six survey stations located across the installation. The established survey stations were identified in a previous BSFB raptor survey report (Schorr, 2013). Raptor survey reports work to identify species using BSFB, how these species behave, possible mission impacts, and management recommendations (Casady and Colburn 2020). As a whole, there was a 30.3% decline in raptor observations compared to the 2018/2019 surveys. Less raptor activity was documented inside the airfield perimeter (14.1% compared to 35.3% in 2018/2019). Less raptor activity was also observed outside the airfield perimeter but still within the BSFB perimeter (30.6% compared to 41% in 2018/2019). The reduction in observations could be due to recent habitat modification projects, having different personnel collecting data, differing weather conditions, etc. Recent habitat modifications that occurred between the 2018/2019 surveys and 2019/2020 surveys may have reduced the number of observations. These projects include a tree removal project where 84 large cottonwood and willow trees were removed from below Williams Lake as well as a large number of juniper trees that were removed from along the perimeter road. The USDA is also actively contributing to lowering raptor activity on the airfield by hazing, trapping and relocating, and also depredating avian species. Raptor surveys were not performed in the winter of 2020/2021 because of COVID 19 restrictions.

### **Wading Birds, Shorebirds, and Waterfowl**

Wading birds are uncommon on the installation; however, Great Blue Herons (*Ardea herodias*) and Black-Crowned Night-Herons (*Nycticorax nycticorax*) occasionally frequent East Toll Gate Creek around wetland areas. Shorebirds, such as the Killdeer (*Charadrius vociferus*), have been observed breeding throughout portions of the installation. Other shorebird species, such as the Western Sandpiper (*Calidris mauri*), Spotted Sandpiper (*Actitis macularius*), American Avocet (*Recurvirostra americana*) and Phalaropes (*Phalaropus*) were also observed at Williams Lake.

Waterfowl species observed on BSFB include mallard (*Anas platyrhynchos*), American coot (*Fulica americana*), northern shoveler (*Anas clypeata*), and Canada goose (*Branta canadensis*) though waterfowl numbers using the Williams Lake area as a roost have been reduced to essentially nil since it was drained.

### **Amphibians and Reptiles**

Several amphibian and reptilian species occur on the installation. Amphibian species identified include plains spadefoot toad (*Spea bombifrons*) and American bullfrog (*Rana catesbeiana*). Reptiles observed on the installation include the bullsnake (*Pituophis catenifer sayi*), western hognose snake (*Heterodon nasicus*), plains garter snake (*Thamnophis radix*), and prairie rattlesnake (*Crotalus viridis*).

In the 2008 Small Terrestrial Mammal Survey of BAFB, biologists found the common garter snake (*Thamnophis radix*), within the installation boundaries. In the state of Colorado, the common garter snake is a state-listed species of concern in Arapahoe County by CPW. An amphibian and reptile survey report and draft management plan were completed in February 2011 by Colorado Natural Heritage Program (CNHP), College of Natural Resources, Colorado State University-Ft. Collins, CO.

### **Invertebrates**

BSFB is located in the Colorado Front Range, which is a region known to support a diverse terrestrial and aquatic Arthropoda fauna. In 2015, the CNHP accomplished a baseline survey of Arthropoda (Hexapoda) on BSFB and in addition profiled and identified any potential management issues for species at risk

identified during the survey. The 2015 baseline Hexapoda survey on BSFB detailed a total of 3,454 collected specimens representing at least 15 orders, 153 families and 459 species. The conservation assessment revealed no federally endangered or threatened insect species; however two of the insects found at BSFB are at risk species - monarch butterfly (*Danaus plexippus*; Linnaeus 1758) and the Paiute Dancer (*Argia alberta*; Kennedy 1918), a damselfly.

### **Promoting Pollinators on BSFB**

Pollinators, such as most bees and some birds, bats, and other insects, play a crucial role in flowering plant reproduction and in the production of most fruits and vegetables. BSFB recognizes the importance and growing concern for pollinators in the environment, which are known to frequent the installation. Along with the many benefits pollinators provide, such as improved ecosystems and economy, pollinator friendly habitats require less water and maintenance as well as provide an opportunity for education and outreach. As a result, BSFB is helping establish continued habitat for pollinators and the Monarch butterfly species. Annually, since spring of 2016, USFWS staff assigned to BSFB have strategically planted common milkweed in unimproved areas of the installation with the aim to aid in the regrowth of desired pollinator and Monarch habitat. BSFB will continue to inter-seed common milkweed in riparian unimproved areas not planned for development and seek project funding opportunities to assist in maintaining habitat for pollinators including building pollinator gardens.

### **Small Mammals**

Numerous small mammal species are observed on BSFB. Small mammals include the black-tailed prairie dog, pocket gopher (*Geomys bursarius*), fox squirrel (*Sciurus niger*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), white-tailed jackrabbit (*Lepus townsendii*), eastern cottontail (*Sylvilagus floridanus*), deer mouse (*Peromyscus maniculatus*), meadow vole (*Microtus pennsylvanicus*), and other less common species.

### **Large Mammals**

In accordance to AFI91-212, there is zero tolerance for large mammals within the wildlife exclusion zone that encompasses the entirety of BSFB. Common mammals include carnivorous species such as red fox (*Vulpes vulpes*) and coyote (*Canis latrans*). These predators prey on rodents, rabbits, and insects. Ungulates such as pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoileus hemionus*) have occupied BSFB in the past however, due to the installation of a perimeter fence, mule deer only occur on base occasionally.

### **Fisheries**

Fishery resources found at BSFB include Williams Lake and the small pools observed in the streambed of East Toll Gate Creek. Prior to 2007, Williams Lake was stocked with sport fish including rainbow trout (*Oncorhynchus mykiss*) and largemouth bass (*Micropterus salmoides*). Grass carp (*Ctenopharyngodon idella*) were also stocked in the lake to keep the vegetation growth down. Prior to 2010, when fishing was permitted on the lake, anglers reported regularly catching catfish (*Siluriformes*). In the spring 2004, the USFWS assisted BSFB in performing fish sampling of Williams Lake. Large quantities of fathead minnows (*Pimephales promelas*) were captured and released and four channel catfish were taken ranging in size from 10 to 22 inches. Tissue samples were sent to Colorado Veterinarian Diagnostic Laboratory for analysis of heavy metals. None were found above state health standards. Williams Lake currently has no fish in it after being drained due to BASH safety concerns. In addition, a fish survey of East Toll Gate Creek outside the fence and downstream (west) of BSFB, conducted by the CPW (Moore 2001) yielded brook stickleback

(*Culaea inconstans*), fathead minnow (*Pimephales promelas*), and white sucker (*Catostomus commersonii*).

#### 2.3.4 Threatened and Endangered Species and Species of Concern

Threatened and endangered (T&E) species are afforded federal protection through listing of the species under the authority of the Endangered Species Act (ESA). Under the ESA, an endangered species is defined as any species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The USFWS provides a list of species that are regarded as candidates for possible listing under the ESA (72 Federal Register FR169033). Although candidate species receive no statutory protection under the ESA, the USFWS believes it is important to advise government agencies, industry, and the public that these species are at risk and could warrant future protection under the act. The USFWS defines critical habitat as “the specific areas within the geographic area, occupied by the species at the time it was listed that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection.”

In accordance with AFMAN32-7003, Environmental Conservation, which stipulates that each Air Force installation must develop an overall ecosystem management strategy that provides for the protection and recovery of T&E species. With regard to state listed species, AFMAN32-7003 section 3.38.2, states “INRMPs should provide for the protection and conservation of state-listed protected species when practicable and consistent with the military mission. Although not required by the ESA or federal law, provide similar conservation measures for species protected by state law when such protection is not in direct conflict with the military mission. When conflicts occur, consult with the appropriate state authority to determine if any conservation measures can be feasibly implemented to mitigate impacts.”

Because DoD lands support numerous listed, proposed, and non-listed species, DoD NRM should be aware of actions by USFWS or National Marine Fisheries Service (NMFS) to propose new species for listing, place species on the candidate list, and designate critical habitat. These listings and critical habitat designations may include species and critical habitat on military lands. It is recommended by the USFWS that DoD installations do the following:

- Address listed species and designated critical habitat in the development and implementation of INRMPs.
- Monitor announcements published in the Federal Register, to be aware of upcoming proposals for listing or designations.
- Provide comments on proposed actions. Once a notice is published in the Federal Register, installations usually will have 60 days to comment. Comments should be solicited from all applicable installations, major commands or claimants, and headquarters, as necessary. Comments should include:
  - Any data or information collected on the installation about the species’ presence or its habitat.
  - Information on any increases in economic and other relevant impacts from critical habitat, such as increases in administrative burden, conflicts with military mission, and benefits of proposed action.

No federal T&E species or designations of critical habitat are known to occur on BSFB. Table: Federal T&E Species, State T&E Species, and Federal Candidate Species for BSFB; outlines potential species that could occur on base and indicates those species that have been identified on BSF (Appendix C). Candidate species are defined as “species where there is sufficient information on the biological status and threats to propose them as endangered or threatened under the ESA” in AFMAN32-7003.

Table: Federal T&E Species, State T&E Species, and Federal Candidate Species for BSFB				
Species	Scientific Name	*Federal Listing	*State Listing	Species presence on BSFB
<b>Birds</b>				
Piping Plover	<i>Charadrius melodus</i>	FT	ST	
Whooping Crane	<i>Grus americana</i>	FE	SE	
Western Burrowing Owl	<i>Athene cunicularia</i>		ST	X
<b>Flowering Plants</b>				
Ute Ladies'-tresses	<i>Spiranthes diluvialis</i>	FT		
Western Prairie Fringed Orchid	<i>Platanthera praeclara</i>	FT		
<b>Mammals</b>				
Black-footed Ferret	<i>Mustela nigripes</i>	FE	SE	
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	FT		
<b>Fishes</b>				
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	FE		
<b>Insects</b>				
Monarch Butterfly	<i>Danaus plexippus</i>	FC		X

\*FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; FC = Federal Candidate Species (not a statutory category)

**T&E Habitat on BSFB**

Potential habitat have been identified along riparian corridors of East Toll Gate Creek, Williams Lake, and other wetland areas existing on BSFB for federally threatened Preble's meadow jumping mouse and Ute ladies'-tresses. A survey for Preble's meadow jumping mouse was conducted; however, no animals were encountered during the survey. Based on these surveys, the USFWS concluded that a population of Preble's meadow jumping mouse is not likely present within BSFB (USFWS 2002). Further, the USFWS has designated the BSFB area as being within a "block clearance zone" that does not support and is not likely to have Preble's meadow jumping mouse as well as black-footed ferret (*Mustela nigripes*), and further consultation with the USFWS is not required when impacting potential habitat for these species. Also, a survey along all riparian corridors at BSFB was conducted for the Ute ladies'-tresses in August 2001 where no sensitive plants were encountered. Ute ladies'-tresses were also not encountered in the Sensitive Species Survey BAFB (CNHP-CSU, 2018).

**State Listed T&E Species on BSFB**

Western burrowing owl is the only known state listed T&E species known to occur on BSFB. Comprehensive seasonal Western burrowing owl nest surveys began on BSFB in 2013 (Schorr) and continued through 2020. Western burrowing owl nest surveys were conducted by USFWS Colorado Fish and Wildlife Conservation Office, Region 6 personnel on BSFB in the spring and summer months. Western burrowing owl sightings on BSFB have steadily decreased from surveys conducted in earlier years with no confirmed nesting sites and no Western burrowing owls seen during the 2020 surveys. Prairie dog eradication and burrow collapsing in support of the BSFB mission has affectively reduced nesting habitat used by Western burrowing owls and is likely influencing them to move on to more suitable habitat. Western burrowing owl nesting activities had no impacts to BSFB's military mission in 2020. Western burrowing owl nest survey reports work to identify species using BSFB, how these species behave, possible mission impacts, and management recommendations (Casady et al. 2020). Western burrowing owl surveys were discontinued after the 2020 survey because of their lack of presence in recent years surveys and the

lack of suitable habitat. Their absence is a result of habitat modifications that removed prairie dog colonies and burrows from the installation. Site surveys are still performed as needed in areas that have plans for development or military activities. No Western burrowing owls were observed during site surveys in 2021.

**Federal/State Listed Species of Special Concern on BSFB**

Black-tailed prairie dog has been classified as a species of special concern in Colorado partially because of their status as a keystone species for the state threatened Western burrowing owl. In February 2000, the USFWS designated the black-tailed prairie dog as a candidate species (or a species warranted but precluded from listing on the T&E species list). In August 2004, the USFWS removed the black-tailed prairie dog from the candidate species list however; it remains a state species of special concern. State listed species of special concern observed on BSFB include: bald eagle (SC), ferruginous hawk (SC), black-tailed prairie dog (SC), and plains common garter snake (SC). Western burrowing owl is federally listed as a species of special concern as shown in Table: Federal/State Species of Concern and Candidate Species for BSFB.

Table: Federal/State Species of Concern and Candidate Species for BSFB				
Species	Scientific Name	*Federal Listing	*State Listing	Species presence on BSFB
<b>Amphibians</b>				
Northern Leopard Frog	<i>Rana/Lithobates pipiens</i>		SC	
<b>Birds</b>				
White-faced ibis	<i>Plegadis chihi</i>	SC		
Bald Eagle	<i>Haliaeetus leucocephalus</i>		SC	X
Ferruginous Hawk	<i>Buteo regalis</i>		SC	X
Western Burrowing Owl	<i>Athene cunicularia</i>	SC		X
<b>Mammals</b>				
Black-Tailed Prairie Dog	<i>Cynomys ludovicianus</i>		SC	X
Long-eared myotis	<i>Myotis evotis</i>	SC		
Long-legged myotis	<i>Myotis volans</i> )	SC		
<b>Reptiles</b>				
Common Garter Snake	<i>Thamnophis sirtalis</i>		SC	X
Eastern short-horned lizard	<i>Phrynosoma douglassii brevirostra</i>	SC		
SC = Federal/State Species of Special Concern (not a statutory category)				

The northern leopard frog is declining throughout its range in Colorado and they are particularly sensitive to populations of the introduced bullfrog as they can impact northern leopard frogs through intense predation, predatory or competitive larval interactions, and transmission of parasites and pathogens (Kliesecker et al. 2001). Sovell (2011) explained in the BAFB Amphibian and Reptile Report and Management Plan, that suitable habitat for the northern leopard frog does exist at BSFB. Williams Lake and ephemeral ponds such as those in East Toll Gate Creek offer suitable habitat for northern leopard frogs, however, none were found at either location in the Sensitive Species Survey BAFB (CNHP-CSU, 2018).

In 2017, a Sensitive Species Survey was conducted at BSFB and the properties acquired through the REPI program. Seventy animal species were documented (one amphibian, 51 birds, six insects, eight mammals, two mollusks, and two reptiles). No federally threatened or endangered animals were found at BSFB. However, there were three species observed at BSFB that are monitored by CNHP and the Colorado State

Wildlife Action Plan considers them to be of greatest conservation need. These species are the black-tailed prairie dog, Western burrowing owl, and bobolink (*Dolichonyx oryzivorus*). Also, 205 plant species were observed during the surveys and no threatened, endangered, or CNHP monitored plants were detected (Sovell and Doyle 2018).

**Birds of Conservation Concern specific to BSFB**

The USFWS has identified birds of conservation concern for Bird Conservation Region (BCR) 18 which is occupied by BSFB (USFWS 2021). BCR 18 is the Shortgrass Prairie region. Table: Birds of Conservation Concern within BCR 18 with Potential to Occur or Documented to Occur on BSFB, shows the bird species of conservation concern for BCR 18 and indicates which of those species have the potential to occur on or have been documented to occur on BSFB (BCR 2019-2021; Casady 2014-2018; Canestorp 2009-2013; Schorr 2013).

<b>Table: Birds of Conservation Concern within BCR 18 with Potential to Occur or Documented to Occur on BSFB</b>		
<b>USFWS BCR 18 Shortgrass Prairie Species</b>	<b>Potential to Occur</b>	<b>Documented to Have Occurred</b>
Broad-tailed Hummingbird	X	
Buff-breasted Sandpiper (nb)		
Chestnut-collared Longspur		
Chimney Swift	X	
Clark’s Grebe	X	
Grasshopper Sparrow		X
Ferruginous Hawk		X
Hudsonian Godwit (nb)		
Lesser Yellowlegs (nb)	X	
Lewis's Woodpecker	X	
Long-billed Curlew	X	
Long-eared Owl	X	
Mountain Plover	X	
Pectoral Sandpiper (nb)	X	
Pinyon Jay		
Pyrrhuloxia		
Red-headed Woodpecker	X	
Short-eared Owl (nb)	X	
Snowy Plover	X	
Sprague's Pipit (nb)		
Thick-billed Longspur		
Whimbrel (nb)	X	
*(nb) non-breeding in this BCR		

The loggerhead shrike (*Lanius ludovicianus*) is not a state or federally listed species of conservation concern however, it is important to the shortgrass prairie ecosystem that encompasses BSFB. The Colorado Shortgrass Prairie Initiative agrees that the loggerhead shrike is a species of concern on shortgrass prairies.

Additionally, in the Colorado Wildlife Management Plan (2015) prepared by the CPW, the loggerhead shrike was listed as a primary tier 2 species of conservation need (medium priority) for shortgrass prairie. Loggerhead shrikes have been documented on BSFB (Schorr 2013).

### *2.3.5 Wetlands and Floodplains*

BSFB has various areas that are considered wetlands, some of which are jurisdictional "waters of the United States". The wetlands associated with East Toll Gate Creek are the only jurisdictional wetlands on the base. While the USFWS National Wetlands Inventory (NWI) maps identify a total of six (6) wetland areas on BSFB (USFWS 1989a, 1989b), a survey conducted during 2001 identified twenty-three (23) wetlands. This discrepancy between the NWI maps and the field survey is not unexpected since NWI maps are based on aerial photograph review and do not normally have the ground truthing that occurs during a field survey. Furthermore, NWI surveys examine aerial photographs for flooded areas and they therefore underestimate the number of wetlands in an area in dry years.

In the 2001 study, the entire land surface of BSFB was examined for sections of land that exhibited the presence of the three mandatory wetlands assessment criteria: the presence of hydrophytic vegetation (wetland plants), the presence of hydric soils (soils formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper layer of soil, and the presence of wetland hydrology. For this survey, the boundaries of the wetland were assumed to be a distinct vegetation change. These boundaries were mapped on aerial photographs and transferred to GIS tiles. A jurisdictional determination by the USACE would be needed if any impacts to these wetlands are expected from a proposed action (e.g., the placing or removal of fill or dredge materials as a result of construction activity).

In May 2001, a USACE representative made a determination that Williams Lake and its associated streams and drainage are isolated and not jurisdictional. While not jurisdictional, these areas would still be afforded some protection because of the monitoring, restoration, and mitigation requirements of AFMAN32-7003 and EO 11990.

In June 2014, Natural Resources Consulting conducted a reassessment and resurvey of nineteen (19) wetland areas from the 2001 wetland survey. These 19 wetland areas and their vicinities were evaluated for current potential to qualify as wetlands or waters of the U.S. The objective of the study was to identify and map areas within the installation that either qualify as wetlands/waters of the U.S. or have the potential to qualify as wetlands/waters of the U.S. under Section 404 of the CWA. The evaluated 19 wetlands are all located in the vicinity of Williams Lake, the Williams Lake drainage, and the two reaches of East Toll Gate Creek that are located within the southwestern corner of BSFB. The potential wetland areas identified within BSFB by the study are areas that would require a detailed wetland delineation study and possible 404 permit application in the future if plans were to be developed for land uses that would require the discharge of fill material or other surface disturbance. The 2014 wetland areas surveyed are outlined in Table: Acreage of Potential Wetland/Waters of the U.S. on BSFB and seen in the map provided below the table titled "2014 Wetlands Study - Potential Wetlands/Waters of U.S. on BAFB Map." The total area of potential wetlands on BSFB identified through the 2014 study is 16.026 acres; these areas would require a detailed wetland delineation study and possible 404 permit application in the future if plans were to be developed for land uses that would require the discharge of fill material or other surface disturbance.



<b>Acreage of Potential Wetlands/Waters of U.S. on BAFB</b>		
<b>Potential Wetland/Waters of U.S.</b>	<b>Classification<sup>1</sup></b>	<b>Area (acres)</b>
<b>Unnamed Tributary to Sand Creek and Williams Lake</b>		
<b>Total Area by Classification</b>		
	PEM1	3.4
	PFO1	0.121
	PSS1	0.332
	PUB3	1.438
<b>Total Area of Potential Wetlands/Waters of U.S. – Williams Lake Drainage</b>	<b>5.291</b>	
<b>East Toll Gate Creek</b>		
<b>Total Area by Classification</b>		
	PEM1	3.149
	PFO1	1.589
	PSS1	5.737
	R2AB3	0.096
	R2UB3	0.164
<b>Total Area of Wetlands/Waters of U.S. – East Toll Gate Creek</b>	<b>10.735</b>	

<sup>1</sup>PEM1 = Palustrine Persistent Emergent

PSS1 = Palustrine Broad-Leaved Deciduous Scrub-Shrub

R2AB3 = Riverine Rooted Vascular Aquatic Bed Lower Perennial

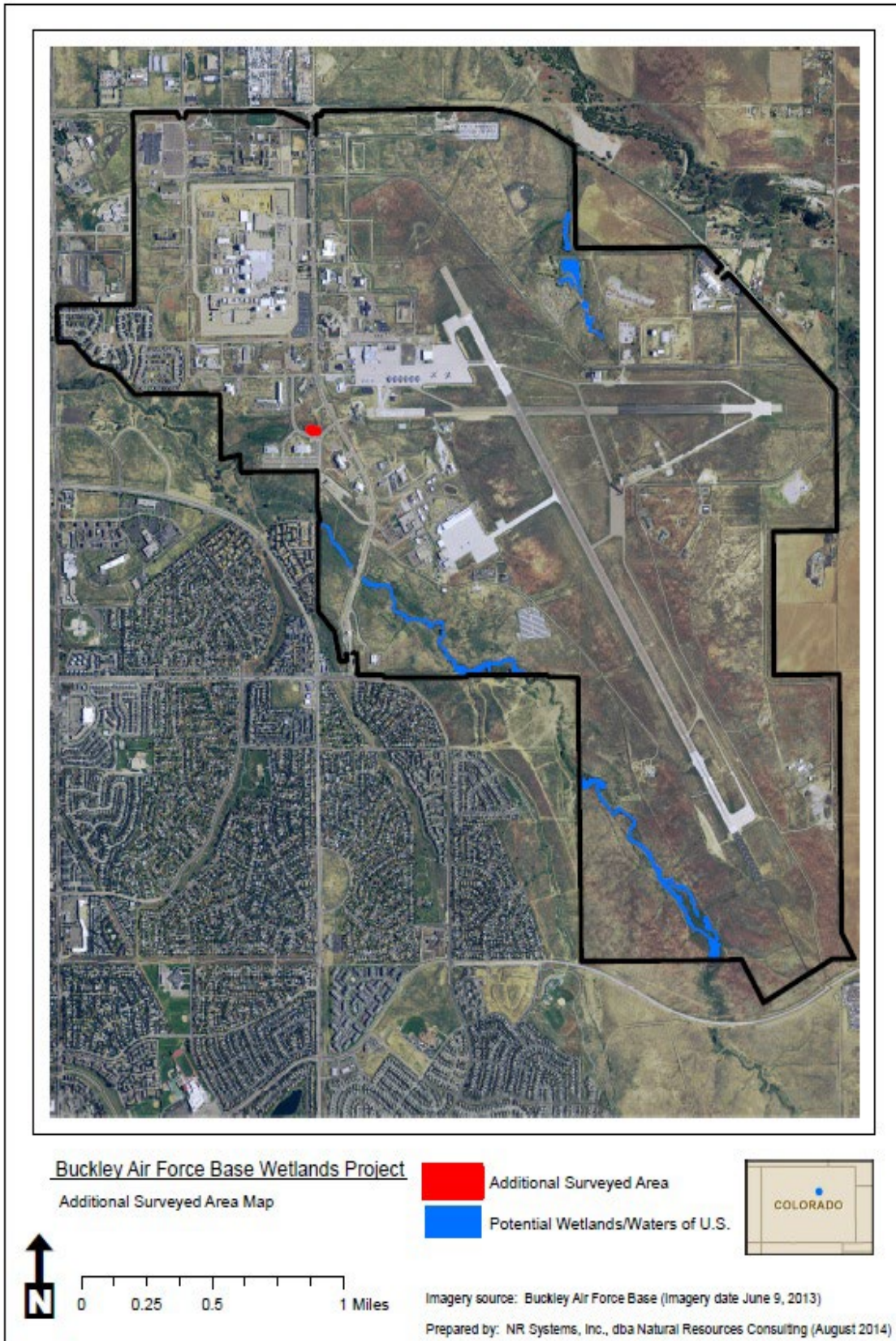
PFO1 = Palustrine Broad-Leaved Deciduous Forested

PUB3 = Palustrine Unconsolidated Bottom Mud

R2UB3 = Riverine Unconsolidated Mud Lower Perennial



2014 Wetlands Study - Potential Wetlands/Waters of U.S. on BAFB Map



Floodplain management is an issue closely related to wetland management. EO 11988, Floodplain Management, requires all federal agencies to:

"Provide leadership and take action to reduce the risk of flood loss: minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands."

When an action cannot avoid impacts to a floodplain a "Finding of No Practicable Alternative" (FONPA) must be prepared and signed by higher headquarters before any action within a floodplain may proceed, as specified in Secretary of the Air Force Order 790.1 - Floodplains. When the practicality of alternatives has been fully assessed then a statement regarding the FONPA is included with an associated "Finding of No Significant Impact" (FONSI) of an Environmental Assessment (EA) or Record of Decision (ROD) for an Environmental Impact Statement (EIS). It must be noted per 32 CFR 989.14 (g) that a FONPA is required when floodplains or wetlands could be affected (not just wetlands).

If an action is taken that permits an encroachment within the floodplain that alters the flood hazards (e.g., changes to the floodplain boundary) on a Flood Insurance Rate Map (FIRM, the official map of a community on which the Federal Emergency Management Agency (FEMA) has delineated both the special hazard areas and the risk premium zones applicable to the community), an analysis reflecting those changes must be submitted to FEMA.

Based on the review of FIRMS for this area, no floodplains have been mapped for BSFB for the flood insurance program. However, in 2006, the 100 year floodplain associated with East Toll Gate Creek was surveyed and mapped.

Floodplains are defined as areas along a river that are inundated by the river leaving its banks. Floodplains along a river are important because they temporarily store floodwaters, improve water quality through capture of sedimentation and debris, provide important habitat for river wildlife, and create opportunities for recreation.

Typically, in the United States, rivers have a 100-year floodplain, or an area that is inundated by a 100-year flooding event. The FEMA has designated the 100-year floodplain as an area in which construction activities are regulated. FEMA prints 100-year floodplain maps that show the floodplain for rivers in the United States. FEMA maps are based on historic events and insurance claims.

As discussed previously, East Toll Gate Creek is the only named creek found at BSFB, however FEMA does not produce floodplain maps on federally owned land because the flood insurance program is not applicable. Delineation of the floodplain depicting the 100-Year and 500-Year floodplain for the segment of East Toll Gate Creek located on the installation was performed as part of the Flood Hazard Area Delineation (FHAD) Study for Toll Gate Creek and East Toll Gate Creek (Lower), also known as the Major Drainageway Planning Master Plan project. The project was performed by J3 Engineering Consultants, Inc. and sponsored by Urban Drainage and Flood Control District, BSFB, and the City of Aurora (FHAD for Toll Gate Creek and East Toll Gate Creek (Lower), UDFCD, J3, November 2013).

### *2.3.6 Other Natural Resource Information*

As discussed in the preceding INRMP sections, BSFB contains a variety of species and natural resources. In order to develop and periodically revise the INRMP, biological surveys are carried out to establish and update the natural resources status on BSFB. The focus of accomplishing field surveys begins with a list of vetted target species and habitat determined by the NRM and then continues with internal and external stakeholders reviewing and approving the species and habitat within the INRMP. The agreed upon approach

to conducting natural resource surveys is to identify target species and observe other species encountered in the process. Significant natural resource surveys and inventories conducted on BSFB include the following and are available upon request:

- Natural Heritage Inventory of BAFB (Colorado Natural Heritage Program (CNHP) – Colorado State University (CSU 2000);
- Floristic Survey of BAFB Conservation Area B and East Toll Gate Creek (Center for Environmental Management on Military Lands (CEMML 2006);
- Baseline Small Mammal Terrestrial Survey Report (e<sup>2</sup>M 2008);
- Baseline Amphibian and Reptile Survey Report and Management Plan for BAFB (CNHP-CSU 2011);
- Baseline Raptor and Songbird Survey Report (CNHP-CSU, 2013);
- Short Grass Prairie Soil and Vegetative Investigative Study (Western Colorado Research Center- CSU 2013);
- Baseline Hexapoda (Invertebrate) Survey on BAFB (CNHP-CSU 2016);
- Sensitive Species Survey BAFB (CNHP-CSU 2018); and
- Bald and Golden Eagle Protection Act Compliance Strategy (CEMML-CSU 2019)
- USAF Vegetation Mapping BAFB (CEMML-CSU 2019);
- Bat Survey for NRM, Multiple Installations (AFCEC- Tennessee Tech University 2019); and
- Noxious Weed Survey of BAFB (CNHP-CSU 2019)

As a foundation for the above mentioned surveys and inventories on BSFB, the BSFB Ecosystem Monitoring Plan (CEMML, 2003) outlines site specific protocol to critically monitor the installation ecosystem through developing baseline information on natural resources and various components of the ecosystem, and to determine how they interact. The plan focuses on ecosystem monitoring by: a) standardizing sampling, data collection, and analysis procedures for credibility of inventory and monitoring at BSFB; b) determining the conditions (degraded, maintained, flourishing) of biological and physical components of the BSFB ecosystem; c) determining potential negative impacts of use of the installation by the Air Force; and d) determining the condition of biological and physical components following protection and enhancement projects. This plan is used to provide natural resource program continuity to Environmental Program Managers with regard to data collection, reporting, and sampling when past surveys were completed and future surveys are conducted.

Recurring biological surveys and monitoring are of equal importance because they influence natural resources management decisions based on data collection, observations, and population trends over time. In particular, two BSFB annual reports act in this way:

- Annual raptor survey reports (2013-present)
- Annual songbird survey reports (2013-present)

The focus of these surveys is to identify individual species of birds on BSFB and make general observation on how birds are using habitats on base that guide management decisions. The reports accompanying these surveys document species observed, provides density estimates of these species, identify areas on base with higher bird activity, and provides recommendations for modifying, maintaining, and/or improving habitat for migrating and breeding birds while ensuring military readiness and an active flying mission is maintained. The Annual Western Burrowing Owl (2003-2020) and Black-Tailed Prairie Dog (2003-2010) survey reports became unnecessary as BSFB actively removes prairie dogs and destroys burrows used by

Western Burrowing Owls resulting in no owls nesting on BSFB during the 2017 through 2020 surveys. Surveys for burrowing owls are still conducted in areas before construction starts, before planned military training exercises are conducted, and before areas are treated with rodenticide by the Pest Management Shop to remove prairie dogs.

Component plans of an INRMP act to address site specific natural resources concerns/issues, provide management guidance or actions, and aid in project development and justification for present and/or future Air Force level funding. Thus, integration of the following installation level signed and approved BSFB INRMP component plans are integral to overall natural resources program effectiveness on BSFB:

- Wildland Fire Management Plan (WFMP) (AFWFSC, 2020)

The purpose of the WFMP is to support wildland fire management activities approved under this plan and includes wildfire suppression by personnel meeting qualification standards as outlined in DoDI 6055.06, Section E3.8 and/or AFMAN32-7003, Section 3.80. BSFB WFMP was developed to comply with federal mandates for military installations to address issues associated with potential wildland fires on operational military lands (AFMAN32-7003, Section 3.80). This plan outlines specific measures, responses, and protocols for maintaining the military mission at BSFB and ensuring the safety of military and civilian personnel. In addition, this plan evaluates the potential effect of wildland fire management practices on the military mission and shortgrass prairie ecosystem at BSFB.

INRMP integration with the installation level Grounds Maintenance service contract is integral to natural resource program effectiveness by identifying gaps in management and avoiding conflicting or duplicative efforts. For this reason an urban forestry inventory is essential to providing information regarding tree populations on BSFB. Landscape trees are crucial to the built environment and viewsheds at BSFB and an essential natural resources asset. Proper management of trees in these urban sites can provide many benefits with respect to stormwater management, erosion control, noise reduction, air quality improvements, and reducing heat island effects. An evaluation of the existing landscape trees ensures that current maintenance efforts can efficiently address the needs and health of the urban forests at and also help in design of future landscaped areas. Urban tree inventories on BSFB have been conducted by Davey Inc. in 2004, internally by the USFWS in 2009, and most recently by Amec and Mountain High Tree, Lawn, and Landscape Company in 2014.

The BAFB 2014 Urban Tree Inventory included 2,583 trees and an assessment of the 103 shelterbelts at BSFB. The survey incorporated 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 information for prioritized urban tree management recommendations. Additionally, information from this survey was integrated into the BSFB GIS and Geobase systems.

Federal and State laws mandate the control of noxious weeds, making this type of survey a necessary tool for compliance with Federal, State, and local laws. A noxious weed/invasive plant survey is required to determine the nature and extent of infestation of known/listed noxious weeds. Moreover this survey is a valuable tool for the development of a baseline monitoring and control plan. Therefore, Invasive Plant Species Survey and Control Plan, BAFB, Colorado, (North Wind Inc. 2005, Geo-Marine, Inc., 2008; AMEC, Foster, and Wheeler, 2015; and CNHP-CSU 2020) were accomplished in order to identify invasive, nonnative plant species on BSFB; identify the impacts of invasive species on natural resources and the military mission; and to provide the installation with a site-specific control plan and monitoring strategy in sufficient detail to be incorporated for management and control services. During the 2020 survey, twelve

(12) invasive species were identified and a control plan was developed for them (see Section 4.4 Noxious or Invasive Plants and Animals).

BSFB in partnership with the USFWS and Texas A&M - Texas AgriLife, focused on establishing approved insects and mites for control of various federal and state listed noxious weeds; redistributing established insects and mites to additional on-site weed infestations; and monitoring the reduction in weed infestations through GPS mapping of infestation perimeters and plant measurements (i.e., density and height). The biological control of noxious weeds within BSFB targeted the following species: Canada thistle, musk thistle, field bindweed, Dalmatian toadflax, and leafy spurge. The agents which targeted Canada and musk thistle included: *Aceria anthocoptes*, *Cassida rubiginosa*, *Larinus planus*, *Rhinocylls conicus*, *Trichosirocalus horridus*, and *Urophora carduii*. The agent released to target field bindweed was a mite, *Aceria malherbae*. The agent used on Dalmatian toadflax was *Mecinus janthinus*. The agents released on leafy spurge were *Aphthona* spp. and *Oberea erythrocephala*. Biocontrol agents used to control leafy spurge were shown to be affective.

## **2.4 Mission Impacts on Natural Resources**

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

Natural resources may impose administrative constraints and timing considerations at BSFB. These constraints primarily deal with compliance issues related to specific laws and regulations, such as the ESA, MBTA, and the CWA. Personnel developing construction projects, planning training activities, and maintenance activities should be aware these constraints could increase the costs of these activities, and/or delay them.

### *2.4.2 Land Use*

BSFB covers approximately 3,311 acres of land, all of which requires maintenance depending on designation of land use. (Reference Section 2.2.2 *Landforms* Grounds Maintenance Map).

#### *Improved Areas and Semi-improved*

Improved areas on BSFB are defined in the Grounds Maintenance Contract and are based on the level of service activities provided. BSFB has 89 acres of improved area on the installation. Semi-improved grounds areas are mowed less often than the maintained turf grass on improved grounds. Improved land is managed by the Grounds Maintenance Contract and semi-improved land is managed by the Pest Management Shop.

#### *Unimproved Areas*

Unimproved grounds include forest lands, croplands and grazing lands, lakes, ponds, and wetlands, and any areas where natural vegetation is allowed to grow unimpeded by maintenance activities.

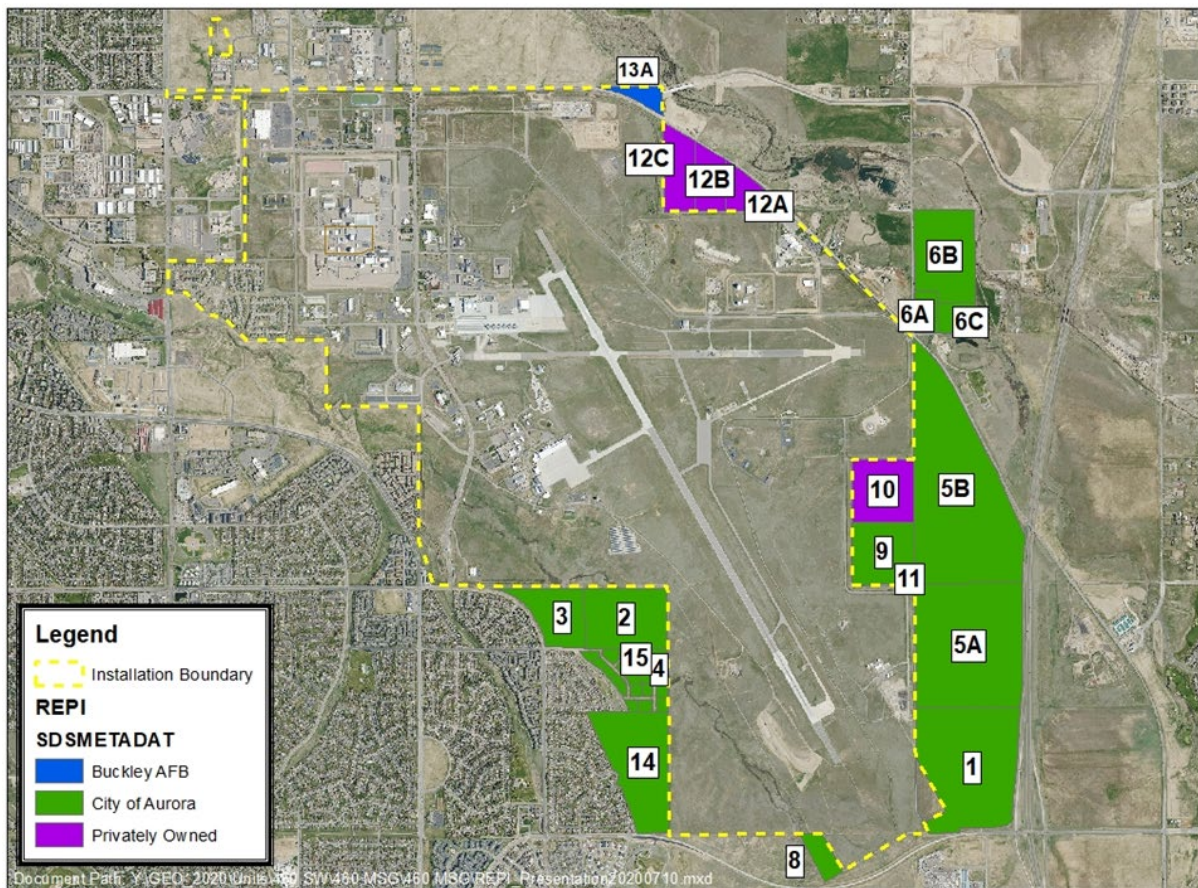
BSFB has trees in the semi-improved and unimproved areas, in particular along the East Tollgate Creek and at Williams Lake. Most of these trees are cottonwood, willow, and Siberian elm. No protocol or plan is available for replanting trees after removal or for tree maintenance at the installation in semi-improved and unimproved areas. Trees along East Tollgate Creek, around Williams Lake, and below the Williams Lake dam are being removed to reduce BASH risk.

Trees and shrubs were planted as shelterbelts (windbreaks and/or snowbreaks) in cooperation with the Colorado State Forest Service (CSFS). Currently the shelterbelts are being removed completely as they increase risk to flight safety and are not native to the prairie ecosystem. Once shelterbelts are completely removed the weed barrier will be removed and the area will be reseeded with native vegetation as necessary.

*REPI*

The BSFB Readiness and Environment Protection Integration (REPI) compatible use buffer project was completed and is now closed. The BSFB REPI was a collaborative effort with participation of 8 community stakeholders and BSFB partners and tenants. City of Aurora has acquired 759 acres as City of Aurora Parks, Recreation, and Open Space (PROS). The image below shows Parcels 1, 5A, 5B, 9, and 11 as concerns because of the close proximity to the Airfield. It is critical to agree upon management strategies that imitate current natural resources management strategies. A Memorandum of Understanding should be used to ensure that prairie dog control and exclusion continue as well as maintaining this area tree free. The prairie dog barrier or some version thereof should be maintained and possibly expanded to include the property between the end of the runway and Jewel Avenue. Without continued management of these areas, including use of wildlife barrier(s), it is a concern that these areas could revert to their original status and impact flight safety.

REPI Parcels Map



### 2.4.3 Current Major Impacts

Natural resources needed to support the military mission include air, water, and land. Examples include: wetlands for flood control and water quality and open areas that maintain flexibility for future mission requirements and training. Habitat and species provide positive aesthetic, social, and recreational attributes, which contribute to the human quality of life. Mission impacts to these natural resources, where they exist, should be avoided or carefully managed in all BSFB planning decisions.

Activities which have the potential to impact the natural environment at BSFB include:

- Construction and maintenance activities
- Ground & surface water discharges
- Training activities
- Airfield operation and noise
- Environmental Restoration Program (ERP)

Natural resources and their management also have the potential to serve as a constraint to mission operations and future development. A summary of the current status of our air, land and water quality regulatory compliance efforts is as follows:

#### **Air**

While no adverse effects to natural resources attributable to air pollution emissions on BSFB are known, some general information regarding the status of air compliance efforts on the installation is provided in this section.

The primary concern regarding air quality and potential environmental effects pertains to increases in pollutant emissions; exceedance of National Ambient Air Quality Standards (NAAQS) and other Federal, state, and local limits; and impacts on existing air permits. Primary sources of emissions on the installation include: emergency generators, fuel storage tanks, and natural gas usage via external combustion sources.

A geographic area with air quality that is cleaner than the primary standard is called an "attainment" area; areas that do not meet the primary standard are called "nonattainment" areas. The Denver Metro and Northern Front Range is currently classified as being in "serious" nonattainment for Ozone and will be redesignated to "severe" nonattainment in 2022. As such, B GAR currently operates under a Synthetic Minor Construction Permit (19AR0572) but will be required to operate under a Title V Operating Permit by 2023.

As part of the air permit disaggregation efforts at Buckley SFB the Aerospace Data Facility - Colorado (ADF-C), Navy, Colorado Army National Guard (COARNG), and Colorado Air National Guard (COANG) have been issued their own operating permits. Upon issuance of each individual APEN/Permit, the entities took ownership and compliance responsibilities for their equipment and emission sources, alleviating B GAR of any liabilities associated to each entity.

#### **Water Supply**

The majority of water needs on base are supplied from the City of Aurora potable water system. Such needs include domestic, drinking, commercial, irrigation, facility heating & cooling systems, firefighting, and other military uses.



## **Stormwater**

BSFB's stormwater sewer system is currently covered under the USEPA's National Pollutant Discharge Elimination System (NPDES) individual MS4 permit (NPDES ID: COR042003-Expiration date 30 Sep 2018; in administrative continuance until new permit is issued). The MS4 permit requires an overall management and compliance program by the owners and operators of stormwater conveyance systems to preserve, protect, and improve surface water resources from polluted stormwater by reducing, to the maximum extent practicable, common everyday sources of pollution from being picked up in runoff and transported into the MS4. Requirements of the MS4 permit include preparation and implementation of a Storm Water Management Plan (SWMP).

BSFB's stormwater discharges from air transportation industrial activities are currently covered under the USEPA NPDES 2021 MSGP (NPDES ID: COR05F004- Expiration date 28 Feb 2026). The purpose of the 2021 MSGP is to identify and limit stormwater discharges from sources associated with airfield operations that are or have the potential to carry industrial pollutants in the runoff to prevent such discharges from impacting waters of the United States. Requirements of the MSGP include preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) specifically for air transportation activities.

The discharge of stormwater from a construction project on BSFB that disturbs more than one acre of land must be authorized by a construction stormwater permit issued by the USEPA in accordance with the NPDES 2017 General Permit for Storm Water Discharges from Construction Activities for Federal Facilities in the State of Colorado (NPDES ID: COR10F01Y – Expiration date 16 Feb 2022). The objective of this permit, commonly referred to as the Construction General Permit (CGP), is to eliminate or minimize pollutants on construction sites (e.g., sediment, petroleum, oil, and lubricants [POLs], concrete washout, chemicals) from being picked up and transported in storm water runoff from the project site. Requirements of the CGP are to develop and implement a SWPPP.

## **Groundwater**

Groundwater from aquifers in the Denver Basin formations was utilized as the water supply for the installation through multiple wells until the mid-1980s when the source changed to potable water supplied by the City of Aurora. Since then only limited use has been made of the groundwater from the Denver Basin aquifers for recreation, firefighting, irrigation, and miscellaneous industrial-type processes.

More specifically, Buckley dhas decreed water rights in the Upper and Lower Arapahoe, Denver and Laramie-Fox Hills Aquifers with the Arapahoe and Denver aquifers being especially known for their high quality and need for little to no s treatment being required for use as drinking water It should also be noted that there are multiple Environmental Restoration Program (ERP) sites at BSFB that aim to clean-up environmental contamination associated with past industrial activities; while clean-up efforts associated with these sites are ongoing, the quality of shallow, water-table groundwater resources (Approximately 40' below ground surface) on base has been negatively affected and additional information can be found in the Environmental Restoration Program section below.

## **Noise**

An air installation compatible use zone (AICUZ) study was prepared for BSFB in 1998. An AICUZ study addresses safety issues and identifies hazard potential due to aircraft accidents, obstructions to navigation, and compatible land uses based on exposure levels to aircraft noise in the surrounding area. According to

the AICUZ Study, the majority of the off-installation and day-night average sound levels (DNLs) of 65 decibels on the A-weighted scale (dBA) were a result of aircraft noise.

Noise is perhaps the most identifiable environmental impact associated with mission operations at BSFB. The installation has quantified noise: there are no known impacts to native species.

## **Land**

The impacts to land resources include soil compaction, introduction of invasive species, destruction of native vegetation, urban forestry, and sustainable maintenance (to include sustainable vegetation).

## **Environmental Restoration Program (ERP)**

The AF Environmental Restoration Program (ERP) implements the goals and responsibilities of the AF Defense Environmental Restoration Program (DERP). The goal of the ERP is to reduce risks to human health and the environment due to contamination from past military activities in a cost effective manner, in accordance with governing directives, which fosters community support. The scope of the ERP includes cleanup and restoration of sites contaminated with toxic and hazardous substances, military munitions, petroleum, oils and lubricants (POL), and other pollutants and contaminants.

The ERP at BSFB currently consists of three areas: Installation Restoration Program (IRP, four sites) which are older/historic funded sites under the AF ERP; Military Munitions Response Program (MMRP) which focuses on cleaning up closed training ranges; and the Compliance Restoration Program (CRP) which focuses on cleanup sites identified during a Basewide Site Inspection (BSI) completed in March 2010.

The BSFB IRP currently consists of four open sites (Site 1, Site 3, Site 10, and Site 11). Sites 1, 10, and 11 are sites with former industrial solvents, Trichloroethylene (TCE) and Tetrachloroethylene (PCE), which have contaminated groundwater both on base and off base. Site 10 also has 1, 4 dioxane, which was used as a solvent stabilizer, contamination above regulatory limits. Site 3 is a former base landfill that has completed Remedial Action-Construction (RA-C) in 2014 and 2015 to augment soil to the existing cover ensuring the material in the landfill has the proper soil cover (at least two feet). Site 3 is under a Long-term Monitoring (LTM) program to monitor groundwater within the landfill boundary and is under a landfill gas monitoring program to detect for potential explosive gas (methane) associated with the landfill.

The BSFB MMRP scope is currently addressing the investigation and cleanup of three Munition Response Sites (MRS) that were former training ranges and munitions disposal sites located in various locations at BSFB. The three MRS's at BSFB are MB-103, LF-105, and MB-106, are going through remedial actions (RA) that started in the summer and fall of 2020. A surface clearance at MB103 will begin in the fall of 2021 and a subsurface clearance will occur in the summer and fall of 2022 in an accordance with the May 2021 Final Record of Decision (ROD). Full clearance is expected at MB106 after the subsurface removal is performed in the fall and winter of 2021 and 2022. The remedy for LF105 will be to implement and maintain land use controls (LUCs).

The BSFB CRP consists of Sites located in two main areas, the Central Industrial Area (CIA) and the East Industrial Area (EIA). There are three open sites in the CIA: The Armament and Automotive Area (AAA), Aerospace Ground Equipment Shop (AGES), and Truck Fueling Area (TFA) have petroleum and TCE contamination in groundwater. A Final ROD was signed by Colorado Department of Public Health and Environment (CDPHE) and the Air Force in July 2018 for AAA/AGES. Remedial Design (RD) began in early 2018 and the Remedial Action-Construction (RA-C), in situ treatment/injections into the contaminated zone, began in late 2018 and into early 2019. AAA/AGES was approved for Remedy in Plan (RIP) by the Air Force and CDPHE in September 2019 at the completion of RA-C. AAA/AGES is now in Redial Action-Operations (RA-O) to determine if the remedies implemented are effective. RA-O will

continue through 2027 and further injections are not planned at this time. The TFA Final ROD was approved by the CDPHE and the Air Force January 2019. Remedial Action/Remedial Design (RA/RD) began in late 2020 and early 2021 with RA-C commencing in 2023.

There is one open site in the EIA: Ordnance Storage Area (OSA) which has TCE; 1, 4 dioxane contamination; and perchlorate contamination in groundwater. A remedial investigation (RI) Report was completed in 2014 and an FS was completed in June 2016. A Final ROD was approved by CDPHE and the Air Force in the summer of 2017. Implementation of the RA-C (in situ treatment/injections) began in the summer of 2018 and is under annual groundwater monitoring. Annual groundwater monitoring will continue through Redial Action-Operations (RA-O) through 2027. No further injections are planned at this time.

### **ERP Off Base Contamination**

Sites 10 and 11 both have groundwater contamination plumes that extends onto City of Aurora Property. Site 11 currently has an environmental covenant (EC) between the State of Colorado and the City of Aurora that implements land use controls (LUC's) to protect human health. In accordance with the January 2017 Final ROD for Site 11 the LUC's for Site 11 are; Protect groundwater monitoring network (monitoring wells) and limit intrusive digging in the area that has underlying groundwater contamination. LUC's for Site 10 currently do not have an associated EC, however the City of Aurora is aware of the contamination and currently has no plans to allow any development in the area of the Site 10 contamination. Once the remedies are selected for Site 10 in the Final ROD, a similar EC to Site 11 will be developed to formally implement the LUC's. The Final ROD was approved by CDPHE in 2021. Site 10 Remedial Design/Remedial Design work plan was submitted to CDPHE in September 2021 and is awaiting final approval. RA-C is expected to begin in the Fall and Winter of 2021 and 2022.

Part of implementing the remedies for Sites 10 and 11, besides implementing LUC's, will require access to off-base portions of the contamination plumes. This includes having workers and equipment, such as small trucks and drilling rigs, in the area. As such, the areas are surveyed by USFWS personnel assigned to BSFB prior to mobilization of personnel and equipment to ensure no protected biological species are in the work area(s). Similar to the on-base areas, no critical habitat for threatened or endangered species have been designated within the before mentioned areas, Sites 10 and 11.

### **BSFB ERP Sites**



**Legend**

- |        |        |        |             |              |
|--------|--------|--------|-------------|--------------|
| FT-001 | MB-106 | SS-010 | TU-581      | Installation |
| LF-003 | MY-568 | SS-011 | Skeet Range |              |
| MB-103 | MY-570 | TA-564 |             |              |

**Buckley SFB  
Environmental  
Restoration  
Program Map**



**Prepared by:**  
Center for Environmental  
Management of Military  
Lands (CEMML)/  
Colorado State University  
Date: 8/22/2020  
Contact: Brian Burek  
brian.burek.ctr@us.af.mil  
719-556-1768  
Cooperative Agreement:  
Number W9126G-18-2-0033



Coordinate System: WGS 1984 UTM Zone 13N  
Projection: Transverse Mercator  
Datum: WGS 1984

0.5 0.25 0 0.5 1 Miles

0.5 0.25 0 0.5 1 1.5 Kilometers

Map created for presentation purposes only. Although efforts  
have been made to verify data, accuracy cannot be guaranteed

Document Path: C:\GIS\BuckleyAFB\BAFB\_Maps\BAFB\_ERPMap\_ANSI\_A\_Letter\_Portrait\_85x11.mxd

#### *2.4.4 Potential Future Impacts*

As BSFB continues to modernize and beddown additional missions, the competition for finite resources may impact the natural environment.

Natural infrastructure is the combined set of natural and statutory assets and operational components that together facilitate the military mission at installations, ranges, and operating areas. Natural infrastructure and built infrastructure are required to support military missions.

Encroachment is the degradation and/or denial of access to the natural infrastructure resulting from various forms of competition for these resources. Competition for the resources on base is steadily increasing over time due to population growth and development in this area.

Based on the BSFB Natural Infrastructure Assessment (NIA) surface land measures, BSFB is not experiencing encroachment with regards to its access to testing and training areas. These areas are of sufficient size and are readily available for installation use to conduct its training requirements. However, BSFB is facing encroachment issues that are not captured within the current NIA measures. Heavy residential encroachment is evident on the south and east sides of the installation, and the northern side of BSFB has heavy industrial and commercial encroachment. Although the City of Aurora has indicated that no residential areas are slated for development within the 4,198 acres of off-base noise zones and accident potential zones (APZs), the rapid growth that Aurora is experiencing is still a high visibility topic for the installation.

External issues that impact implementation of the INRMP include the location of BSFB within the Denver Basin near the City of Aurora, one of the fastest growing communities in the country. The city is presently the third largest in Colorado and the second largest in the Denver Basin. Construction of residential areas to the east and south of BSFB is evidence of this rapid growth. Areas to the north and northwest are zoned industrial/commercial and construction activities can be observed in these areas as well. Development around BSFB is expected to continue because the Denver Basin is restricted to the west by the foothills of the Rocky Mountains and to the northeast of BSFB by Denver International Airport.

If the base takes no action in preserving buffers, urbanization around the installation will further constrain and/or preclude mission operations. As local expansion increases BSFB's natural infrastructure will be unable to absorb the impact. Further urbanization and the increase of human population around BSFB has increased public interest in installation activities.

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

Natural resources needed to support the military missions on BSFB include: stable soils; vegetation for concealment; open areas for on the ground and in the air training and testing; wetlands for flood control and water quality functions; open areas that maintain flexibility for future mission requirements; and habitat and species that provide positive aesthetic, social, and recreational attributes, which substantially contribute to the overall quality of life. Management of these resources is addressed in this INRMP and the associated operational component plans.

### **3.0 ENVIRONMENTAL MANAGEMENT SYSTEM**

The AF environmental program adheres to the Environmental Management System (EMS) framework and it's Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade*, U.S. Department of Defense Instruction (DoDI) 4715.17, *Environmental Management Systems*, AFI32-7001, *Environmental Management*, and international

standard, ISO 14001:2015, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

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

**4.0 GENERAL ROLES AND RESPONSIBILITIES**

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

<b>Office/Organization/Job Title</b> (Listing is not in order of hierarchical responsibility)	<b>Installation Role/Responsibility Description</b>
Installation Commander (B GAR/CC)	The B GAR Commander ensures that an INRMP is developed, maintained, and implemented. In doing so, the commander is responsible for approving the INRMP, certifying the annual review of the INRMP as valid and current, providing appropriate funding and staffing to ensure implementation of the INRMP, and controlling access to and use of installation’s natural resources.
AFCEC Natural Resources Media Manager/Subject Matter Expert (SME)/ Subject Matter Specialist (SMS)	AFCEC is a field operating agency of the Air Force Civil Engineer. It provides Air Force leaders with the comprehensive expertise and professional services necessary to protect, preserve, restore, develop, and sustain environmental and installation resources. In addition, AFCEC assists BSFB with implementing the INRMP with reach back support and funding.
Installation Natural Resources Manager/POC	Natural resource management-related responsibilities in the Environmental Element include: <ul style="list-style-type: none"> <li>• maintaining an organization with the resources and personnel available to accomplish the INRMP;</li> <li>• implementing this INRMP and its programs to ensure the inventory, classification, and management of all applicable natural resources;</li> <li>• coordinating with local, state, and federal government and civilian conservation organizations relative to natural resources management;</li> <li>• ensuring the ongoing and timely coordination of current and planned land uses between mission, natural resources, environmental, legal, and master planning;</li> <li>• ensuring all installation personnel are aware of and comply with procedures and requirements, laws, regulations, and other measures that promote environmental quality necessary to accomplish objectives of this INRMP;</li> <li>• reviewing environmental documents (e.g., environmental impact assessments and permits), construction designs</li> </ul>

<b>Office/Organization/Job Title</b> (Listing is not in order of hierarchical responsibility)	<b>Installation Role/Responsibility Description</b>
	and proposals to ensure adequate protection of natural resources through review and consideration of the technical guidance presented in this INRMP; <ul style="list-style-type: none"> <li>• inspecting and reviewing mitigation measures implemented for the protection of natural resources to ensure they are properly functioning and meeting their intended goals; and</li> <li>• ensuring compliance with laws and regulations related to the environment and natural resources.</li> </ul>
Installation Security Forces	Physical enforcement.
Installation Unit Environmental Coordinators (UECs); see AFI32-7001 for role description	Ensures NRM is coordinated with to address BSFB natural resources in the AF Environmental Maintenance System (EMS) process and remain in compliance with AF EMS implementation and maintenance for BSFB.
Installation Wildland Fire Program Manager	460 CES Fire Department in coordination with the BSFB NRM annually reviews and updates the approved Tier 1 WFMP.
Pest Manager	Ensures BSFB INRMP and BSFB IPMP are mutually supportive during the review process and plan development.
Range Operating Agency	Not applicable on BSFB.
Conservation Law Enforcement Officer (CLEO)	Not applicable on BSFB.
NEPA/Environmental Impact Analysis Process (EIAP) Manager	Coordinates with NRM to ensure biological resources are properly addressed when implementing the Environmental Impact and Analysis Process (EIAP) as part of NEPA compliance efforts.
National Oceanic and Atmospheric Administration (NOAA)/ National Marine Fisheries Service (NMFS)	Not applicable on BSFB.
US Forest Service	Not applicable on BSFB.
US Fish and Wildlife Service	<p>The USFWS is the primary federal agency with which BSFB cooperates on natural resources management. Collaborative efforts include federal-listed species management and noxious weed and pest management.</p> <p>IAW the Sikes Act, the USFWS is a cooperating agency in implementation of this INRMP. INRMP reviews are coordinated with the USFWS Deputy Regional Director and appropriate field station. The Sikes Act Coordinator, organizationally located under the Assistant Regional Director of Fisheries, serves as the primary point-of-contact for installations during the formal INRMP review process.</p>

<b>Office/Organization/Job Title</b> (Listing is not in order of hierarchical responsibility)	<b>Installation Role/Responsibility Description</b>
	BSFB has an embedded USFWS employee responsible for supporting implementation and completion of natural resource projects.
Base Grounds Maintenance	Ensures INRMP and BSFB Grounds Maintenance Services Contract are mutually supported and natural resource actions performed under the contract is supported by NR program goals and objectives.
460th Civil Engineer Squadron Commander	The 460th Civil Engineer Squadron Commander and staff ensure that plans and studies supporting the Installation Development Plan, including the INRMP, are accomplished as necessary and that necessary actions are implemented.
460 <sup>th</sup> Civil Engineering, Operations Flight	Some activities of the Operations Flight overlap with Natural Resources Management programs. Road repair and maintenance, weed and pest control, fire prevention and suppression, and grounds maintenance are part of the operations mission that could impact natural resources. The Environmental Element supports the Operations Flight to accomplish these missions by providing them regulatory and technical guidance, reviewing and requesting permits, consulting with other agencies, and assisting with wildland fire management and integrated pest management.
Public Affairs	Public support of natural resources management at BSFB is vital to ensuring a regional approach. Therefore, Public Affairs plays an important role in natural resources management by disseminating information to the public regarding BSFB's Natural Resources Management programs and how they support state and regional environmental awareness and protection. Public Affairs is responsible for promoting an understanding of military operations among its various constituents and providing professional advice and support to installation leaders and activities related to public outreach.
Staff Judge Advocate	The Staff Judge Advocate provides legal advice, counsel, and services to command, staff, and subordinate elements at BSFB. Their responsibilities with regard to integrated natural resources management include: <ul style="list-style-type: none"> <li>• interpretation and application of laws, regulations, statutes, and other directives to the management of natural resources on the installation;</li> <li>• coordinating with the Office of the Judge Advocate General, the Department of Justice, and other government agencies on environmental disputes and litigation; and advising B GAR on compliance with environmental laws.</li> </ul>
Others	Implementation of this INRMP also requires assistance from other directorates and divisions such as Contracting (procurement) and Logistics, Safety, Comptroller (budget)



Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	Installation Role/Responsibility Description
	process), and commanders of assigned and tenant units and activities.
Area Military Installations	BSFB shares some regional natural resources management issues with other Front Range military installations including Peterson Air Force Base, Schriever Air Force Base, Cheyenne Mountain Air Force Station, the U.S. Air Force Academy, Fort Carson Army Post, Pueblo Chemical Depot, and F.E. Warren Air Force Base. Partnerships and crosstalk may occur between installations with comparable habitat types likely to raise similar management issues.
Animal and Plant Health Inspection Service (APHIS), Wildlife Services	The APHIS, Wildlife Services is a branch of the USDA that provides animal damage management and works with 460 <sup>th</sup> Safety Office and the 140 <sup>th</sup> Safety Office to lead the BASH program.
Colorado Parks and Wildlife (CPW)	CPW is responsible for managing most fish and wildlife within the state, including those on federal lands. Specific cooperation between BSFB and CPW generally involves bird/wildlife rehabilitation and other animal management. CPW is a signatory of the INRMP and management actions on base are coordinated to eliminate conflict management goals between agencies.
Other Interested Parties	None identified at this time.

## **5.0 TRAINING**

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

### *Installation Supplement – Training*

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

1. NRMs at Category I installations must take the course, DoD Natural Resources Compliance, endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval School, Civil Engineer Corps Officers School (CECOS). See <http://www.netc.navy.mil/centers/csfe/cecos/> for CECOS course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (<http://www.afit.edu>), the National Conservation Training Center managed by the USFWS (<http://www.training.fws.gov>), and the Bureau of Land Management Training Center (<http://training.fws.gov>).

2. Natural Resources Management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and may be allowed to attend appropriate national, regional, and state conferences and training courses.
3. All individuals who will be enforcing fish, wildlife, and natural resources laws on AF lands must receive specialized, professional training on the enforcement of fish, wildlife, and natural resources in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (<http://www.fletc.gov/>).
4. Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, to include training that is mandatory to attain any required permits.
5. Personnel supporting the BASH program should receive flight line drivers training, training in identification of bird species occurring on airfields, and specialized training in the use of firearms and pyrotechnics as appropriate for their expected level of involvement.
6. The DoD supported publication *Conserving Biodiversity on Military Lands - A Handbook for Natural Resources Managers* (<http://dodbiodiversity.org>) provides guidance, case studies, and other information regarding the management of natural resources on DoD installations.

## **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*

All BSFB NRM official records are kept electronically via the Electronic Records Management (ERM) system and applicable physical files are located at the USFWS desk. Unofficial BSFB NRM electronic working files are located on the 460 CES/CEIE installation share drive. These unofficial electronic records are updated weekly and outdated documents are purged quarterly.

### ***6.2 Reporting***

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

#### *Installation Supplement – Reporting*

## **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 primary natural resources which could impact or be impacted by the installation's mission are the presence of the black-tailed prairie dog, Western burrowing owl, wetlands, and the native prairie ecosystem. The major natural resources management concern is the loss of habitat and animal fauna (i.e., biodiversity) associated with current and future mission requirements (i.e., construction of new facilities). Natural resources management concerns, goals, and objectives address constraints to the installation's mission, conservation of biodiversity, and multiple uses of the installation's natural resources. Projects were subsequently developed to meet BSFB natural resources management goals. The U.S. Fish and Wildlife Service (USFWS) and Colorado Parks and Wildlife (CPW) conduct an annual interagency review of the proposed INRMP projects.

This INRMP supports the Air Force mission by providing the steps needed to fulfill all compliance requirements related to natural resources and to foster environmental stewardship at BSFB. Therefore, full compliance and sound stewardship are dependent on the implementation of the INRMP through the appropriation of funds for the recommended projects. Additionally, annual reviews with the USFWS and CPW will ensure that the INRMP remains current and relevant.

Formal biological surveys have been conducted and a wide variety of native flora and fauna have been documented. Native prairies, one of the most endangered habitats in the United States are present. Birds and mammals are the dominant faunal groups. Because of its location and size, the installation provides migratory feeding and wintering habitat for a variety of birds, including waterfowl (e.g., ducks and geese) and raptors (e.g., bald eagles and red-tailed hawks). Small mammals (e.g., black-tailed prairie dogs, rabbits, and mice) and large mammals (e.g., coyote, red fox, and occasionally deer) are present. No federal-listed species are known to reside on the installation. State-listed threatened species known to occur on the installation include the Western burrowing owl. Western burrowing owl is also considered a species of special concern by the USFWS. Several Colorado state species of special concern are present including bald eagle, ferruginous hawk, common garter snake, and black-tailed prairie dog.

## ***7.1 Fish and Wildlife Management***

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

Based on the presence of significant natural resources, BSFB is classified as a Category I installation. Management of fish and wildlife resources is not only a natural resources stewardship responsibility but is also important to quality of life. Fish and wildlife programs can provide a variety of outdoor recreational opportunities for military personnel.

BSFB has limited wildlife resources, though non-consumptive (e.g., bird watching) wildlife management opportunities do exist on the installation. Consumptive use (e.g., hunting) of game species on BSFB is not practical because the installation is situated in a suburban and industrial area and it contains an active airfield. In addition, there are obvious safety and security issues inherent in the operation of a military installation, that conflict with unregulated public access and the use of firearms.

## **Migratory Bird Protection**

The Front Range is part of the Central Flyway which is an important corridor for migrating birds. Both the developed and undeveloped areas of BSFB contain habitat that is attractive for many migratory bird species. It is estimated that 200-300 bird species potentially pass through or reside temporarily, seasonally, or permanently at BSFB. Species of special concern such as bald eagles are regularly seen throughout the year and occasionally ferruginous hawks are seen. In addition, the state-listed threatened Western burrowing owl are observed at times mainly during spring and summer months. Western burrowing owl have not been documented to be nesting on BSFB since 2017. Western burrowing owl nesting on BSFB has been reduced to zero due to prairie dog management that removes prairie dogs and destroys burrows that are used for nesting. Large flocks of geese are also overwintering in the Denver Metro area due to an increase in winter forage on golf courses, athletic fields, parks, and landscaped commercial areas. Canada geese are seen on Williams Lake and turf areas throughout the installation mostly during the winter and these flocks can present a serious hazard to aircraft.

Seasonal avian surveys are regularly conducted to accurately identify species utilizing the habitat at BSFB. Current data on avian species is essential to correctly identify actual and potential conflicts between mission operations, installation development, and outdoor activities (e.g. training, recreation). Project or activity sites should also be surveyed for avian species prior to the start of their utilization and when necessary throughout the project timeline, in order to proactively address constraint issues.

### **Nuisance Wildlife**

Nuisance wildlife or wildlife pests at the installation are those animals that are incompatible with the mission of BSFB. The most serious nuisance wildlife issues on BSFB are related to BASH but their many other activities that are affected by nuisance wildlife.

Nuisance wildlife issues that exist on BSFB involve numerous bird species, coyotes, black-tailed prairie dogs, and rabbits. Canada Geese are incompatible with the flying mission and present the greatest BASH concern on BSFB due their size, flying behaviors, and large population. Prairie dog colonies are also a major nuisance wildlife species on BSFB because they attract large raptors looking for prey. In addition, coyotes have been observed entering the installation through the gates, climbing over the perimeter fence, and breaches in the perimeter fence. Coyote presence on or near the airfield increases BASH risk. In the winter of 2000-2001 two coyotes were struck during a F-16 landing. USDA Wildlife Services are responsible for control of nuisance wildlife that pose a BASH risk within the BSFB Wildlife Exclusion Zone in accordance with AFI91-212. The BASH plan defines the entirety of BSFB as the Wildlife Exclusion Zone. The National Guard Bureau initiated a Memorandum of Understanding (MOU) with the USDA Wildlife Services to control wildlife that pose a threat to flight safety.

Known to be shy, coyotes are adaptable animals that can become more aggressive when they adapt to more urban settings such as the City of Aurora and BSFB. Some coyotes actively avoid people, while other coyotes are much more adapt to humans or influenced by disease and will come much closer. The CPW warns that: "In urban settings, they can lose their fear of people and may threaten domestic pets." Although attacks on humans are extremely rare, there have been cases elsewhere where coyotes have attacked young children.

Historically, a herd of wintering pronghorn antelope, numbering approximately 60 individuals, frequented the southern portion of the installation. The herd would often cross the southern portion of Runway 14/32, especially during April and May. Records also document that mule deer have been involved with vehicle collisions on the installation. Installation of the perimeter fencing along the BSFB boundary has effectively excluded pronghorn antelope and mule deer from the base (Barnes 1998, Saitta 1998). Mule deer still make it onto base sometimes and photos have shown them walking in through main gates.

## BSFB Wildlife Management Areas

BSFB is divided into seven wildlife management areas (WMA's) depicted in Figure: BSFB Wildlife Management Areas. A three-tiered management approach will be applied: wildlife conflict prevention and deterrence, habitat modification, and species removal. This approach applies to all land units on BSFB, including the 2nd Space Warning Squadron (SWS) within the restricted area, but does not apply to the Aerospace Data Facility - Colorado (ADF-C) and the BSFB Family Housing area, which have separate contracts to address the management of wildlife and wildlife conflicts. Current land use constraints on BSFB are depicted in Figure: Land Use Constraints.

All WMA's are within the Wildlife Exclusion Zone that is defined in the BASH plan. The BASH manager, in accordance with AFI91-212 section 1.3.10.2., is responsible to "Designate a Wildlife Exclusion Zone or other appropriate mitigation zones (airfield specific) encompassing the Aircraft Movement Area, clear zones and any additional habitat attractants (such as water treatment facilities, golf courses, landfills, and athletic fields) in proximity to the airfield and low-level flight corridors (such as final approach/departure)."

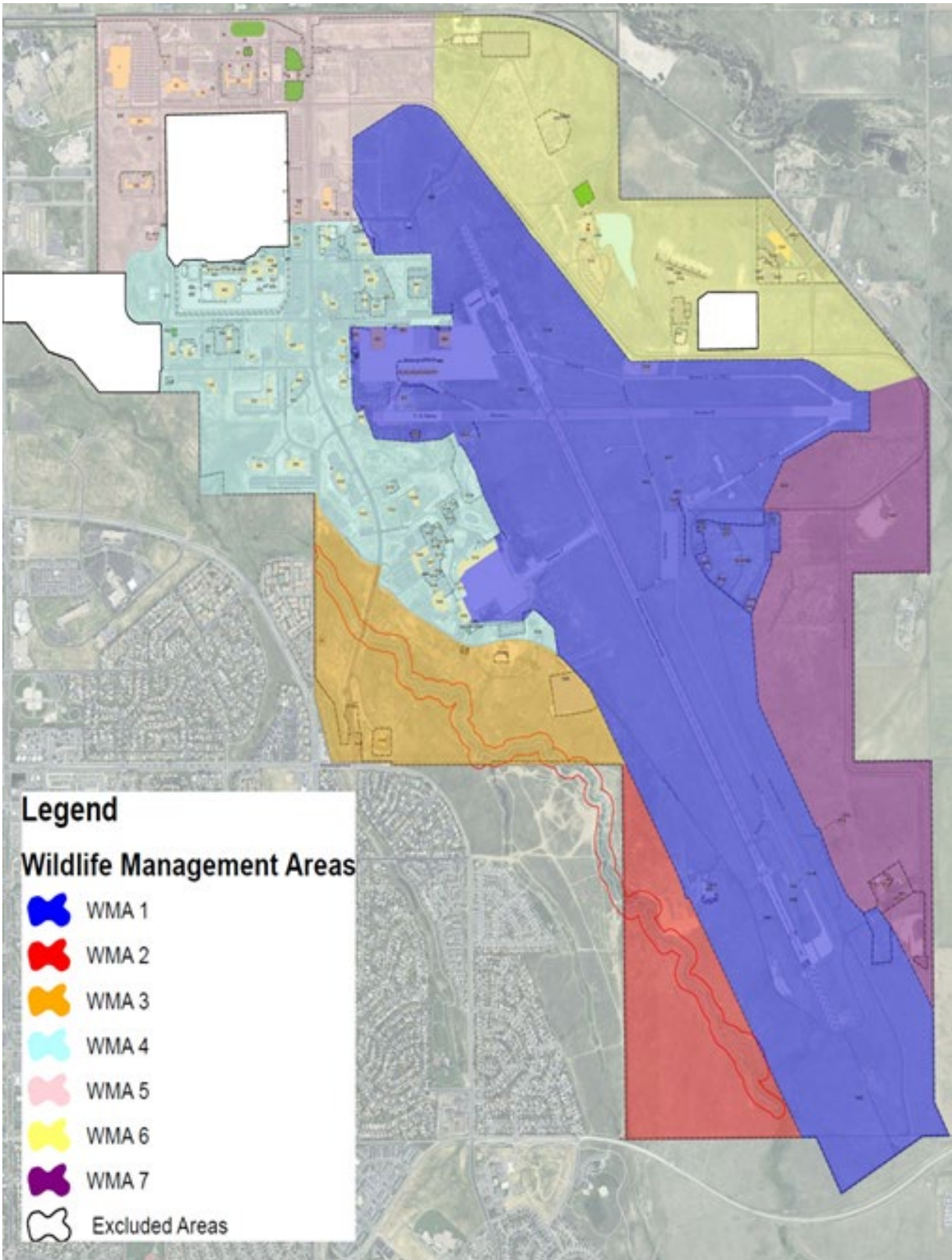
## BSFB Wildlife Management Area Descriptions

WMA 1 is comprised of the airfield and includes the area within the airfield flightline boundary fence. This area is comprised of open grasslands, buildings, and paved surfaces including the runway and taxiways. Dominant vegetation throughout most of this area is crested wheatgrass. There are patches of native midgrass prairie on northern and southern ends of the runway. To ensure no species that increases BASH risk dwell within the airfield the associated general guidelines for management in this area extends out to the installation boundary to provide an adequate buffer which is designated as the Wildlife Exclusion Zone.

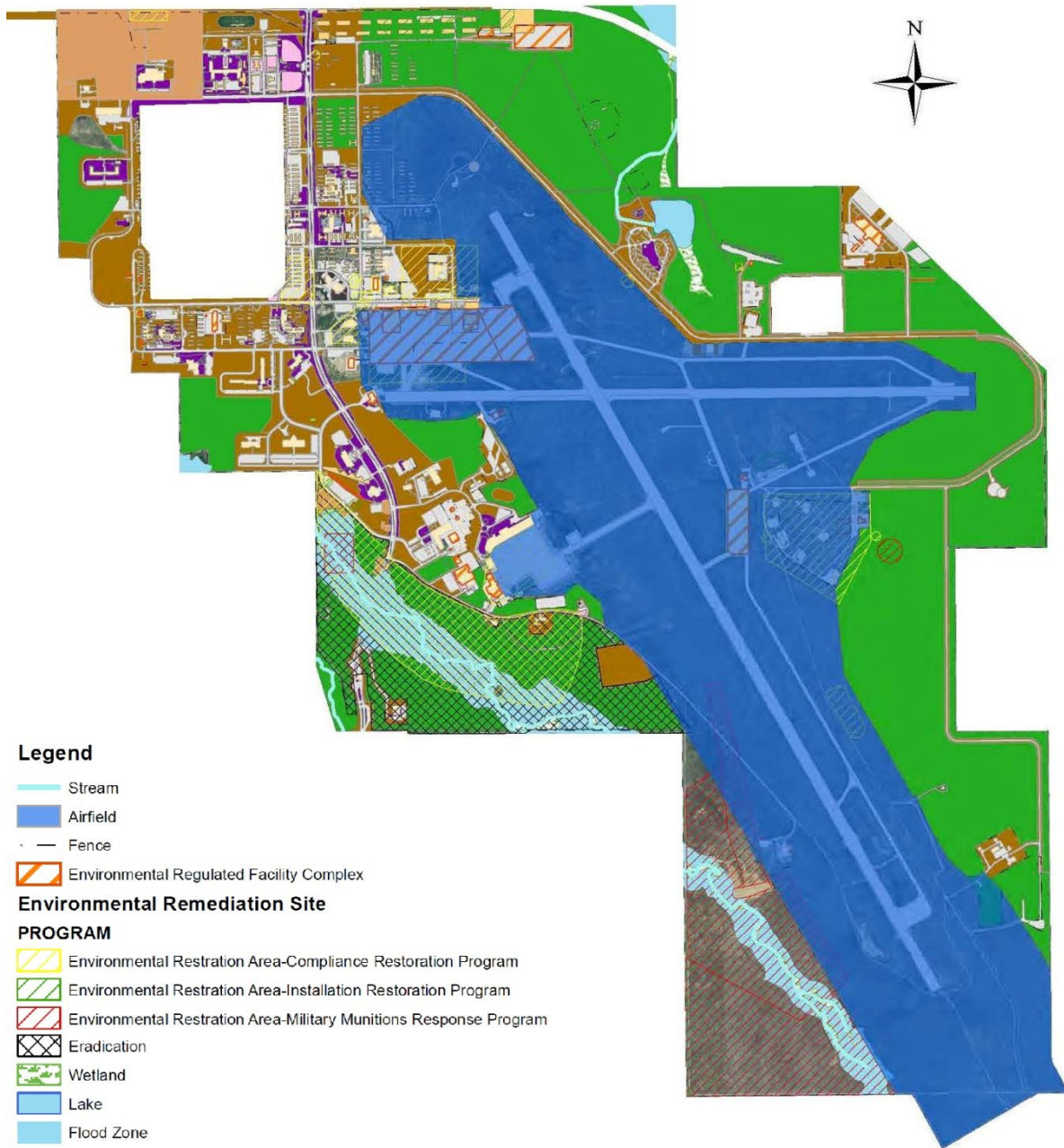
WMA's 2, 3, 6, and 7 are comprised of open, mostly undeveloped lands. Vegetation throughout much of the central portion is dominated by crested wheatgrass, with native prairie vegetation dominant in most of the southern and northern portions. Riparian and bottomland meadow vegetation with plains cottonwoods/peachleaf willow overstory occur along East Toll Gate Creek and around Williams Lake. These WMA's also contain small patches of rabbitbrush and yucca. The majority of larger prairie dog colonies have been removed from these areas, but there are small colonies that repopulate areas along East Toll Gate Creek in WMA's 2 and 3 because of inadequate wildlife barrier installed on the perimeter fence. Western burrowing owl presence has declined in recent years in all WMA's and nesting Western burrowing owls have not been documented since 2017 (Casady and Colburn 2020). Most of the larger weed infestations on BSFB have been mapped within these WMA's. Windbreaks have been planted around much of the installation perimeter within these WMA's and are attractive to wildlife. USFWS and USDA are actively removing these shelterbelts to prevent the need to depredate and reduce BASH risk.

WMA's 4 and 5 encompass the developed portions of BSFB and contain the majority of the buildings, roads, and other infrastructure on the base. Introduced landscape plants, including lawn grasses and ornamental trees and shrubs, are the dominant vegetation. Prairie dogs and rabbits are routinely removed from these areas to prevent damage to vehicles, vegetation, and facilities.

**Figure: BSFB Wildlife Management Areas**



**Figure: Land Use Constraints**



**Legend**

- Stream
- Airfield
- Fence
- Environmental Regulated Facility Complex

**Environmental Remediation Site**

**PROGRAM**

- Environmental Restriction Area-Compliance Restoration Program
- Environmental Restriction Area-Installation Restoration Program
- Environmental Restriction Area-Military Munitions Response Program
- Eradication
- Wetland
- Lake
- Flood Zone

**Pollution Area**

**TYPE**

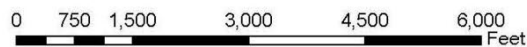
- Known Asbestos Soil
- Suspect Asbestos Soil

**Grounds Maintenance**

**Maintenance Level**

- Improved Mowed to 2-4 in.
- Semi-Improved Mowed to 4-10 in.
- Special Area
- Unimproved Mowed 1/yr to 10-14 in.
- Building
- Pavements

**WM Area Land Constraints**



### **Element 1: Wildlife Conflict Prevention and Deterrence**

Mammals such as black-tailed prairie dogs, rabbits, and coyotes have the ability to burrow and/or are an attractant to avian species in search of prey. Their burrows also can become roosting or nesting habitats for Western burrowing owls. As a result, the aforementioned mammals may impact the military mission on BSFB by impeding flight safety, compromising environmental compliance, causing damage to infrastructure, and may impact human health and safety. Physical barriers are the primary method on BSFB to limit movement of burrowing mammals. The current approach uses base-wide installation, maintenance, and repair of permanent metal sheeting buried 2-3 feet in the ground consistent in color with the BSFB Installation Facility Standards (IFS). The ideal long term wildlife prevention and deterrence would be to install 1 ¼ inch chain link buried 3 to 4 feet along both the airfield and base perimeter fences. Other wildlife conflict prevention and deterrent methodologies are addressed in the BSFB BASH plan, Annex C.

### **Element 2: Habitat Modification**

Habitat modification on BSFB means making WMA's less attractive to wildlife such as avian species, prairie dogs, coyotes, rabbits, and other mammals in order to maintain military mission readiness. The methodology for applying habitat modification on BSFB includes the following priorities, but is not limited to: collapsing burrows in all WMA's, roost/nest removal, water management, tree and perch removal, and maintaining vegetation height in critical areas such as the BSFB airfield and grounds maintenance contracted areas.

### **Element 3: Species Removal**

The BSFB WMA's and Office of Primary Responsibility (OPR) for species removal (i.e., relocate, harass, and/or lethal control) are defined below. Areas are defined by management strategies and management resource constraints. A zero tolerance approach for species control on BSFB includes relocation, harassment and/or lethal control measures to the extent possible. The approach taken to achieve zero tolerance will be WMA and species specific.

WMA 1. Zero tolerance for all avian and wildlife species to support the installation active flying missions. The OPR is 140 WG/SE supported by USDA APHIS Wildlife Services and 140 CES.

WMA 2. Zero tolerance for all avian and wildlife species to support the installation active flying missions. Due to unexploded ordinance (UXO) concerns, species specific management strategies may be modified. The OPR is 460 CES Pest Management supported by USDA APHIS Wildlife Services.

WMA 3. Zero tolerance for all burrowing mammals to maintain federal and state land use compliance by ensuring the integrity and effectiveness of the final landfill cover. Avian species will be managed as necessary. The OPR is 460 CES/CEIE Environmental Restoration Manager and 460 CES Pest Management supported by USDA APHIS Wildlife Services.

WMA 4, 5, and 6. Zero tolerance for all wildlife species as outlined in the BSFB IPMP (Chapter 9). Avian species will be managed as necessary. The OPR is 460 CES Pest Management supported by USDA APHIS Wildlife Services.


WMA 7. Zero tolerance for all wildlife species as outlined in the BSFB IPMP (Chapter 9). Avian species will be managed as necessary. For specific regulations regarding Western burrowing owls, refer to section 7.4 Management of T&E Species, Species of Concern and Habitats - Western burrowing owls of the INRMP. The OPR is 460 CES Pest Management supported by USDA APHIS Wildlife Services.



Prairie Dog Species Removal Management. Prairie dogs are considered a health and safety issue, especially in terms of BASH risk and as a potential source of bubonic plague and other diseases for BSFB personnel and residents. Therefore, prairie dogs will be removed base-wide to the maximum extent practical. The ideal long-term goal is complete removal of prairie dogs on BSFB.

When physical controls such as live trapping and/or use of a firearm are ineffective, pesticide techniques such as fumitoxin and/or Rozol will be used within BSFB WMA's. Any application of pesticide will be applied in accordance with the proper chemical label. Fumitoxin can be applied year round and Rozol is applied 1 October through 15 March. During avian nesting, breeding, and migratory season(s) pre- and post-site avian surveys are conducted by a trained biologist when pesticide removal techniques are utilized. In order to avoid any inadvertent misapplication of a pesticide or rodenticide regulated federally by the Environmental Protection Agency (EPA), it is recommended that the physical control method of prairie dog removal be applied within a 125 foot buffer of any wetland and/or riparian area on BSFB. Once prairie dogs are removed the burrows are cultivated to reduce recolonization.

WMA's 1, 2, and 7 are the first priority for prairie dog removal, to maintain flying mission readiness. Due to land use constraints (i.e. Military Munitions Response Program site) and limited resources in WMA 2, it is suggested that physical and pesticide techniques be applied every two (2) years. The recurring maintenance of prairie dog removal on BSFB takes place in WMA's 3-6, where 460 CES conducts weekly monitoring and removal of prairie dogs dependent on manpower. During migratory bird nesting season, 460 CES Natural Resources staff conducts weekly monitoring and nesting surveys prior to physical and/or pesticide treatment to ensure non-target species (e.g., Western burrowing owls) are not affected.

Coyote Species Removal Management. The primary method of controlling coyotes and other nuisance furbearers is to reduce their access to all WMA's as much as physically feasible by repairing fence-lines and replacing current fence with more robust buried 1 ¼ inch fencing. Trapping as a means of coyote removal can be used on an as-needed basis to reduce the risk of coyotes entering the Wildlife Exclusion Zone. Finally, other legal lethal means such as shooting can be used for coyotes that pose an immediate threat to mission military readiness and/or human health and safety.  USDA Wildlife Services personnel can also use trapping with the proper state permits.

USDA Wildlife Services must annually apply for an Amendment 14 Exemption issued by the CDPHE for trapping. This permit requires the permit holder to report species and number of species trapped, as well as trapping devices used to the CDPHE. USDA Wildlife Services will provide this data to the NRM upon request.

Rabbit Species Removal Management. The methodology of rabbit removal is mechanical and physical control. Mechanical control or the use of cage traps to remove rabbits is accomplished October through March and is dependent on manpower. The trapped rabbits are humanely euthanized using carbon dioxide, bagged, and frozen. 460 CES donates the rabbit carcasses to the local raptor recovery facility to be fed to injured raptors. Physical control or the use of firearms/shooting is performed year round. The carcasses from lead based shots from physical control are disposed of; they cannot be sent to the raptor recovery facility.

To maintain military mission readiness, the WMA's priority level for rabbit removal includes WMA's 1, 4, and 5. The non-airfield recurring maintenance of rabbit removal on BSFB takes place in WMA's 4 and 5, where 460 CES conducts weekly monitoring and mechanical/physical rabbit removal. Rabbit removal in the identified areas is dependent on 460 CES manpower.

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

### *Applicability Statement*

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

### *Program Overview/Current Management Practices*

In the context of the INRMP, outdoor recreation refers only to those recreational pursuits requiring the availability of unimproved or semi-improved grounds. The primary outdoor recreational activities at BSFB consist of jogging and walking. Other recreational opportunities at BSFB include camping, hiking, bird watching, and picnicking. The 460th Force Support Squadron (FSS) manages athletic fields for baseball, soccer, volleyball, football, and track. The installation has developed additional "Family Camp" (FAMCAMP) recreational facilities, including RV campsites near Williams Lake.

The installation's outdoor recreation resources are open to installation personnel and families, military retirees, and tenants. Public access to the installation is limited to special events and recreational vehicle storage areas. The level of enjoyment that is derived from these activities is directly related to the quality of the natural resources present on BSFB. Maintaining a quality outdoor recreation program is dependent on proper management of natural resources and efficient program administration and oversight.

According to AFMAN32-7003, "Natural resources managers should collaborate with the installation Community Planner, Air Force Personnel Center Directorate of Services, Force Support Squadron, Flight Safety, and other stakeholders in the planning and development of outdoor recreation on an Air Force installation; and with the Range Operating Agency for Air Force ranges." BSFB does not currently allow fishing, hunting or trapping, or off-road vehicle use (including mountain bikes, dirt bikes, and all-terrain vehicles). Horseback riding and rock climbing are also not applicable to the resources at the installation.

The funding of outdoor recreational projects must be closely coordinated with the FSS since non-appropriated funds (NAF) can be used for a project in some cases. The DAF has made substantial funds available to BSFB for the improvement of recreation at the installation.

### **Watchable Wildlife and Bird Watching**

BSFB provides sufficient area and habitat to support a bird-watching program. Bird watching can be done from the miles of perimeter road, sidewalks, and the jogging path. Bird watching is a non-consumptive activity that provides a high capacity for recreational use and enjoyment of the outdoors without impacting other programs or the military mission.

BSFB currently does not have a watchable wildlife program. Visible wildlife at BSFB consists mostly of bird species. If such programs are developed, they should minimize/exclude wildlife attractiveness to prevent the potential increase in BASH risk and reduce human-wildlife interactions.

### **Improved Recreation Areas (Non-Appropriated Funds - NAF)**

The 460th Force Support Squadron has planned a number of major projects near Williams Lake. One project included the establishment of a primitive campground and a more developed campground (Family Camp, AFI Class 1). The NPS Service Center in Denver was contacted concerning the potential use of that area as a family camp area. NPS provided this guidance: that the NPS considers recreation to be resource dependent, and recreation opportunities or activities need to fit the landscape. Furthermore, suggested that designs of recreational areas, including campgrounds, need to preserve the ecology of the area while

optimizing the quality of the recreational experience. In addition, care should be taken that the campgrounds and other recreational facilities do not encroach on the various sensitive areas on the installation. Sensitive areas include vigorous yucca stands, the wetlands along the perimeter fence north of Williams Lake, and the riparian habitats of the drainages entering Williams Lake. These valuable natural areas can be incorporated into the design of the area through trails construction, interpretive signage, and placement of picnic tables. A study was recommended to determine the estimated number of visitors that are expected at the camping areas, in order to determine design specifications for the campground. The NPS recommended that, in some cases the Visitor Experience and Resource Protection (VERP) Framework (Hof 2002) could be useful in developing carrying capacities for activities in a recreation area, as well as associated visitor use management.

### ***7.3 Conservation Law Enforcement***

#### *Applicability Statement*

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

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

In partnership with AFCEC and USFWS, CEMML accomplished a Conservation Law Enforcement Vulnerability Assessment for Front Range Air Force Bases, which BSFB was included. The December 2015 report assessed: "BAFB land ownership is under concurrent jurisdiction, whereby both state and federal officers have authority to enforce regulations on the site. Appropriate state or federal law enforcement authorities are contacted and consulted if and when an incident occurs. Natural and cultural resource law violations, depending on violation type, are enforced by the 460 Security Forces Squadron, 460 CES Natural and Cultural Resource Managers, CPW, USFWS, and the State Historic Preservation Office (SHPO). Procedures for reporting and tracking natural and cultural resource violations on BSFB are the responsibility of the 460 CES Natural and Cultural Resource Managers. If a violation occurs, procedures for reporting are employed as needed, in accordance with the appropriate agency, per federal and state regulations. CEMML further assessed and concluded that, BSFB has limited need for conservation law enforcement and is not needed.

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

#### *Applicability Statement*

This section applies to AF installations that have threatened and endangered species on AF property. This section is applicable to BSFB.

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

There are no federally listed T&E species known to occur on BSFB. The monarch butterfly is federal Candidate species and is known to occur on BSFB. Reference section 2.3.4 *Threatened and Endangered Species and Species of Concern*, for the complete list of federal and state threatened, endangered, candidate species, and species of special concern for BSFB. Other federally listed species found in the vicinity have not been documented and are not expected to occur on BSFB. These listed species are: black-footed ferret (Endangered), Preble's meadow jumping mouse (Threatened), Colorado butterfly plant (Threatened), and Ute ladies'-tresses orchid (Threatened). The USFWS has designated the BSFB area as being within a "block clearance zone" that does not support and is not likely to have Preble's meadow jumping mouse as well as black-footed ferret, and further consultation with the USFWS is not required when impacting potential habitat for these species.

Periodic resurveys and monitoring of known listed species are necessary if they are stipulated in: (1) the 'Terms and Conditions' that implement the 'Reasonable and Prudent' conservation measures rendered in a Biological Opinion from the USFWS or NOAA Fisheries, (2) a USFWS or NOAA Fisheries Species Recovery Plan, or (3) an INRMP, coordinated and approved in accordance with the Sikes Act (16 USC §§ 670a-f). Currently no TEC species meet these requirements (AFMAN32-7003, section 3.39).

In accordance with AFMAN32-7003 (section 3.39), "Follow-up reconnaissance surveys are necessary if the USFWS or NOAA Fisheries determines that a new federally listed species may occur on the installation." The survey methodology, scope, and species considered in the inventory will be determined after consultation with the USFWS.

### **Management of State Listed T&E Species and Species of Concern on BSFB**

#### *Black-tailed Prairie Dog*

The major issues associated with the presence of black-tailed prairie dogs at BSFB are: mission constraints (BASH incidences, infrastructure damage, and construction/training delays); human health and safety (bubonic plague); encroachment; aesthetics; and public interest from outside the base.

Prairie dogs pose flight safety and operational safety hazards due to their burrowing activity (e.g., ejection of rocks and dirt on the runway and cutting through underground power lines servicing runway lights and navigational aids); and their attractiveness as prey to high threat BASH avian species (e.g., raptors). Infrastructure issues are a result of burrowing and chewing activities that impact irrigation, communication, and electrical lines; as well as structural integrity. Construction timelines and budgets can be increased as a result of the association of Western burrowing owls with prairie dog colonies. As a state of Colorado listed "threatened" species, surveys for Western burrowing owls are required where ground disturbing activities will occur.

Prairie dogs pose a threat to human health and safety due to the high incidence of sylvatic plague, which is spread by fleas. Several outbreaks of sylvatic plague (which in humans is known as the bubonic plague) have occurred within the black-tailed prairie dog populations on BSFB though there have been no reported cases involving humans.

Other issues with prairie dogs are encroachment, aesthetics, and public interest. Prairie dogs are highly mobile and can move great distances to expand an existing colony or start a new one. This causes BSFB to expend resources on management every year, thereby reducing the availability of funds for other projects. Prairie dog colonies are thought by some to be unsightly. The burrowing activity of prairie dogs can destroy manicured grounds leaving large areas of bare ground. Though many people consider the prairie dog to be a pest, they are necessary and a part of the natural environment. Because BSFB lies within an urban setting, the base's large areas of open space attracts attention from concerned public that want prairie dogs to be protected. BSFB manages this species to meet their mission requirements, while still managing to appease public interest in the long term survival of the prairie dog. BSFB has partnered with the Pueblo Chemical Depot to reintroduce black-tailed prairie dogs to the base landscape and help offset removal efforts that occur on BSFB. This reintroduction effort could support Western burrowing owl and also black-footed ferret in the future.

#### *Western Burrowing Owl*

The Colorado state listed Western burrowing owl does occur on BSFB. Western burrowing owls are more likely to be found on BSFB between 1 March and 31 October on any given year. Western burrowing owls use burrows for nesting, and they are commonly found in areas occupied by prairie dogs. The major issues

associated with the presence of Western burrowing owls generally relates to mission disruption including BASH incidences, construction delays, and exercise interruption (ground and air training). Additional disruptions can also impact grounds maintenance operations, recreational activities, and MMRP.

Western burrowing owls present a significant BASH hazard when they occupy locations that impact the mission. Because of their perching and flying habits, they could be ingested into a turbine engine while a plane is in the most critical parts of flying (landing and takeoff). Western burrowing owls have been observed using the lights and signs along the runway and taxiways at BSFB to perch. Their low flying behaviour makes them difficult to observe from either the tower, or the cockpit of the aircraft, therefore making them difficult to avoid. If a nesting Western burrowing owl is present within the Wildlife Exclusion Zone and deemed to be a hazard in accordance with the approved base BASH Plan, it will be trapped and relocated by approved and qualified personnel.

The presence of Western burrowing owls at BSFB has resulted in project delays and increased costs. The State of Colorado endangered species regulations requires that any active Western burrowing owl nest have a minimum 660 foot buffer zone between nesting site and any encroachment. Construction projects in, or near prairie dog towns could incur delays if the owls nest is within 660 feet of the project. Once a nest is active, all construction within the buffer must cease until the Western burrowing owl nesting season is over and the owls have moved on or until they can be trapped and relocated. Pre-construction surveys are required in areas where construction activity could potentially result in the "take" of owls or their eggs.

Units engaging in deployment are at greater risk in a combat zone if they have not undertaken pre-deployment training. Military training exercises could face the same limitations as construction, due to the presence of owls. That is, if the activity occurs within 660 feet of an active nest, the activity must cease until the Western burrowing owl nesting season is done and the owls have moved on or until they can be trapped and relocated. Planned recreation activities and grounds maintenance actions could similarly be delayed if Western burrowing owls are nesting in the area.

## **7.5 Water Resource Protection**

### *Applicability Statement*

This section applies to AF installations that have water resources. This section is applicable to BSFB.

### *Program Overview/Current Management Practices*

#### **Watershed Protection**

The concept of watershed protection or watershed management requires the consideration of all land management actions in terms of their impact on the quality and quantity of runoff water from the watershed. The watershed (or drainage basin) is the area defined primarily by topography that drains to a particular point on the landscape, usually a water body, wetland, or point along a stream or ditch. In developed areas, the watershed can also be determined by the network of man-made storm sewer systems. Watershed protection is important to natural resources management because it directly affects surface water quality and the value of aquatic habitats.

BSFB is located in the watersheds of three natural intermittent creeks and one man-made flood-control drainage channel, all of which are tributaries to Sand Creek which drains into the South Platte River approximately 10 miles to the northeast of BSFB. Any materials that enter the installation storm sewer system could affect the quality of stormwater runoff leaving the installation, and subsequently discharging to a creek or drainage channel. Materials which could potentially be carried in stormwater runoff from the

developed areas include: fertilizers, pesticides, and pet wastes; solid waste refuse discarded from vehicles and present on pavements and lawns; fuels, oils, greases, and coolants; deicing chemicals applied to roadways, runways, and aircraft; and sediments, debris materials, and trash from construction sites either during construction activity or from lack of successful revegetation after construction is complete.

All actions that affect the vegetative cover or soil can also potentially affect the quality and quantity of water that runs off the watershed during storm events. Actions include military construction projects (which expose the soil to erosion as well as limit infiltration into the soil by converting permeable surfaces to impermeable surfaces), land management, and grounds maintenance activities (including fertilization, herbicide application, and turf improvement). Chemicals used for maintenance of turf grasses and prevention/control of turf grass pests, diseases, and weeds are of particular concern. Outdoor recreation, as well as supporting maintenance activities (e.g. trail design/construction/maintenance, habitat modification, etc.) and pest management (pesticide application) also affect water quality. Many of these activities are considered nonpoint sources of pollution, which are difficult to manage centrally.

The responsibility of watershed management does not fall entirely on operational personnel. Additionally, grounds maintenance contractors, residents, facility managers maintaining landscaped areas, and general construction contractors must all take responsibility to prevent soil erosion and protect surface waters from nonpoint source pollutants (sediments, pesticides, excess nutrients, and other surface contaminants).

### **Surface Water Quality**

Water quality monitoring is performed as required by the 2021 Stormwater MSGP for Industrial Activities as well as the MS4 Permit. The 2021 MSGP requires selenium monitoring at all outfalls and *Escheria coli* (E. Coli) at outfall 5. Quarterly visual monitoring is done at each industrial outfall. With regard to the Municipal Separate Storm Sewer Systems (MS4) permit, dry weather screening is done at 21 outfalls around BSFB that includes each of the (4) drainage basins (East Toll Gate Creek, Granby Ditch, Murphy Creek and Sand Creek); as with the quarterly visual monitoring, various qualitative parameters are evaluated.

B GAR, as the MS4 system owner and permitted operator, must develop, implement, and enforce a Stormwater Management Plan (SWMP) designed to reduce the discharge of pollutants from the MS4, to protect water quality, and to satisfy Colorado's water quality standards. The SWMP includes management practices, control techniques, and methods appropriate for the control of pollutants in discharges from the MS4. It provides guidance and directives in the areas of: public education and outreach; public involvement/participation; illicit discharge detection and elimination; construction site stormwater runoff control; new development and redevelopment project post-construction stormwater runoff management; and pollution prevention/good housekeeping management.

In accordance with the Department of Defense (DoD) Implementation of Storm Water Requirements under Section 438 of the Energy Independence and Security Act (EISA) dated Jan 19, 2010, all projects that construct facilities with a footprint greater than 5,000 gross square feet, or expand the footprint of existing facilities by more than 5,000 gross square feet are required to maintain predevelopment hydrology and prevent any net increase in storm water runoff, unless determined to be infeasible. DoD defines "predevelopment hydrology" as the pre-project hydrologic conditions of temperature, rate, volume, and duration of storm water flow from the project site. The analysis of the "predevelopment" hydrology must include site specific factors such as soil type, ground cover, and ground slope. Two options are allowed for the determination of the design water volume; either use the total volume of rainfall from the 95th percentile storm or use continuous simulation modeling techniques, published data, studies or other established tools. EPA and Mile High Flood District (MHFD) are the primary sources of information used on BSFB.

Once the design water volume is determined, one or more Low Impact Development Best Management Practices (LID BMP's) are to be incorporated into each project that meets the criteria above. LID BMP's shall be designed in accordance with the Unified Facilities Criteria (UFC 3-210-1 0) Low Impact Development Manual November 2010, (MHFD) criteria or other EPA guidance manuals as appropriate. Maintenance requirements will be developed for each LID BMP. EPA and MHFD are primary sources for general BMP maintenance requirements, but manufacturer's recommendations should be followed when applicable.

### **Deicing Fluid Management**

While BSFB does not routinely deice its airplanes, it does deice mission-sensitive airplanes when necessary. The routine airfield operations practice is to avoid deicing by canceling, postponing, or rescheduling flights. Aircraft deicing is normally performed on the Main Ramp tarmac adjacent to the east side of Building 909. A second infrequently used deicing location is located on the East Ramp. Stormwater carries deicing fluids off the runway, as sheet flow, to adjacent lands. These areas are well vegetated allowing for substantial infiltration or evaporation to occur.

### **Erosion and Sedimentation**

Inadequately controlled runoff from construction-type activities can result in the transport of sediment and other pollutants in stormwater runoff that then enters the installation's stormwater drainage system. Typically such impacts are limited to components of this system because of the relatively small areas and flows involved, and the distances between sites and outfalls to the creeks or drainage channel. Typical impacts to the stormwater drainage system include deposition of sediment in culverts, ditches, or on vegetated ground surfaces. Only infrequently does such discharge reach a creek or drainage channel such as from an unusually large precipitation event or when a project is located adjacent to the creek channel. Discharges of sediment beyond a project boundary are required to be mitigated by either direct removal or other methods, to minimize long-term or permanent impact to either a system component or creek.

BSFB's MS4 permit includes requirements to manage erosion and sediment transport into the stormwater drainage system through the use of appropriate temporary BMP's on construction sites; and permanent or post-construction BMP's on newly developed or redeveloped sites. Construction projects are required to implement various types of temporary BMP's for perimeter control, tracking control, inlet protection, spill control, and waste management. At a minimum, all construction projects disturbing more than one acre are required to develop a Stormwater Pollution Prevention Plan and 460 CES reviews these plans for general compliance with the requirement set forth in the CGP. Additionally, permanent or post-construction BMP's can include those characterized as LID type practices such as permeable pavements and bioretention swales (See above comments regarding EISA 43-8 requirements).

### **Riparian Buffer Protection**

Vegetated riparian buffers serve many important functions in protecting water resources. By stabilizing the stream banks and shorelines with vegetation, erosion and sedimentation rates are reduced. Increased sediment loads are associated with the physical destruction of habitat such as the smothering of bottom communities and spawning beds. Vegetated riparian areas also stabilize water levels. For lotic ("running water") systems, stable water levels and velocities result in reduced scouring of stream banks (i.e., reduced erosion), reduced pollutant transport, reduced turbidity, increased species diversity, and increased habitat for aquatic species. For lentic systems ("standing water"), stable water levels result in balanced thermal and mixing characteristics, reduced turbidity, and increased aquatic species diversity. High turbidity levels in water bodies often result in reduced prey capture rates, and the suspended solids associated with turbidity

can be lethal to fish species by clogging their gills. In many cases, the vegetation also absorbs excess overland water flow. The primary concerns at BSFB evolve from increased land development resulting in soil erosion and loss of riparian buffer zones.

### **Fuel Storage**

Another potential contaminant sources includes chemical and fuel storage facilities. BSFB currently protects its watershed through compliance with a number of federal, state, local, and DAF environmental regulations that require the base to have detailed spill control and response procedures such as those outlined in the Spill Prevention, Control and Countermeasures (SPCC) Plan. The objective of these regulations is to prevent pollutants (e.g., fuels, solvents) from entering the installation storm sewer system, thus protecting downstream creek or drainage channel waters.

## **7.6 Wetland Protection**

### *Applicability Statement*

This section applies to AF installations that have existing wetlands on AF property. This section is applicable to BSFB.

### *Program Overview/Current Management Practices*

Wetlands Project on BSFB, Colorado (Natural Resources Consulting, 2014) was a study of the wetlands, potential wetlands, and waters of the U.S. located within the accessible sectors of BSFB to re-assess, re-survey, and re-baseline wetlands known to occur within the installation. Wetlands identified were classified using the Cowardin system and U.S. Army Corp of Engineer standards. The project objective was to identify and map areas within the installation that qualify as wetlands/waters of the U.S. under Section 404 of the CWA. The information collected was used to determine what areas within BSFB would require a detailed wetland delineation study and possible 404 permit application if future plans were to develop land which would require the discharge of fill material or other surface disturbance. Two major areas, unnamed tributary to Sand Creek and Williams Lake including the Williams Lake Drainage, were identified and 16.026 acres were found to be potential wetlands/waters of the U.S. Further, this assessment, identified, located, mapped, and updated the wetland resources to create a comprehensive GIS wetland layer within Air Force GeoBase for the installation. Presently, any wetland specific maps created and information gathered during these efforts is used in base operations, natural resource management, and installation development decisions. Lastly, Volume 2: Appendix E of this report memorialized all relevant historical wetlands reports on and for BSFB. Issues associated with wetlands on BSFB include: BASH incidences (wildlife attractant), construction delays (permitting, EO compliance, FONPA), and pest management.

## **7.7 Grounds Maintenance**

### *Applicability Statement*

This section applies to AF installations that perform ground maintenance activities that could impact natural resources. This section is applicable to BSFB.

### *Program Overview/Current Management Practices*

The following subsections describe procedures for reviewing service contracts (i.e., mowing, urban forestry, and pest management) and water management issues related to ground maintenance. These subsections should be used as a basis in the development any Grounds Maintenance Performance Work Statements (PWS's) for the installation.



## Service Contracts

Although BSFB is relatively small, the installation will likely play an increasingly larger role in the preservation of sensitive species in the Denver Basin. It is, therefore, paramount that BSFB manages natural resources in accordance with ecosystem management principles. As described in section 2.2.2 Landforms, BSFB is divided into three major areas which include the improved areas, the semi-improved areas, and the unimproved areas.

The maintenance of improved and semi-improved grounds often involves the intensive use of labor, equipment, water, and other materials. Installation maintenance personnel and government contractors perform the grounds maintenance activities at BSFB. The COANG 140th Wing is responsible for maintenance in its licensed area (e.g. airfield and associated buildings). Most land management and grounds maintenance activities are funded with operations and maintenance (O&M) funds. Typical grounds maintenance activities completed consist of lawn mowing, mulching, tree planting and pruning, and snow removal. BSFB has developed a grounds maintenance contract that divides the installation into improved and semi-improved areas. Improved areas require more intense management and is the primary focus of the grounds maintenance contract.

## Water Management

Grounds maintenance should address and integrate water management and water management-related issues (including irrigation) into ground maintenance plans. Using potable city water for irrigation is not a sustainable practice in the arid climate of Colorado and poor soils on BSFB.

## Other Potential Impacts to the Watershed

Landscape maintenance of improved and semi-improved grounds and construction activities often involves the intensive use of various resources (e.g., labor, equipment, water, and other materials). In addition, improved and semi-improved grounds typically receive chemicals such as fertilizers and pesticides. The potential for impacts of these chemicals to the surrounding environment is present. These chemicals can become a nonpoint source of pollution to groundwater or surface water when managed improperly. Furthermore, the use of nonnative species of plants could increase the need to rely on these chemicals for the maintenance of the landscape. Particular issues in the Presidential Memorandum of 26 April 1994, entitled "Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds," address nonpoint source pollution. These include the use of regionally native plants for landscaping (to protect local natural heritage; provide wildlife habitat; and reduce fertilizer, pesticide, and irrigation costs) and native seed to prevent pollution by reducing fertilizer and pesticide requirements, using IPM techniques, recycling/composting green waste, and minimizing runoff. Fertilizer and pesticide applications on the installation have been minimized through an only "as need" approach, and by restricting performance of applications to contractors or licensed installation personnel. These steps were taken to comply with Merit 2 of the DAF Integrated Pest Management Program (IPMP), which required each DAF installation to reduce its pesticide use by 50 percent by the year 2010.

## 7.8 Forest Management

### *Applicability Statement*

This section applies to AF installations that maintain forested land on AF property. This section is not applicable to BSFB.

*Program Overview/Current Management Practices*

BSFB has limited native forest resources. The installation does have a significant urban forest management requirement resulting from the large number of landscape trees associated with existing landscaping, new construction landscaping, and base beautification efforts. Special consideration must be given during species selection and siting of tree plantings to avoid creating attractants to birds, insects, and other wildlife that may increase BASH risk. Tree species selection also drives the need for additional considerations with respect to water conservation, maintenance, etc. Landscaped plant species that are known to attract invasive species (e.g. emarold ash borer and Japanese beetle).

**Urban Forestry**

BSFB has made a considerable investment in beautifying the installation by planting ornamental trees throughout the improved areas. The planting of trees in areas north and east of the airfield is discouraged to avoid increasing risk of BASH. The installation possesses a significant urban forestry resource. Native trees at the installation are incorporated as part of the landscaping and are present mostly along riparian corridors and around Williams Lake. An advantage of planting trees is that they help keep buildings cooler in summer and warmer in winter, reduce pollution, and help meet energy consumption reduction goals outlined in EO 12902, Energy Efficiency and Water Conservation at Federal Facilities.

Urban forestry programs at AF installations in the United States and U.S. territories has the option to satisfy the criteria for a Tree City USA designation from the National Arbor Day Foundation, IAW AFMAN32-7003, section 3.72.3. BSFB was designated a Tree City USA for the 16th year in April 2021 and will continue annual efforts to remain designated in future years. An Urban Tree Inventory was accomplished in September 2014, to identify all urban trees on BSFB, map their location, assess their condition and monetary value, and to document any recommended maintenance. This valuable information is utilized to support the installation Grounds Maintenance contract and support maintaining military mission readiness.

The BSFB IFS provides a list of approved plant species. An excerpt of the plan, containing this list can be found in Appendix Ground Maintenance.

**7.9 Wildland Fire Management***Applicability Statement*

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

*Program Overview/Current Management Practices*

Wildland fire is a natural component of the shortgrass prairie ecosystem found at BSFB; therefore, the vegetation is adapted to recurring fire. Fire maintains plant structure, function, and composition of the shortgrass prairie and a recurring fire regime encourages biodiversity and wildlife habitat integrity. Increased urbanization is causing shortgrass prairie to dwindle inside and outside the base. Current urban expansion of the City of Aurora is encroaching upon installation boundaries, increasing the potential for off-base fires to enter and threaten operations. Human-caused fire can have a large effect on funding priorities and ecological functions/features.

Extensive shortgrass prairies on BSFB represent a potential threat of wildland fire because of the buildup of plant material fuels. Fuel loads (i.e., accumulated live and dead vegetation matter) and drought conditions in the region increase the potential for both natural and man-made fires on and off BSFB. The continued

growth of the population on BSFB and in the surrounding communities present an increased risk for potential wildfires.

The colonization of BSFB by non-native weed plants, especially cheatgrass, is a concern for fuel and fire management because they alter the normal fire regime by changing the nature of the fuel. Cheatgrass, which now occurs throughout BSFB, is a highly flammable and flashy fuel that will increase fire intensity and rate of spread compared to native grasses. Cheatgrass also extends the fire season by one or two months because it senesces ("grows old") in late spring whereas native grasses senesce in late summer or early fall. Fire also increases nitrogen in the soil that cheatgrass is adapted to use very efficiently and encourages growth.

There are several potential sources of natural and human-caused wildland fire on BSFB. Lightning is the only natural cause of fire on BSFB, and thunderstorms are common along the Front Range during warmer months. Human-caused ignition sources are numerous and can be divided into two main categories: arson or accidental fire and military-related fires. Arson or accidental fires are always a risk because of the proximity of non-military residential housing off BSFB. Fireworks, off-highway vehicles (OHV), downed power lines, discarded smoking material, children playing with matches, and discarded hot charcoal briquettes are common sources of wildland fire. Military activities associated with training may cause wildfire. Accidents associated with aircraft fueling and operations are additional potential ignition sources.

Air Force Wildland Fire Safety Center requires, AFMAN32-7003, Section 3P - Wildland Fire Management, requires BSFB to have a Wildland Fire Management Plan (WFMP). An approved WFMP for BSFB was signed 9 October 2016 and is reviewed annually.

### **7.10 Agricultural Outleasing**

#### *Applicability Statement*

This section applies to AF installations that lease eligible AF land for agricultural purposes. This section is not applicable to BSFB.

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

BSFB has no plans for commercial out-leases for grazing or croplands; however, there may be potential for individual permits for community gardens, small-scale bee-keeping, or other personal-consumptive use agricultural programs. If such programs are developed, they should minimize/exclude wildlife attractiveness to prevent potential BASH's and reduce human-wildlife interactions.

### **7.11 Integrated Pest Management Program**

#### *Applicability Statement*

This section applies to AF installations that perform pest management activities in support of natural resources management, e.g. invasive species, forest pests, etc. This section is applicable to BSFB.

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

The 460 CES Pest Management Section is governed by DODI 4150.07 and AFI32-1053 Integrated Pest Management Program. Their scope of work is defined in the installation Integrated Pest Management Plan (IPMP). Pest Management's number one priority is managing pests and vectors of medical importance. The following is a list of potential pest-borne diseases and their vectors/hosts:

- Bubonic Plague vectored by the oriental rat flea found on prairie dogs (or other rodents)
- Rabies carried by bats, coyotes, raccoons, skunks, feral dogs, and cats
- Lyme Disease and Rocky Mountain Spotted Fever vectored by ticks
- Tularemia carried by rabbits, can be vectored by ticks, fleas and horseflies
- West Nile vectored by mosquitoes
- Endemic Mycoses (Histoplasmosis, Blastomycosis & Coccidioidomycosis) carried by birds, especially pigeons and bats
- Hantavirus found in deer mouse feces/urine

Due to the possibility of immune reaction, the following are also considered medically important pests: rattlesnakes, black widow, centipedes, bees, and wasps. A large portion of Pest Management's responsibility involves controlling many of the above-mentioned nuisance vertebrate and insect pests/vectors. During the summer months, Pest Management's focus shifts to noxious and invasive weed control. These weeds are important to control because they grow unchecked by natural enemies such as insects or diseases. It is also essential to minimize any weed growth along the perimeter fence of the installation, the Aerospace Data Facility (ADF) and the 2 SWS fence. Information and management procedures on all targeted pests can be found in the IPMP.

Flight safety is the overriding priority at BSFB however, BSFB must maintain compliance with federal and state laws and Air Force specific instructions and directives. The Wildlife Exclusion Zone is managed by the USDA for lethal and non-lethal wildlife control. The 460 CES Pest Management shop collects/disposes of dead animals and provides rabbit/prairie dog control throughout the base. Proposed projects to reduce BASH vulnerability include replacing ~30,000 LF of perimeter fence with 1 ¼ inch chain link buried 4 feet below ground (CRWU171009 programmed with 460 CES/CENP as of November 2021), replacing airfield and perimeter fence with the 1 ¼ inch chain link for isolated *ad hoc* repairs to existing fence and pest barriers, installing pest barriers on airfield gates, trimming/removing trees from around flight line areas, and ensuring proper grass mowing height.

### **Pesticides**

The Civil Engineer Installation Management Flight Chief (CEI) is responsible for obtaining and managing all NPDES permits for each installation. The installation pest management coordinator will maintain a comprehensive and updated IPMP that will be developed IAW guidance in DoDI 4150.07 to reflect sound IPMP practices to include: all pesticide use by in-house and contract operations. A copy of this IPMP, with a current pesticide inventory will be provided to the CEI to determine what pesticides will require permits for in-house or contract use, but can also be obtained from the Installation Pest Management Coordinator. The installation environmental attorney at the Base Legal Office will answer questions from the CEI environmental program manager responsible for NPDES permits or Installation Pest Management Coordinator about how to meet federal and state regulatory requirements. BSFB uses pesticides to maintain grounds, habitat for wildlife, vegetation, safety, and prevent disease vectors. Only pesticides approved by the Armed Forces Pest Management Board (AFPMB) & MAJCOM Pest Management consultant can be used on the installation. Pesticides can only be applied on the installation by DoD or state certified applicators (IAW DoDI 4150.07 and AFI32-1053). Applicators are required to maintain accurate pesticide application records using DD FORM 1532-1, listing the date, site, target pest, product EPA registration number, and applicator. Care must be taken to minimize drift or runoff if weather conditions are not favorable, and to minimize adverse impacts to water or aquatic organisms. Applicators must read the label and follow carefully and use pesticides judiciously as part of an effective IPMP program.

### **Invasive Species Management**

The IPMP (see Tab Integrated Pest Management Plan) provides directives on how BSFB will deal with invasive species on the installation. While invasive plant species can be largely controlled at BSFB, it is more difficult to manage invasive insects that can readily move throughout the installation.

### **Invasive Plant Species Occurring on BSFB**

Increases in invasive species have resulted in the decline of native habitats and wildlife hosting a variety of causes, but most can be linked to changes following man-induced alterations to natural habitats. EO 131 12 (64 FR 6183, 8 February 1999) requires federal agencies to provide for restoration of native species and habitat conditions in ecosystems that have been invaded and to control invasive species and to reduce their ecological and economic impacts. Noxious or invasive weeds and exotic plants have invaded the terrestrial landscape at BSFB. Weedy disturbed areas at BSFB appear to consist of two types: 1) areas that have been disturbed by the excessive presence of prairie dogs; and 2) areas that were disturbed during construction activity. These disturbed areas are often the source of noxious weeds for the entire installation.

In 2019, the Colorado Natural Heritage Program (CNHP-CSU, 2020) conducted an invasive plant survey on BSFB to document the presence and extent of invasive plant species at the base. The purpose of this project was to: 1) identify invasive species that occur on BSFB; 2) locate and map target plant species; 3) identify the impacts of invasive species on natural resources and the military mission; and 4) develop a management strategy. The survey did not map cheatgrass (*Bromus tectorum*) because it is too widespread for mapping to be useful. Common mullein (*Verbascum thapsus*) and field bindweed (*Convolvulus arvensis*) were also not mapped because they are list C species that are widespread across within the state and control is not likely. Curly dock (*Rumex crispus*), kochia (*Kochia scoparia*), and Russian thistle (*Salsola kali*) are unlisted species and were also not surveyed. Puncturevine (*Tribulus terrestris*), yellow flag iris (*Iris pseudacorus*), and yellow toadflax (*Linaria vulgaris*) were not found in the 2019 survey but were found in the 2014 survey. A total of 12 invasive species were identified:

Canada thistle (*Cirsium arvense*)  
 Common teasel (*Dipsacus fullonum*)  
 Dalmatian toadflax (*Linaria dalmatica*)  
 Diffuse knapweed (*Centaurea diffusa*)  
 Hoary cress (*Lepidium draba*)  
 Houndstongue (*Cynoglossum officianale*)  
 Leafy spurge (*Euphorbia esula*)  
 Musk thistle (*Carduus nutans*)  
 Russian knapweed (*Acroptilon repens*)  
 Russian olive (*Elaeagnus angustifolia*)  
 Scotch thistle (*Onopordum acanthium*)  
 Tamarisk (*Tamarix* spp.)

The highest priority species are those that have small populations with a high likelihood of control: Russian olive, tamarisk, hoary cress, and yellow toadflax. For management of invasive plants, BSFB is broken down into four treatment habitats: fields, fence lines, riparian areas, and roads and construction staging areas. The Unpaved Roads and Construction Areas and High Priority Fields are the highest priority for treatment. Unpaved roads and staging areas are key vectors for movement of invasive plants, while high priority fields have a relatively low density and diversity of invasive plants and high wildlife value. Riparian areas are also a higher priority area for treatment, but there are limitations on treatment options available.

The various treatment options for each species are discussed in Tab 1 Noxious Weed Survey of BAFB, as well as an overview of historical treatments and the changes in invasive plants since the 2004 survey. There was a biocontrol program on BSFB from 2003 to 2015 which has affected a few species. There have been

large changes in the distribution of most invasive plants between 2004 and 2019. The cause is likely due to efforts to eradicate prairie dogs from base which also causes large changes in vegetative cover in a short period of time. In addition, Tab 1 includes maps of each invasive species in 2019; detailed species summaries; a photo log of the species; a management urgency ranking system; and management recommendations for each species. It is highly recommended to institute a vigorous revegetation program to ensure that any disturbed soil is not infested with invasive plants before native ones get a chance to establish.

### **Measures to Prevent Introduction of Invasive Plant Species on BSFB**

Implementing aggressive management and control measures is critical to preventing establishment of these invasive species on the base. Precautionary measures recommended for BSFB include the following best management practices in areas where activities result in ground disturbance (e.g., road construction, installation or removal of facilities, etc.).

- Identification is the first step in forming a weed management plan. Early detection is always the best defense against noxious weeds. Treat intensely when a new or small patch is found. Educate operations and maintenance supervisors and managers on weed identification and the importance of controlling and preventing infestations.
- Require contractors or departments to clean equipment and vehicles with high pressure air or water prior to arriving and again before departing the installation. Cleaning should also occur within project areas especially when coming in contact with unavoidable infestation zones. Cleaning should concentrate on the undercarriage, axles, frames, cross members, running boards, and front bumper/brush guard assemblies. Vehicle cabs should be swept and refuse disposed of in waste receptacles. Care should be taken that wash water be retained on site to prevent weed material transport.
- Use certified invasive weed-free imported materials (e.g., straw bales, erosion control seed, and fill material) when and where needed during construction, reclamation, maintenance, and operations.
- Conduct follow-up invasive weed surveys and weed control treatments during the growing season following completion of construction and revegetation activities in all construction and reclamation areas. The surveys may be conducted concurrently with reclamation monitoring activities.
- Reseed disturbed sites with competitive and native species. In areas where applicable grasses are recommended, use species that will be tolerant of broadleaf herbicides, which can later be used to spot treat any broadleaf weeds.
- After an area is seeded establish a maintenance schedule to continue to water and fertilize seeded areas to promote establishment. The maintenance activities should continue through a minimum of one growing season; however, it is preferable to complete the monitoring through two growing seasons.
- When tilling, till only in the weed patch so roots and seeds do not spread. Always clean equipment and machinery on site after working in a weed patch to prevent spread.
- In areas that are routinely mowed, set mowing schedules in such a manner as to mow the weeds before they go to seed and schedule subsequent mowing often enough to prevent seed production.
- Assert in any landscape plans the maximum use of native plants, minimal use of exotics that are not considered invasive species, and non-use of exotic, invasive species to minimize impacts to biodiversity, native plant composition, and endangered species with habitat loss.

### **Strategies to Prevent the Spread of Invasive Species on BSFB**

Invasive plants are very aggressive, highly productive plants that actively intrude or encroach upon and replace native and agricultural plants. Invasive weeds can crowd out or out-compete native grasses and other plants that provide habitat for wildlife and livestock. In addition to the control and eradication methods

listed in Tab 1 Noxious Weed Survey of BAFB recommendations are provided to prevent infestations of known and other invasive plant species occurring on BSFB.

Equally, The USDA's Animal and Plant Health Inspection Service (APHIS) has proposed these strategies to prevent the spread of established invasive plants: The first line of defense against introduced invasive plants is early detection of new infestations. Early detection and reporting of new plant species or infestations, such as that presented in annual survey reports, is critical. The second line of defense is to contain and eradicate incipient infestations as soon as they are detected. Several control methodologies and recommendations are presented above for the species known to occur on BSFB. The third line of defense is to prevent movement of invasive species into non-infested areas. This includes not only prevention or spread of species from the base to non-infested areas on and off base, but also prevention of additional infestations of other invasive species on the base from off-base sources. In many cases this can be achieved through careful management practices that prevent the transport and establishment of noxious plant species. The fourth line of defense against invasive plants is to develop effective and environmentally sound methods and procedures for control of large infestations.

### **Water-Related Nuisance Species**

Invasive and noxious species have displaced native species in portions of the aquatic resources on BSFB. A normal distribution of aquatic species in water bodies is essential for maintaining overall ecosystem health and diversity. Large increases in one species tend to cause species to outcompete other aquatic species. Large population increases are relatively common in algal species, particularly blue-green algae. Algal blooms are typically the result of high nutrient concentrations (especially phosphorus) and also of increased temperatures. Algal blooms usually occur during the summer months and have been recorded in Williams Lake.

A different class of noxious species includes terrestrial plant species that depend on water bodies for their survival and reproduction. Salt cedar (*Tamarix* spp.) and leafy spurge (*Euphorbia esula*) are nuisance species that have been observed in the installation's riparian areas and surrounding Williams Lake. Salt cedar can out-compete native vegetation, interfere with natural plant succession and nutrient cycling, and tax water reserves. Leafy spurge is competitive, is one of the first plants to emerge each spring, and uses moisture and nutrients that otherwise would be available for desirable vegetation. Additional information on invasive species may be found in Tab 1 Noxious Weed Survey of BAFB.

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

#### *Applicability Statement*

This section applies to AF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section is applicable to BSFB.

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

The focus of the BASH program is to prevent wildlife-related aircraft mishaps and reduce the potential for bird/wildlife hazards to aircraft operations. Accomplishing this goal requires knowledgeable natural resources management on and adjacent to installation airfields. INRMPs must support the installation's BASH Plan and the requirements of AFI91-202 - The US Air Force Mishap Prevention Program, AFI91-204 - Safety Investigations and Reports, and AFI91-212 - BASH Management Techniques. To this end, the following natural resources management items have been identified as increasing BASH potential and require careful attention in the INRMP.

- Installation construction and improvement projects
- Grass height and land/vegetation management
- Wetlands
- Drainage ditches and standing water
- Pest management
- Invasive species
- Bird/wildlife management techniques
- East Toll Gate Creek
- Williams Lake

BASH references and supporting documentation is provided in Associated Plans Tab Bird/Wildlife Aircraft Strike Hazard (BASH) Plan.

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

#### *Applicability Statement*

This section applies to AF installations that are located along coasts and/or within coastal management zones. This section is not applicable to BSFB.

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

N/A.

### ***7.14 Cultural Resources Protection***

#### *Applicability Statement*

This section applies to AF installations that have cultural resources that may be impacted by natural resource management activities. This section is applicable to BSFB.

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

A comprehensive cultural resources inventory was conducted at BSFB in 1989 and 1990 that included a pre-field report describing existing data and a review of the archeological literature available for the surrounding area. A total of 40 archeological sites (historic and prehistoric) and 26 isolated finds were recorded during the 1989-1990 inventories. Of the 43 recorded sites, 35 were prehistoric sites, 5 were historic properties related to the military occupation of the land, and 3 had both prehistoric and historic components. The isolated finds consisted of 25 prehistoric items and one historic item dating to pre-military use of the land. All of the sites and isolated finds recorded in 1989-1990 were found determined to be not eligible for listing to the NRHP. One additional isolated find was discovered inadvertently in 2013 and determined to be not eligible for listing on the NRHP. A base wide survey was conducted by the Texas State University (TSU) in June 2018. The TSU survey resulted in an increase from 43 archaeological sites and 25 isolate finds to 54 archaeological sites and 31 isolated finds on BSFB. The survey also resulted in seven “needs data” sites (5AH.481, 5AH.482, 5AH.483, 5AH.528, 5AH.536.1, 5AH.3753, and 5AH.3756) that will need further survey’s to determine the eligibility of the resources for the NRHP. Until the status of these sites are determined, they will be considered as if they are NRHP-eligible.

In December of 2020, BSFB conducted an 11-acre survey of undeveloped land in a WWII cantonment area for a proposed Recreational Vehicle Lot. The survey located 5 newly recorded archaeological resources, historic roads associate with WWII-era buildings. SHPO concurred that none of the resources are eligible for inclusion in the NRHP. BSFB currently has 59 archaeological sites recorded, 52 of the sites are non-



eligible for the NRHP.

A Historic Building Inventory and Evaluation was completed in June 2004. This inventory and evaluation identified six buildings eligible for listing on the NRHP: two hangers (Buildings 801 and 909) and the exteriors of four of the radomes (Facility #s 402, 403, 404, and 405). A Historic Building Inventory and Evaluation was conducted in January, 2018. The survey resulted in two radome buildings (Buildings 432 and 434) being recommended eligible for the NRHP. The SHPO concurred both buildings to be eligible for listing on the NRHP and included four additional buildings (Facility #s 431, 433, 630, and 814) to be eligible for listing on the NRHP. As of 2018, twelve of the 447 buildings and structures on base have been identified as NRHP-eligible.

These inventories were used to develop an ICRMP for BSFB and outline the installation's policies and procedures for the protection, management, and preservation of all prehistoric and historic properties as required by Federal laws, regulations, and DAF policy.

### **7.15 Public Outreach**

#### *Applicability Statement*

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

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

Public access to BSFB is restricted, requiring scheduled visitors to sign in at the main gate with photo identification and proof of vehicle registration and insurance. However, developing outreach programs for military personnel and the general public is a high priority at the installation as long as such programs can be accomplished within military mission constraints.

BSFB hosts Arbor Day and Earth Day festivities each year, promoting native species, xeriscape landscaping, and water conservation. Additional events could be planned in coordination with ribbon-cutting ceremonies for new construction or anniversaries of the installation's commission. Interpretive signs along the jogging trail would also facilitate education regarding the native ecosystems and associated species. For the public at large, outreach opportunities include dissemination of natural resources management information via the base's website or the local media; brochures, posters, videos and other natural resources program educational materials.

### **7.16 Geographic Information Systems (GIS)**

#### *Applicability Statement*

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

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

GIS is an essential tool for managing natural resource requirements, enabling end-users to instantly display current base-wide conditions, and make informed decisions based on comprehensive visual analysis. BSFB utilizes GeoBase to manage geo-spatial data including the Common Installation Picture (CIP) and various Functional Data Sets (FDS) including the Environmental FDS (EFDS).

Beginning in FY10, Asset Management Natural Resources (CEAN) (and the respective data stewards/media managers for installations and HQ AFSPC) are responsible for reviewing and verifying

geospatial features represented in the EFDS, no later than 31 December of each calendar year. This will ensure geospatial features are current, complete, and accurate. This guidance is applicable to all AFSPC Main Operating Bases (MOBs) and Geographically Separated Units (GSUs).

### **Data Validation and Updates**

Current and detailed data is vital to accurate and ongoing analysis and therefore, requires frequent updates from identified data stewards. Using ESRI ArcServer software, the GeoBase office can make necessary data accessible to identified end-users and data stewards for display and data management. The data stewards will assess and review available environmental data from all sources within AFSPC to identify any deficiencies and make updates in order to completely develop the EFDS. Data stewards will document findings and discrepancies from his/her review and provide all documentation (to include written statements) to the Asset Manager (CEA).

Attribute information and metadata related to spatial data is a vital element of the EFDS and must also be kept current. Minimum attribute requirements for the EFDS have been identified by HQ AFSPC/A7A and data stewards are responsible for collecting necessary attribute data and populating attributes. Metadata is used to document standards and practices used to create and update the EFDS data. Information included in the metadata fields may include: origin or source of data, data of creation, data last updated, description, contact information, spatial reference, spatial accuracy, keyword, use restrictions, etc. CEAN Program Managers will update the metadata tables for all AFSPC EFDS layers.

Asset Managers (460 CES/CEA) will certify that an annual review of the EFDS has been performed by the respective data stewards/media managers and will provide the overall status on EFDS development and maintenance to AFSPC/A7A for all MOBs and GSUs. Asset Managers will submit this review no later than 31 December of each calendar year.

### **Training and Technical Support**

To ensure all necessary updates are captured and are reflected in the GIS data, the GeoBase office will conduct training modules with all identified data stewards. When the natural resources dataset is current and complete, decision makers can view the data and gain an understanding of how specific layers interact. In a single map, issues become apparent when spatial data overlaps, intersects, or otherwise conflicts with another layer. For example, the base comprehensive planner might be evaluating two proposed locations for facility that is to be built in upcoming years. Spatial data showing the proposed locations can be added to the GIS data along with existing natural resource data to evaluate the sites. If one of the proposed locations is on culturally important land, or overlaps with species habitats, it would make sense to choose the alternative site.

The Technical Support Element (CEPT) will also provide technical support to Environmental Element program managers regarding geospatial processes and technology availability to support their management of EFDS data. CEPT will provide oversight regarding geospatial capabilities for the installation. They are the gate keepers of the database assuring that geospatial data conforms to Air Force standards. CEPT further assures that the EFDS for their Wing is stored and available in the AFSPC GeoBase system architecture.

## **8.0 MANAGEMENT GOALS AND OBJECTIVES**

The installation establishes long term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported

by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize AF missions, this section may list specific goals and objectives aimed at eliminating, reducing or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by the preparers of the INRMP from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire natural resources program.

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

#### *Installation Supplement – Management Goals and Objectives*

The INRMP will define natural resources management goals and objectives that are consistent with the military mission and ensure no net loss in the capability of installation lands that support the military mission. The following table of INRMP goals and objectives provide short and long-term targets for conservation and management activities. They directly support programming (ACES-PM) and budgeting of natural resources activities (projects) in accordance with the SAIA, AFMAN32-7003, and AFI32-7001. INRMP goals and objectives reflect statutory and regulatory, Executive Order (EO), and DoD and Air Force policy directives for federal land management and environmental conservation programs. They also support regional, state, and local initiatives to ensure consistency of management across the landscape and accomplishment of mutually-beneficial actions to achieve strategic goals.

This INRMP is a “living document based on several short-, medium-, and long-term planning goals. Short-range goals include activities in a 6- to 10-year period. Long-range goals usually require more than 10 years to reach. A majority of the objectives discussed in this INRMP are based on short-term 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 changing conditions such as a new mission that requires protective management processes.

Management goals and objectives are policy statements providing overall program direction and specific management practices for the natural resources program on BSFB. Goals are intended to direct resource management programs for the long term. Objectives are more specific than goals, and are directives to help achieve the larger goals; some may be able to be achieved over the next five years (2017-2021). Further, projects detail the steps needed to achieve an objective, which lead to achieving a particular goal. Table: Management Goals and Objectives presents a summary of the BSFB goals and objectives followed by a listing that includes each of the discrete projects associated with meeting each objective, hence goal. Tasks outlined under the defined objectives require no programmed funding level of effort aside from a full time employee NRM, whereas projects require funding and are programmed in the Air Force Automated Civil Engineering System (ACES).

These goals address the need to manage natural resources at BSFB. Natural resources are those associated with water and land, and are not part of the built environment. They include wildlife, birds, plants, soils, wetlands, trees, outdoor recreation areas and other unimproved and landscaped areas, etc. BSFB natural areas are subject to substantial human activity. On BSFB, the ecosystem is comprised primarily of short-grass prairie, birds, small mammals, wetlands, and riparian areas.

**Table: Management Goals and Objectives**

Goal #	Goal	Objective #	Objective	INRMP Functional Area (Migratory Birds, Wetlands and Floodplains, etc.)	Office of Primary Responsibility (OPR)	Office(s) of Coordinating Responsibility (OCR)	Source (Plan, EO, AF Policy, Measure of Merit)
8.1	REMAIN IN COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS REGARDING NATURAL RESOURCES	8.1.1	<i>Maintain the most current and accurate INRMP practical which defines the natural resources management actions performed on BSFB.</i>	7.0 Natural Resources Program Management	460 CES/CEIE	B GAR/JA B GAR/CC 460 MSG/CC 460 CES/CC	Sikes Act DODI 4715.03 AFMAN32-7003
		8.1.2	<i>Develop and maintain partnerships with other relevant organizations on base that impact, or are impacted by, the INRMP to ensure mutual compatibility of various base plans and contract actions.</i>	7.0 Natural Resources Program Management	460 CES/CEIE	B GAR/JA B GAR/CC 460 MSG/CC 460 CES/CC	Sikes Act DODI 4715.03 AFMAN32-7003
		8.1.3	<i>Maintain BSFB Natural Resources Management records.</i>	6.0 Natural Resources Program Management	460 CES/CEIE	B GAR /JA B GAR /CC 460 SW/SE 460 MSG/CC 460 CES/CC	Sikes Act DODI 4715.03 AFMAN32-7003
		8.1.4	<i>Maintain federal environmental compliance of soil and water resources on BSFB through the promotion and management of soil and water resources.</i>	7.5 Water Resource Protection	460 CES/CEIE	460 CES	Soil and Water Conservation Act (16 USC 2001) DODI 4715.03 BSFB MS4 Permit # COR042003 BSFB Multi-Sector General Permit #COR05F004  Construction General Permit # COR10F01Y

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							AFI32-1067 Engineering Technical Letter 3  FIFRA  AFMAN 32-7003
8.2	EFFECTIVELY MANAGE WILDLIFE THROUGH THE IMPLEMENTATI ON OF AN ECOSYSTEM MANAGEMENT APPROACH, PROTECT ENDANGERED OR THREATENED SPECIES TO INCLUDE FEDERAL CANDIDATE SPECIES, AND PROTECT MIGRATORY BIRDS IN BALANCE WITH HUMAN HEALTH AND SAFETY	8.2.1	<i>Utilize adaptive management to monitor basewide fish and wildlife species surveys to establish status of these resources.</i>	7.1 Fish and Wildlife Management	460 CES/CEIE	B GAR /JA 460 SW/SE 460 CES 140 CES 140 SE	Sikes Act DODI 4715.03 AFMAN32-7003 Migratory Bird Treaty Act
		8.2.2	<i>Utilize habitat modification strategies to effectively manage wildlife populations.</i>	7.1 Fish and Wildlife Management	460 CES/CEIE	B GAR /JA 460 SW/SE 460 CES 140 CES 140 SE	Sikes Act DODI 4715.03 AFMAN32-7003
		8.2.3	<i>Assess methods to reduce the attractiveness of the installation to hazardous wildlife.</i>	7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)	460 CES/CEIE	B GAR /JA 460 SW/SE 460 CES 140 SE 140 CES	AFMAN32-7003 AFI91-202 AFI91-204 AFI91-212 BSFB BASH Audit Report
		8.2.4	<i>Conduct surveillance /surveys of key species (when appropriate).</i>	7.4 Management of Threatened and Endangered Species and Habitats	460 CES/CEIE	B GAR /JA 460 SW/SE	Endangered Species Act NEPA Birds of Conservation Concern (BCC) DODI 4715.03

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		8.2.5	<i>Ensure planning and coordination efforts are being conducted regarding construction, improvement projects, and outdoor training activities to minimize affects to endangered or threatened species to include species of concern.</i>	7.4 Management of Threatened and Endangered Species and Habitats	460 CES/CEIE	B GAR /JA 460 SW/SE 460 SW/XP 460 CES 140 CES	Endangered Species Act Birds of Conservation Concern (BCC) 32 CFR 989 40 CFR 1500-1508 AFI32-1015
		8.2.6	<i>Contribute to conservation of migratory birds, to the extent practicable within the constraints of the military mission.</i>	7.1 Migratory Birds	460 CES/CEIE	460 CES	Migratory Bird Treaty Act Bald and Golden Eagle Protection Act EO 13186 DoD Armed Forces MOU with USFWS AFMAN32-7003
		8.2.7	<i>Avoid or minimize impacts on birds federally protected by law.</i>	7.1 Migratory Birds	460 CES/CEIE	460 CES	Migratory Bird Treaty Act Bald and Golden Eagle Protection Act EO 13186 DoD Armed Forces MOU with USFWS AFMAN32-7003
8.3	EFFECTIVELY MANAGE HABITAT AND INVASIVE SPECIES USING PRINCIPLES OF ECOSYSTEM MANAGEMENT WHILE SUSTAINING THE MILITARY TRAINING MISSION REQUIREMENTS ON THE INSTALLATION	8.3.1	<i>Manage areas on BSFB to support native biodiversity (i.e. short grass prairie) when practical and consistent with the military mission.</i>	Chapter 12 Tab 5 Wildlife Management Plan	460 CES/CEIE	460 CES	Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds AFMAN32-7003

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		8.3.2	<i>Prevent the introduction of invasive species and provide for their control and minimize the economic, ecological, and human health impacts that invasive species cause.</i>	7.11 Invasive Species	460 CES/CEIE	460 CES	Federal Noxious Weed Act FIFRA EO 13112 AFMAN32-7003
8.4	PRESERVE THE NATURAL VALUES OF WATERSHEDS, WETLANDS, AND FLOODPLAINS WHILE AVOIDING ACTIONS WHICH WOULD EITHER DESTROY OR ADVERSELY MODIFY THEM WITHOUT INCREASING BASH RISK	8.4.1	<i>Ensure no net loss of jurisdictional and isolated wetlands while maintaining mission priorities.</i>	7.6 Wetland Protection	460 CES/CEIE	460 CES/CEO B GAR /JA 460 SW/SE 140 CES	Executive Order (EO) 11990, Protection of Wetlands, May 24, 1977 DODI 4715.03 Clean Water Act, Sec 404 AFMAN32-7003
		8.4.2	<i>Ensure restoration and preservation of floodplains to reduce the risk of flood loss and impact of flooding to human safety, health, and welfare.</i>	2.3.5 Watersheds, Wetlands, and Drainage Patterns on Installation	460 CES/CEIE	B GAR /JA 460 CES 140 CES	EO 11988, Floodplain Management AFMAN32-7003
8.5	PROMOTE NATURAL RESOURCE AWARENESS WITH EDUCATION AND MAXIMIZE ANY PRACTICAL OUTDOOR RECREATION OPPORTUNITIES INVOLVING NATURAL RESOURCES	8.5.1	<i>Determine if outdoor recreation opportunities are feasible on BSFB.</i>	7.2 Outdoor Recreation and Public Access to Natural Resources	460 CES/CEIE	B GAR /JA 460 SW/SE 460 FSS	Sikes Act AFMAN32-7003
		8.5.2	<i>Promote natural resources outreach opportunities.</i>	7.15 Public Outreach	460 CES/CEIE	460 CES	AFMAN32-7003

**GOAL 1: REMAIN IN COMPLIANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS REGARDING NATURAL RESOURCES**

**Objective 8.1.1**

*Maintain the most current and accurate INRMP practical which defines the natural resources management actions performed on BSFB.*

***Task 8.1.1.1***

Host and participate in annual INRMP tripartite meeting with BSFB NRM, USFWS, and CPW to review goals, objectives, and implementation process per the Sikes Act, as amended. Dually, accomplish annual review and coordination with BSFB internal functional level stakeholders. (Recurring)

***Task 8.1.1.2***

Annually accomplish a review for effect of the current INRMP, making changes as mutually determined necessary by the Sikes Act partners. Retire previous work plan and create a “plus 4” work plan, adjusting any intervening work plans as necessary to have five years of agreed work effort. (Recurring)

***Task 8.1.1.3***

Annually update INRMP on Air Force ePlans or within MS Word and maintain a master list of INRMP updates and signature pages. (Recurring)

***Task 8.1.1.4***

Ensure natural resource and environmental constraints and opportunities are clearly identified in installation planning documents to include approved P4 and Installation Development actions. (Recurring)

***Task 8.1.1.5***

Ensure installation NRM maintains appropriate qualifications through the attendance of national, regional, and state conferences and other professional development training opportunities required to manage the INRMP and projects within the plan. (Recurring)

***Task 8.1.1.6***

Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan. (Recurring)

**Objective 8.1.2**

*Develop and maintain partnerships with other relevant organizations on base that impact, or are impacted by, the INRMP to ensure mutual compatibility of various base plans and contract actions.*

***Task 8.1.2.1***

Review base plans and current contracts and determine mutually acceptable methods to resolve and inconsistencies found. Establish procedures to ensure consistency. (Recurring)

***Task 8.1.2.2***

Annually review collateral plans to ensure the goals and objectives of the approved INRMP are consistent with those of the State of Colorado Comprehensive Wildlife Conservation Action Plan, Installation Facility Standards (IFS), Installation Development Plan (IDP), BSFB Integrated Pest Management Plan (IPMP), BSFB BASH Plan and other installation operational plans. (Recurring)

***Task 8.1.2.3***

Ensure NRM participates in stakeholder meetings to identify leveraging and information exchange opportunities such as biannual Bird Hazard Working Group meeting and serving as technical expert for the Grounds Maintenance Plan Contract. (Recurring)

***Task 8.1.2.4***

Coordinate and collaborate with Installation Pest Management Coordinator and USDA Wildlife Services on natural resource projects that are within their purview such as invasive species control, avian control, and/or wildlife management. (Recurring)



**Objective 8.1.3**

*Maintain BSFB Natural Resources records.*

***Task 8.1.3.1***

Update, maintain, and manage installation Natural Resources database to ensure avian, aquatic, and wildlife historical records and BASH continuity. (Recurring)

***Task 8.1.3.2***

Maintain and manage current installation Natural Resources GIS data to be integrated periodically into Air Force GeoBase. (Recurring)

**Objective 8.1.4**

*Maintain federal environmental compliance of soil and water resources on BSFB through the promotion and management of soil and water resources.*

***Task 8.1.4.1***

Conduct sampling (water quality monitoring) to document the quality of surface water on BSFB. (Recurring)

***Task 8.1.4.2***

Ensure deicing fluid management alternatives/future options are reviewed annually and receive concurrence by 140 WG. (Recurring)

***Task 8.1.4.3***

Control erosion and sedimentation from land-disturbing/earth-moving activities in accordance with the BSFB MS4 and CGP permits. (Recurring)

***Task 8.1.4.4***

Establish protected riparian buffer zones along all appropriate waterways. (Recurring)

***Task 8.1.4.5***

Control non-point source pollution through a reduction in the use of chemical and processes associated with landscape maintenance and other activities (to include the use of non-native species for revegetation purposes). (Recurring)

***Task 8.1.4.6***

Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS for stream/channel design in Williams Lake area. (Recurring and as needed until construction is complete)

***Task 8.1.4.7***

Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed. (Recurring until construction is complete)

**GOAL 2: EFFECTIVELY MANAGE WILDLIFE THROUGH THE IMPLEMENTATION OF AN ECOSYSTEM MANAGEMENT APPROACH, PROTECT ENDANGERED OR THREATENED SPECIES TO INCLUDE SPECIES OF CONCERN, AND PROTECT MIGRATORY BIRDS IN BALANCE WITH HUMAN HEALTH AND SAFETY**

**Objective 8.2.1**

*Utilize adaptive management to monitor basewide fish and wildlife species surveys to establish status of these resources.*

***Task 8.2.1.1***

Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies. (Recurring)

***Task 8.2.1.2***

Manage and survey for aquatic and wildlife species at Williams Lake and East Toll Gate Creek. (Recurring)

***Task 8.2.1.3***

Identify data gaps in knowledge of wildlife to assess effectiveness of control actions. (Recurring)

***Task 8.2.1.4***

Conduct on-going annual evaluation of BASH records and effects of coyote management. (Recurring)

***Task 8.2.1.5***

Continue to establish wildlife management partnerships in an effort to develop increased flexibility in urban wildlife management. (Recurring)

***Task 8.2.1.6***

Continue partnerships to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from “takes” within BSFB, to the local raptor facility. (Recurring)

**Objective 8.2.2**

*Utilize habitat modification strategies to effectively manage wildlife populations.*

***Task 8.2.2.1***

If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF ERP Restoration Program Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision (ROD). (Recurring)

***Task 8.2.2.2***

Coordinate the installation, repair, and maintenance of visual metal fence skirt barriers in appropriate locations. (Recurring)

**Objective 8.2.3**

*Assess methods to reduce the attractiveness of the installation to hazardous wildlife.*

***Task 8.2.3.1***

Manage and minimize any BASH potential at Williams Lake and East Toll Gate Creek. (Recurring)

***Task 8.2.3.2***

Manage airfield and installation fences to better control wildlife entry points. (Recurring)

***Task 8.2.3.3***

Manage ground maintenance activities (e.g. mowing) in accordance with B GAR and AF BASH programs. (Recurring)

***Task 8.2.3.4***

Ensure planning and coordination efforts are being conducted regarding construction and improvement projects to minimize attractants to birds and wildlife (to include built and natural infrastructure). (Recurring)

**Objective 8.2.4**

*Conduct surveillance/surveys of key species (when appropriate).*

***Task 8.2.4.1***

Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation. (Recurring)

***Task 8.2.4.2***

Continue annual population census of breeding Western burrowing owl, a Colorado state threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, *etc.* Maintain a database of breeding locations of Western burrowing owls on BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future

management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities. (Recurring)

**Objective 8.2.5**

*Ensure planning and coordination efforts are being conducted regarding construction, improvement projects, and outdoor training activities to minimize affects to endangered or threatened species to include species of concern.*

***Task 8.2.5.1***

Ensure through the Air Force Environmental Impact Assessment Process (EIAP) that habitat for wildlife, listed species, and species of concern during planned installation activities are taken into account. (Recurring)

***Task 8.2.5.2***

All activities (construction projects, mission changes, service contracts, etc.) are reviewed by the BSFB NRM to ensure compatibility with INRMP and all installation undertakings are reviewed to determine potential impacts to natural resources. (Recurring)

**Objective 8.2.6**

*Contribute to conservation of migratory birds, to the extent practicable within the constraints of the military mission.*

***Task 8.2.6.1***

Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observations that guide management decisions. (Recurring)

***Task 8.2.6.2***

Avoid or minimize the negative impact of AF actions on migratory birds and take active steps to protect birds and restore or enhance habitat wherever possible. (Recurring)

***Task 8.2.6.3***

Survey installation improved areas for potential avian perch locations, report locations, and make recommendations to eliminate perching using avian exclusion devices. (FY20 - Ongoing)

***Task 8.2.6.4***

Continue to Partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation. (FY20 - Ongoing)

***Project 8.2.6.5***

Conduct an annual avian survey grouped by season and focal species groups. (MGT, SPECIES, AVIAN FY21 and FY23)

***Task 8.2.6.6***

Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)

**GOAL 3: EFFECTIVELY MANAGE HABITAT AND INVASIVE SPECIES USING PRINCIPLES OF ECOSYSTEM MANAGEMENT WHILE SUSTAINING THE MILITARY TRAINING MISSION REQUIREMENTS ON THE INSTALLATION**

**Objective 8.3.1**

*Manage areas on BSFB to support native biodiversity (i.e. short grass prairie) when practical and consistent with the military mission.*

***Task 8.3.1.1***

Promote alternatives to traditional landscaping techniques (i.e. xeriscaping, etc.) and when applicable natural vegetation. (Recurring)

***Task 8.3.1.2***

Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem (FY21 – Ongoing).

***Task 8.3.1.3***

Evaluate all improved and semi-improved areas of the installation for possible conversion to lower levels of grounds maintenance. Map these areas and begin programming the conversion as funds become available. (FY21 – Ongoing)

**Objective 8.3.2**

*Prevent the introduction of invasive species and provide for their control and minimize the economic, ecological, and human health impacts that invasive species cause.*

***Task 8.3.2.1***

Track effectiveness of invasive species control efforts and modify management methodology if necessary. (Recurring)

***Project 8.3.2.2***

Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries. (FY20-FY24 – MGT, INVASIVE SPP)

***Project 8.3.2.3***

Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge. (FY20-FY24 – MGT, INVASIVE SPP)

***Project 8.3.2.4***

Conduct additional and more comprehensive invasive plant spraying across the installation via contract than what is able to be handled currently by existing NR and Pest Management staff. (FY24 – FY27 – MGT, INVASIVE SPP)

***Project 8.3.2.5***

Coordinate with 460 CES/CEN and USDA – APHIS to ensure our Installation Facility Standards, to the extent practicable, recommend plant species that are not desirable to the Japanese beetle (*Popillia japonica*); additionally, coordinate with USDA – APHIS and 460 CES/CEO (both Service Contracts and Pest Management) in an effort to remove/replace existing vegetation that is desirable by the Japanese beetle and in turn limit the presence of this invasive species as much as possible on the installation. (FY22)

**GOAL 4: PRESERVE THE NATURAL VALUES OF WETLANDS AND AVOID ACTIONS WHICH WOULD EITHER DESTROY OR ADVERSELY MODIFY WETLANDS WITHOUT INCREASING BASH RISK**

**Objective 8.4.1**

*Ensure no net loss of jurisdictional and isolated wetlands while maintaining mission priorities.*

***Task 8.4.1.1***

Evaluate identified wetlands for impacts to the military mission. (Recurring)

***Task 8.4.1.2***

Conduct on-going annual wetlands surveys and long-term monitoring. (Recurring)

**Objective 8.4.2**

*Ensure restoration and preservation of floodplains to reduce the risk of flood loss and impact of flooding to human safety, health, and welfare.*

***Task 8.4.2.1***

Conduct on-going evaluation and monitoring of all construction and training type activities for encroachment on drainages (established floodplains). (Recurring)

***Task 8.4.2.2***

Review BSFB East Toll Gate Creek Monitoring Plan to ensure appropriate consideration of natural resources in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)

**GOAL 5: PROMOTE NATURAL RESOURCE AWARENESS WITH EDUCATION AND MAZIMIZE ANY PRACTICAL OUTDOOR RECREATIONAL OPPORTUNITIES INVOLVING NATURAL RESOURCES**

**Objective 8.5.1**

*Determine if outdoor recreation opportunities are feasible on BSFB.*

***Task 8.5.1.1***

Maintain and improve the Williams Lake nature trail for recreational opportunities – update information at kiosk, repair holes in trail, control invasive species within the trail, and update interpretive signage. (Recurring)

***Task 8.5.1.2***

Partner with 460 Force Support Squadron Outdoor Recreation staff to examine installation level recreation opportunities (e.g. archery range). (FY23 & FY25)

***Task 8.5.1.3***

Identify any accessibility to recreational opportunities and programs for the physically challenged on BSFB. (FY22 & FY24)

**Objective 8.5.2**

*Promote natural resources outreach opportunities.*

***Task 8.5.2.1***

Review and update Newcomer Materials for natural resources. (Recurring)

***Task 8.5.2.2***

Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events. (Recurring)

***Task 8.5.2.3***

Prepare and distribute educational materials to educate installation population about the prairie ecosystem and associated species. (Recurring)

***Task 8.5.2.4***

Coordinate with Pest Management Shop, Housing Office, and Public Affairs Office to disseminate information on nuisance wildlife and how to deal with urban wildlife species through various media (e.g. newspaper, presentation, intranet, etc.). (Recurring)

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

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

BSFB's INRMP will be implemented upon signature by B GAR/CC. Currently, a dedicated full time GS-0401-11 USFWS biologist provided via a cooperative agreement between the Air Force and USFWS is embedded in 460 CES/CEIE to assist with INRMP implementation and the annual review and update of

the INRMP. The 460 CES/CEIE Environmental Element Chief is acting as the Natural Resource Program Manager (NRM).

The Natural Resources Management program is closely coordinated with other agencies/divisions on the base that overlap with their respective missions. The NRM consults regularly with 460 CES/CEIE staff, Pest Management staff, 460 CES/CEN staff, Bird Hazard Working Group, and the Grounds Maintenance Contracting Officer Representatives to reduce the incidents of wildlife conflicts, control noxious weeds, enhance public safety on the base and ensure proper implementation of the INRMP, in general.

### ***9.2 Monitoring INRMP Implementation***

USFWS personnel assigned to BSFB are responsible for implementing programs at the base other than the natural resources management responsibilities that will be necessary to implement this INRMP. Additional sources of temporary labor, such as seasonal employees (e.g., summer hires), could be utilized to augment current staff. Outside agency reimbursable hires and guardsman, reservists, or active-duty military personnel assigned to BSFB on temporary duty are another source of supplemental labor. Implementation of a number of projects discussed in this INRMP will require active outside assistance. The outside assistance might come from existing partnerships with state and federal agencies, private consortiums and organizations, universities, and contractors. Using these resources is the most efficient and cost-effective method for acquiring expertise on a temporary basis. The BSFB NRM should assess the level of additional resources necessary to fully implement the INRMP in the current and next fiscal year during the INRMP annual review process and determine the extent to which outside assistance will be required.

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

The INRMP requires annual review, in accordance with DoDI 4715.03, *Natural Resources Conservation Program*, and AFMAN32-7003, to ensure the achievement of mission goals, verify the implementation of projects, and establish any necessary new management requirements. This process involves installation natural resources personnel and external agencies working in coordination to review the INRMP. If the installation mission or any of its natural resources management issues change significantly after the creation of the original INRMP, a major revision to the INRMP is required. The need to accomplish a major revision is normally determined during the annual review with USFWS and the appropriate State. The NRM/POC documents the findings of the annual review in an Annual INRMP Review Summary and obtains signatures from the coordinating agencies on review findings. By signing the Annual INRMP Review Summary, the collaborating agency representatives assert concurrence with the findings. If any agency declines to participate in an on-site annual review, the NRM submits the INRMP for review along with the Annual INRMP Review Summary document to the agency via official correspondence and request return correspondence with comments/concurrence.

The USFWS, the State, and the NRM/ISS conduct an Annual INRMP Review Meeting. This meeting takes place in person with respective representatives for each agency. Individuals may telephone or video call if they cannot attend in person. During this meeting the NRM/ISS updates the external stakeholders/parties with the end of the year execution report and coordinates future work plans and any necessary changes to management methods etc. All parties review the INRMP and begin preliminary collaborative work on updating the INRMP (new policies, procedures, impacts, mitigations, etc.) as applicable. Following completion of updates, to include internal AF review, the INRMP is staffed for signature.

## **10.0 ANNUAL WORK PLANS**

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

1. High: The INRMP signatories assert that if the project is not funded the INRMP is not being implemented and the Air Force is non-compliant with the Sikes Act; or that it is specifically tied to an INRMP goal and objective and is part of a “Benefit of the Species” determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption.
2. Medium: Project supports a specific INRMP goal and objective, and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112 on Invasive Species. However, the INRMP signatories would not contend that the INRMP is not be implemented if not accomplished within programmed year due to other priorities.
3. Low: Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or support long-term compliance with specific requirements within natural resources law; but is not directly tied to specific compliance within the proposed year of execution.

Work plans will be reviewed and updated annually during the tripartite Sikes Act meeting to take into account ongoing, completed, and additional planned projects. This will maintain their currency and relevancy. Project numbers align with outlined BSFB INRMP goals and objectives (see Chapter 8) and indicate programming in ACES-PM by the AFCEC ISS/RST.

**RECURRING NATURAL RESOURCES PROGRAM TASKS**

Priority Level	Funding Requirement? (Y/N)	Task Number	Project/Work Plan
High	N	8.1.1.1	Host and participate in annual INRMP tripartite meeting with BSFB NRM, USFWS, and CPW to review goals, objectives, and implementation process per the Sikes Act, as amended. Dually, accomplish annual review and coordination with BSFB internal functional level stakeholders.
High	N	8.1.1.2	Annually accomplish a review for effect of the current INRMP, making changes as mutually determined necessary by the Sikes Act partners. Retire previous work plan and create a “plus 4” work plan, adjusting any intervening work plans as necessary to have five years of agreed work effort.
High	N	8.1.1.3	Annually update INRMP on Air Force ePlans or within MS Word and maintain a master list of INRMP updates and signature pages.
Low	N	8.1.1.4	Ensure natural resource and environmental constraints and opportunities are clearly identified in installation planning documents – P4 and IDP actions.
Medium	Y/N	8.1.1.5	Ensure installation NRM maintains appropriate qualifications through the attendance of national, regional, and state conferences and other professional development training opportunities required to manage the INRMP and projects within the plan.
Medium	N	8.1.1.6	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Low	N	8.1.2.1	Review base plans and current contracts and determine mutually acceptable methods to resolve any inconsistencies found. Establish procedures to ensure consistency.
Medium	N	8.1.2.2	Annually review collateral plans to ensure the goals and objectives of the approved INRMP are consistent with those of the State of Colorado Comprehensive Wildlife Conservation Action Plan, Installation Installation Facility Standards, Installation Development Plan, BSFB Integrated Pest Management Plan, BSFB BASH Plan, and other installation operational plans.
Low	N	8.1.2.3	Ensure NRM participates in stakeholder meetings to identify leveraging and information exchange opportunities such as – biannual Bird Hazard Working Group meeting and serving as technical expert for the Grounds Maintenance Plan Contract.

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Low	N	8.1.2.4	Coordinate and collaborate with Installation Pest Management Coordinator and USDA Wildlife Services on natural resource projects that are within their purview such as invasive species control, avian control, and/or wildlife management. (Recurring)
Low	N	8.1.3.1	Update, maintain, and manage installation Natural Resources database to ensure avian, aquatic, and wildlife historical records and BASH continuity.
Low	N	8.1.3.2	Maintain and manage current installation Natural Resources GIS data to be integrated periodically into Air Force GeoBase.
Medium	N	8.1.4.1	Conduct sampling (water quality monitoring) to document the quality of surface water on BSFB.
Medium	N	8.1.4.2	Ensure deicing fluid management alternatives/future options are reviewed annually and receive concurrence by 140 WG.
Medium	N	8.1.4.3	Control erosion and sedimentation from land-disturbing/earth-moving activities in accordance with the BSFB MS4 permit.
Medium	N	8.1.4.4	Establish protected riparian buffer zones along all appropriate waterways.
Medium	N	8.1.4.5	Control non-point source pollution through a reduction in the use of chemical and processes associated with landscape maintenance and other activities (to include the use of non-native species for revegetation purposes).
Low	N	8.2.1.2	Manage and survey for aquatic and wildlife species at Williams Lake and East Toll Gate Creek.
Low	N	8.2.1.3	Identify data gaps in knowledge of wildlife to assess effectiveness of control actions.
Low	N	8.2.1.4	Conduct on-going annual evaluation of BASH records and effects of coyote management.
Low	N	8.2.1.5	Continue to establish wildlife management partnerships to development increased flexibility in urban wildlife management.
Low	N	8.2.3.1	Manage and minimize any BASH potential at Williams Lake and East Toll Gate Creek.
Low	N	8.2.3.2	Manage airfield and installation fences to better control wildlife entry points.
Low	N	8.2.3.3	Manage ground maintenance activities (e.g. mowing) in accordance with B GAR and AF BASH programs.
Low	N	8.2.3.4	Ensure planning and coordination efforts are being conducted regarding construction and improvement projects to minimize attractants to birds and wildlife (to include built and natural infrastructure).
Medium	N	8.2.5.1	Ensure through the Air Force Environmental Impact Assessment Process (EIAP) habitat for wildlife, listed species, and species of concern during planned installation activities are taken into account.
Medium	N	8.2.5.2	All activities (construction projects, mission changes, service contracts, etc.) are reviewed by the BSFB NRM to ensure compatibility with INRMP and all installation undertakings are reviewed to determine potential impacts to natural resources.
Medium	N	8.2.6.2	Avoid or minimize the negative impact of AF actions on migratory birds and take active steps to protect birds and restore or enhance habitat wherever possible.
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors.
Medium	N	8.3.1.1	Promote alternatives to traditional landscaping techniques (i.e. xeriscaping, etc.) and when applicable natural vegetation.
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.
Low	N	8.3.2.1	Track effectiveness of invasive species control efforts and modify management methodology if necessary.
Medium	N	8.4.1.1	Evaluate identified wetlands for impacts to the military mission.
Medium	N	8.4.2.1	Conduct on-going evaluation and monitoring of all construction and training type activities for encroachment on drainages (established floodplains).
Low	N	8.5.2.1	Review and update Newcomer Materials for natural resources.
Low	N	8.5.2.3	Prepare and distribute educational materials to educate installation population about the prairie ecosystem and associated species.
Low	N	8.5.2.4	Coordinate with Pest Management Shop, Housing Office, and Public Affairs Office to disseminate information on nuisance wildlife and how to deal with urban wildlife species through various media (e.g. newspaper, presentation, intranet, etc.)

**RECURRING NATURAL RESOURCE ACES-PM PROJECTS**



INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Project Number	Project Name	Amount	Input in ACES-PM through FY27 (Y/N)
CRWUOS400821	MGT, Invasive Species, Canada Thistle	\$49,500	Y
CRWUOS400721	MGT, Habitat, Short grass Prairie	\$40,000	Y
CRWU401121	MGT, Species, Sensitive/Rare Species	\$108,000	Y
CRWU401021	Species, Avian	\$25,000	Y (Every other year)
CRWUOS400621	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400221	Supplies	\$1,500	Y

**2022 Projects/Work Plan**

Priority Level	Funding Requirement? (Y/N)	Task or Project Number	Project/Work Plan
High	N	8.1.1.1	Annual Tripartite INRMP review and signature.
Medium	N	8.1.1.7	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Medium	N	8.1.4.6	Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS on stream/channel design in Williams Lake area.
Medium	N	8.1.4.7	Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed.
Low	N	8.2.1.1	Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies.
Low	N	8.2.1.6	Continue to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from “takes” within BSFB, to the local raptor facility.
Medium	N	8.2.2.1	If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF Restoration Program Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision document.
Low	N	8.2.2.2	Coordinate the install, repair, and maintain visual metal fence skirt barriers.
Medium	N	8.2.4.1	Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation.
Medium	Y/N	8.2.4.2	Continue annual population census of breeding Western burrowing owl, a Colorado State threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, etc. Maintain a database of breeding locations of Western burrowing owls on BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities.
Medium	N	8.2.6.1	Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observation that guide management decisions.
Low	N	8.2.6.4	Continue to partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation.
Medium	Y	8.2.6.5	Conduct an annual avian survey grouped by season and focal species groups.
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.
Medium	Y	8.3.2.2	Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries.
Medium	Y	8.3.2.3	Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge.
Low	N	8.3.2.5	Coordinate with 460 CES/CEN and USDA – APHIS to ensure our Installation Facility Standards, to the extent practicable, recommend plant species that are not desirable to the Japanese beetle ( <i>Popillia japonica</i> ); additionally, coordinate with USDA – APHIS and 460 CES/CEO (both Service Contracts and Pest Management) in an effort to remove/replace existing vegetation that is desirable by

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			the Japanese beetle and in turn limit the presence of this invasive species as much as possible on the installation.
Medium	N	8.4.1.2	Conduct on-going annual wetlands surveys and long-term monitoring.
Medium	N	8.4.2.2	Review BSFB East Toll Gate Creek Monitoring Plan in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)
Low	N	8.5.2.2	Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events.

**2022 NATURAL RESOURCE ACES-PM PROJECTS**

Project Number	Project Name	Amount	Input in ACES-PM through FY27 (Y/N)
CRWUOS400822	MGT, Invasive Species, Canada Thistle	\$49,500	Y
CRWUOS400722	MGT, Habitat, Short grass Prairie	\$40,000	Y
CRWU401122	MGT, Species, Sensitive/Rare Species	\$108,000	Y
CRWUOS400622	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400222	Supplies	\$1,500	Y

**2023 Projects/Work Plan**

Priority Level	Funding Requirement? (Y/N)	Task or Project Number	Project/Work Plan
High	N	8.1.1.1	Annual Tripartite INRMP review and signature.
Medium	N	8.1.1.7	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Medium	N	8.1.4.6	Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS on stream/channel design in Williams Lake area.
Medium	N	8.1.4.7	Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed.
Low	N	8.2.1.1	Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies.
Low	N	8.2.1.6	Continue to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from “takes” within BSFB, to the local raptor facility.
Medium	N	8.2.2.1	If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF Restoration Program Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision document.
Low	N	8.2.2.2	Coordinate the install, repair, and maintain visual metal fence skirt barriers.
Medium	N	8.2.4.1	Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation.
Medium	Y/N	8.2.4.2	Continue annual population census of breeding Western burrowing owl, a Colorado State threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, etc. Maintain a database of breeding locations of Western burrowing owls on BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities.
Medium	N	8.2.6.1	Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observation that guide management decisions.
Low	N	8.2.6.4	Continue to partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation.
Medium	Y	8.2.6.5	Conduct an annual avian survey grouped by season and focal species groups.
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.

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Medium	Y	8.3.2.2	Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries.
Medium	Y	8.3.2.3	Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge.
Medium	N	8.4.1.2	Conduct on-going annual wetlands surveys and long-term monitoring.
Medium	N	8.4.2.2	Review BSFB East Toll Gate Creek Monitoring Plan in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)
Low	N	8.5.1.3	Identify any accessibility to recreational opportunities and programs for the physically challenged on BSFB.
Low	N	8.5.2.2	Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events.

**2023 NATURAL RESOURCE ACES-PM PROJECTS**

Project Number	Project Name	Amount	Input in ACES-PM through FY27 (Y/N)
CRWUOS400821	MGT, Invasive Species, Canada Thistle	\$51,975	Y
CRWUOS400721	MGT, Habitat, Short grass Prairie	\$42,000	Y
CRWU401121	MGT, Species, Sensitive/Rare Species	\$113,400	Y
CRWU401021	Species, Avian	\$26,250	Y (Every other year)
CRWUOS400621	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400221	Supplies	\$1,500	Y

**2024 Projects/Work Plan**

Priority Level	Funding Requirement? (Y/N)	Task or Project Number	Project/Work Plan
High	N	8.1.1.1	Annual Tripartite INRMP review and signature.
Medium	N	8.1.1.7	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Medium	N	8.1.4.6	Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS on stream/channel design in Williams Lake area.
Medium	N	8.1.4.7	Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed.
Low	N	8.2.1.1	Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies.
Low	N	8.2.1.6	Continue to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from “takes” within BSFB, to the local raptor facility.
Medium	N	8.2.2.1	If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF Restoration Program Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision document.
Low	N	8.2.2.2	Coordinate the install, repair, and maintain visual metal fence skirt barriers.
Medium	N	8.2.4.1	Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation.
Medium	Y/N	8.2.4.2	Continue annual population census of breeding Western burrowing owl, a Colorado State threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, etc. Maintain a database of breeding locations of Western burrowing owls on BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities.
Medium	N	8.2.6.1	Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observation that guide management decisions.
Low	N	8.2.6.4	Continue to partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Medium	Y	8.2.6.5	Conduct an annual avian survey grouped by season and focal species groups.
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.
Medium	Y	8.3.2.2	Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries.
Medium	Y	8.3.2.3	Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge.
Medium	Y	8.3.2.4	Conduct additional and more comprehensive invasive plant spraying across the installation via contract than what is able to be handled currently by existing NR and Pest Management staff.
Medium	N	8.4.1.2	Conduct on-going annual wetlands surveys and long-term monitoring.
Medium	N	8.4.2.2	Review BSFB East Toll Gate Creek Monitoring Plan in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)
Low	N	8.5.1.2	Partner with 460 Force Services Squadron Recreation Staff to examine installation level recreational opportunities (e.g. archery range)
Low	N	8.5.2.2	Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events.

**2024 NATURAL RESOURCE ACES-PM PROJECTS**

Project Number	Project Name	Amount	Input in ACES-PM through FY27 (Y/N)
CRWUOS400821	MGT, Invasive Species, Canada Thistle	\$51,975	Y
CRWUOS400721	MGT, Habitat, Short grass Prairie	\$42,000	Y
CRWU401121	MGT, Species, Sensitive/Rare Species	\$125,000	Y
CRWUOS400621	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400221	Supplies	\$1,500	Y

**2025 Projects/Work Plan**

Priority Level	Funding Requirement? (Y/N)	Task or Project Number	Project/Work Plan
High	N	8.1.1.1	Annual Tripartite INRMP review and signature.
Medium	N	8.1.1.7	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Medium	N	8.1.4.6	Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS on stream/channel design in Williams Lake area.
Medium	N	8.1.4.7	Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed.
Low	N	8.2.1.1	Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies.
Low	N	8.2.1.6	Continue to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from “takes” within BSFB, to the local raptor facility.
Medium	N	8.2.2.1	If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF Restoration Program Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision document.
Low	N	8.2.2.2	Coordinate the install, repair, and maintain visual metal fence skirt barriers.
Medium	N	8.2.4.1	Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation.
Medium	Y/N	8.2.4.2	Continue annual population census of breeding Western burrowing owl, a Colorado State threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, etc. Maintain a database of breeding locations of Western burrowing owls on

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			BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities.	
Medium	N	8.2.6.1	Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observation that guide management decisions.	
Low	N	8.2.6.4	Continue to partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation.	
Medium	Y	8.2.6.5	Conduct an annual avian survey grouped by season and focal species groups.	
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)	
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.	
Medium	Y	8.3.2.2	Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries.	
Medium	Y	8.3.2.3	Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge.	
Medium	Y	8.3.2.4	Conduct additional and more comprehensive invasive plant spraying across the installation via contract than what is able to be handled currently by existing NR and Pest Management staff.	Y
Medium	N	8.4.1.2	Conduct on-going annual wetlands surveys and long-term monitoring.	
Medium	N	8.4.2.2	Review BSFB East Toll Gate Creek Monitoring Plan in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)	
Low	N	8.5.1.3	Identify any accessibility to recreational opportunities and programs for the physically challenged on BSFB.	
Low	N	8.5.2.2	Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events.	

**2025 NATURAL RESOURCE ACES-PM PROJECTS**

Project Number	Project Name	Amount	Input in ACES-PM through FY27 (Y/N)
CRWUOS400821	MGT, Invasive Species, Canada Thistle	\$51,975	Y
CRWUOS400721	MGT, Habitat, Short grass Prairie	\$42,000	Y
CRWU401121	MGT, Species, Sensitive/Rare Species	\$125,000	Y
CRWU401021	Species, Avian	\$26,250	Y (Every other year)
CRWUOS400621	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400221	Supplies	\$1,500	Y

**2026 Projects/Work Plan**

Priority Level	Funding Requirement? (Y/N)	Task or Project Number	Project/Work Plan
High	N	8.1.1.1	Annual Tripartite INRMP review and signature.
Medium	N	8.1.1.7	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Medium	N	8.1.4.6	Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS on stream/channel design in Williams Lake area.
Medium	N	8.1.4.7	Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed.
Low	N	8.2.1.1	Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies.
Low	N	8.2.1.6	Continue to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from "takes" within BSFB, to the local raptor facility.
Medium	N	8.2.2.1	If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF Restoration Program

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

			Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision document.
Low	N	8.2.2.2	Coordinate the install, repair, and maintain visual metal fence skirt barriers.
Medium	N	8.2.4.1	Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation.
Medium	Y/N	8.2.4.2	Continue annual population census of breeding Western burrowing owl, a Colorado State threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, etc. Maintain a database of breeding locations of Western burrowing owls on BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities.
Medium	N	8.2.6.1	Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observation that guide management decisions.
Low	N	8.2.6.4	Continue to partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation.
Medium	Y	8.2.6.5	Conduct an annual avian survey grouped by season and focal species groups.
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.
Medium	Y	8.3.2.2	Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries.
Medium	Y	8.3.2.3	Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge.
Medium	Y	8.3.2.4	Conduct additional and more comprehensive invasive plant spraying across the installation via contract than what is able to be handled currently by existing NR and Pest Management staff.
Medium	N	8.4.1.2	Conduct on-going annual wetlands surveys and long-term monitoring.
Medium	N	8.4.2.2	Review BSFB East Toll Gate Creek Monitoring Plan in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)
Low	N	8.5.1.2	Partner with 460 Force Services Squadron Recreation Staff to examine installation level recreational opportunities (e.g. archery range)
Low	N	8.5.2.2	Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events.

**2026 NATURAL RESOURCE ACES-PM PROJECTS**

Project Number	Project Name	Amount	Input in ACES-PM through FY27 (Y/N)
CRWUOS400821	MGT, Invasive Species, Canada Thistle	\$51,975	Y
CRWUOS400721	MGT, Habitat, Short grass Prairie	\$42,000	Y
CRWU401121	MGT, Species, Sensitive/Rare Species	\$125,000	Y
CRWUOS400621	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400221	Supplies	\$1,500	Y

**2027 Projects/Work Plan**

Priority Level	Funding Requirement? (Y/N)	Task or Project Number	Project/Work Plan
High	N	8.1.1.1	Annual Tripartite INRMP review and signature.
Medium	N	8.1.1.7	Annually coordinate with the Air Force Wildland Fire Safety Center the approved Tier 2 Wildland Fire Management Plan.
Medium	N	8.1.4.6	Per the 2011 Environmental Assessment on Williams Lake coordinate with USFWS on stream/channel design in Williams Lake area.
Medium	N	8.1.4.7	Monitor Williams Lake site for open water surface area until dam is removed and native stream/channel is constructed.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Low	N	8.2.1.1	Conduct on-going wildlife (black-tailed prairie dog and coyote) population surveys to determine, establish, and implement effective population control strategies.
Low	N	8.2.1.6	Continue to conserve wildlife resources by donating frozen wildlife carcasses, such as black tailed prairie dogs and rabbits, from “takes” within BSFB, to the local raptor facility.
Medium	N	8.2.2.1	If necessary, assist with surveys to support the removal of black-tailed prairie dogs from Wildlife Management Area (WMA) #3 on AF Restoration Program Site #3, roughly 150 acres, in order to maintain environmental compliance with the Environmental Protection Agency Record of Decision document.
Low	N	8.2.2.2	Coordinate the install, repair, and maintain visual metal fence skirt barriers.
Medium	N	8.2.4.1	Maintain and annually review/validate all federal and state lists of species of concern and critical habitat potentially occurring on the installation.
Medium	Y/N	8.2.4.2	Continue annual population census of breeding Western burrowing owl, a Colorado State threatened species. Map nest locations and revisit pairs periodically to document reproductive success, number of juveniles, etc. Maintain a database of breeding locations of Western burrowing owls on BSFB. A simple database of locations, numbers of young, arrival and departure of pairs, can be helpful for future management decisions. When appropriate partner with neighbors and/or DoD Legacy Program to establish and implement artificial burrow strategy for Western burrowing owls away from military mission activities.
Medium	N	8.2.6.1	Conduct long-term monitoring of migratory birds to collect seasonal or annual data to make general observation that guide management decisions.
Low	N	8.2.6.4	Continue to partner with Audubon Society local chapter to conduct Christmas Bird counts on the installation.
Medium	Y	8.2.6.5	Conduct an annual avian survey grouped by season and focal species groups.
Medium	N	8.2.6.6	Partner with USDA Wildlife Services to increase the trapping and relocating efforts of raptors. (Recurring)
Medium	Y	8.3.1.2	Remove all vegetative shelterbelts within the installation boundaries. Survey for presence of wildlife prior to removal. Work to have shelterbelts removed to enhance native prairie ecosystem.
Medium	Y	8.3.2.2	Utilize and monitor mechanical, chemical, and biological control agents on identified invasive plant species within the installation boundaries.
Medium	Y	8.3.2.3	Overseed with native grasses in areas dominated by non-native vegetation to improve quality of ecosystem and/or assist with the mechanical and chemical control of invasive species. When possible USFWS partnership with Rocky Mountain Arsenal (RMA) Wildlife Refuge.
Medium	Y	8.3.2.4	Conduct additional and more comprehensive invasive plant spraying across the installation via contract than what is able to be handled currently by existing NR and Pest Management staff.
Medium	N	8.4.1.2	Conduct on-going annual wetlands surveys and long-term monitoring.
Medium	N	8.4.2.2	Review BSFB East Toll Gate Creek Monitoring Plan in support of the Environmental Protection Agency (EPA) MS4 permit. (Recurring)
Low	N	8.5.1.2	Partner with 460 Force Services Squadron Recreation Staff to examine installation level recreational opportunities (e.g. archery range)
Low	N	8.5.2.2	Conduct annual outreach and awareness events/activities such as Arbor Day and Earth Day. If possible, research and submit grant applications to garner funding for such events.

**2027 NATURAL RESOURCE ACES-PM PROJECTS**

<b>Project Number</b>	<b>Project Name</b>	<b>Amount</b>	<b>Input in ACES-PM through FY27 (Y/N)</b>
CRWUOS400821	MGT, Invasive Species, Canada Thistle	\$51,975	Y
CRWUOS400721	MGT, Habitat, Short grass Prairie	\$42,000	Y
CRWU401121	MGT, Species, Sensitive/Rare Species	\$125,000	Y
CRWU401021	Species, Avian	\$26,250	Y (Every other year)
CRWUOS400621	Equipment Purchase/Maintain	\$3,000	Y
CRWUOS400221	Supplies	\$1,500	Y

## **11.0 REFERENCES**

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

- [AFMAN32-7003, Environmental Conservation](#)
- [Sikes Act](#)
- [eDASH Natural Resources Program Page](#)
- [Natural Resources Playbook](#) – a Internal AF reference available at <https://cs1.eis.af.mil/sites/ceportal/CEPlaybooks/NRM2/Pages/>


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## **12.0 ACRONYMS**

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

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

### ***12.2 Installation Acronyms***

- (Add installation content or refer to location of related documents)

## **13.0 DEFINITIONS**

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

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

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

- Intentionally Left Blank.

**14.0 APPENDICES**

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

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

<b>Federal Public Laws and Executive Orders</b>	
	reviews and inspections to monitor Federal facility compliance with pollution control standards.
EO 12898, Environmental Justice	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13112, Exotic and Invasive Species	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	The U.S. Fish and Wildlife Service (USFWS) has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement.
<b>United States Code</b>	
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

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



<b>Federal Public Laws and Executive Orders</b>	
	Implementing the National Environmental Policy Act [40 Code of Federal Regulations (CFR) Parts 1500– 1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended.
National Historic Preservation Act, 16 U.S.C. § 470 et seq.	Requires Federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 U.S.C. § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.
Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)	Makes it unlawful for the DAF to conduct any work or activity in navigable waters of the United States without a Federal Permit. Installations should coordinate with the U.S. Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land, 10 U.S.C. § 2665	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other Federal and local programs.
Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Departments of the Interior (USFWS), and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an Integrated Natural Resources Management Plan and public access to natural resources, and allows collection of nominal hunting and fishing fees. NOTE: AFMAN32-7003 sec 3.11 staffing. In accordance with DoDI 4715.03, installations will use professionally trained natural resources

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

<b>Federal Public Laws and Executive Orders</b>	
	stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process.
<b>DAF Instructions and Directives</b>	
AFI32-1015, <i>Integrated Installation Planning</i>	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations to include guidance on integration of the Environmental Impact Analysis Process (EIAP) in base decision making to ensure compliance with the National Environmental Policy Act (NEPA).
AFMAN32-7003, <i>Environmental Conservation</i>	This publication implements Air Force Policy Directive (AFPD) 32-70, Environmental Considerations in Air Force Programs and Activities, and supports Air Force Instruction (AFI) 32-7001, <i>Environmental Management</i> . It provides guidance and procedures for cultural resource and natural resource programs at Air Force installations. This publication applies in its entirety to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve, Air National Guard, and individuals with contractual obligations to comply with Air Force publications located at installations in the U.S. and its territories.
AFPD 32-70, <i>Environmental Quality</i>	Outlines the DAF mission to achieve and maintain environmental quality on all D A F 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 DAF Environmental Office (DAF/ILEV) on January 29, 1999	Outlines the DAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

***Appendix B. Environmental Impact Analysis Program (EIAP)***

[Note that an MFR summarizing the EIAP process completed on the 5 Year update of the INRMP (No Environmental Assessment is planned) and an MFR confirming that all affiliated tribal members have been provided an opportunity to review the draft 5 year document will be inserted here.]

*Appendix C. Threatened, Endangered, and Federal Candidate Species*

<b>Table: Federal T&amp;E Species, State T&amp;E Species, and Federal Candidate Species for BSFB</b>				
<b>Species</b>	<b>Scientific Name</b>	<b>*Federal Listing</b>	<b>*State Listing</b>	<b>Species presence on BSFB</b>
<b>Birds</b>				
Piping Plover	<i>Charadrius melodus</i>	FT	ST	
Whooping Crane	<i>Grus americana</i>	FE	SE	
Western Burrowing Owl	<i>Athene cunicularia</i>		ST	X
<b>Flowering Plants</b>				
Ute Ladies'-tresses	<i>Spiranthes diluvialis</i>	FT		
Western Prairie Fringed Orchid	<i>Platanthera praeclara</i>	FT		
<b>Mammals</b>				
Black-footed Ferret	<i>Mustela nigripes</i>	FE	SE	
Preble's Meadow Jumping Mouse	<i>Zapus hudsonius preblei</i>	FT		
<b>Fishes</b>				
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	FE		
<b>Insects</b>				
Monarch Butterfly	<i>Danaus plexippus</i>	FC		X

**\*FE = Federally Endangered; FT = Federally Threatened; SE = State Endangered; ST = State Threatened; FC = Federal Candidate Species (not a statutory category)**

**Appendix D. Migratory Bird Species List**

<b>Table: Avian List of Potential Birds Occurring on BSFB                      (Combined BBS and Christmas Bird Count - all years and Rocky Mtn. Arsenal NWR)</b>		
American Avocet	Forster's Tern	Red-breasted Nuthatch
American Bittern	Fox Sparrow	Red-eyed Vireo
American Coot	Franklin's Gull	Redhead
American Crow	Gadwall	Red-headed Woodpecker
American Golden-Plover	Golden Eagle	Red-naped Sapsucker
American Goldfinch	Golden-crowned Kinglet	Red-necked Grebe
American Kestrel	Grasshopper Sparrow	Red-necked Phalarope
American Pipit	Gray Catbird	Red-tailed Hawk
American Redstart	Gray Flycatcher	Red-winged Blackbird
American Robin	Great Blue Heron	Ring-billed Gull
American Rough-legged Hawk	Great Crested Flycatcher	Ring-necked Duck
American Tree Sparrow	Great Egret	Ring-necked Pheasant
American White Pelican	Great Horned Owl	Rock Pigeon
American Wigeon	Greater Scaup	Rock Wren
Arkansas Goldfinch	Greater White-fronted Goose	Rocky Mountain Creeper
Ash-throated Flycatcher	Greater Yellowlegs	Rocky Mountain Hairy Woodpecker
Baird's Sandpiper	Great-tailed Grackle	Rocky Mountain Nuthatch
Bald Eagle	Green Heron	Rocky Mountain Screech-Owl
Bank Swallow	Green-tailed Towhee	Rose-breasted Grosbeak
Barn Owl	Green-winged Teal	Ross's Goose
Barn Swallow	Hairy Woodpecker	Rough-legged Hawk
Batchelder's Woodpecker	Hammond's Flycatcher	Ruby-crowned Kinglet
Bay-breasted Warbler	Harris's Sparrow	Ruddy Duck
Belted Kingfisher	Hermit Thrush	Sabine's Gull
Bewick's Wren	Hermit Warbler	Sage Thrasher
Black Scoter	Herring Gull	Sanderling
Black Tern	Hooded Merganser	Sandhill Crane
Black-bellied Plover	Hooded Warbler	Savannah Sparrow
Black-billed Magpie	Horned Grebe	Say's Phoebe
Black-capped Chickadee	Horned Lark	Scarlet Tanager
Black-crowned Night-Heron	Horned Owl	Scissor-tailed Flycatcher
Black-headed Grosbeak	House Finch	Semipalmated Plover
Black-necked Stilt	House Sparrow	Semipalmated Sandpiper
Blackpoll Warbler	House Wren	Sharp-shinned Hawk
Black-throated Blue Warbler	Indigo Bunting	Short-eared Owl

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Black-throated Gray Warbler	Killdeer	Shufeldt's Junco
Black-throated Sparrow	Lapland Longspur	Snow Goose
Blue Grosbeak	Lark Bunting	Snowy Egret
Blue Jay	Lark Sparrow	Snowy Owl
Blue-gray Gnatcatcher	Lazuli Bunting	Snowy Plover
Blue-headed Vireo	Least Flycatcher	Solitary Sandpiper
Blue-winged Teal	Least Sandpiper	Song Sparrow
Bohemian Waxwing	Lesser Goldfinch	Sora
Brewer's Blackbird	Lesser Scaup	Sparrow Hawk
Brewer's Sparrow	Lesser Yellowlegs	Spotted Owl
Broad-tailed Hummingbird	Lewis's Woodpecker	Spotted Sandpiper
Broad-winged Hawk	Lincoln's Sparrow	Spotted Towhee
Brown Creeper	Little Blue Heron	Steller's Jay
Brown Thrasher	Loggerhead Shrike	Stilt Sandpiper
Brown-headed Cowbird	Long-billed Curlew	Surf Scoter
Bufflehead	Long-billed Dowitcher	Swainson's Hawk
Bullock's Oriole	Long-billed Marsh Wren	Swainson's Thrush
Cackling Goose	Long-crested Jay	Thayer's Gull
California Gull	Long-eared Owl	Townsend's Solitaire
Canada Goose	Long-tailed Chickadee	Townsend's Warbler
Canvasback	MacGillivray's Warbler	Tree Swallow
Caspian Tern	Mallard	Tundra Swan
Cassin's Finch	Marbled Godwit	Turkey Vulture
Cassin's Kingbird	Marsh Hawk	Upland Sandpiper
Cassin's Sparrow	Marsh Wren	Veery
Cassin's Vireo	Merlin	Vesper Sparrow
Cattle Egret	Montana Junco	Violet-green Swallow
Cedar Waxwing	Mountain Bluebird	Virginia Rail
Chimney Swift	Mountain Chickadee	Virginia's Warbler
Chipping Sparrow	Mountain Plover	Warbling Vireo
Cinnamon Teal	Mountain Song Sparrow	Western Bluebird
Clark's Grebe	Mourning Dove	Western Burrowing Owl
Clay-colored Sparrow	Nashville Warbler	Western Grebe
Cliff Swallow	Northern Bobwhite	Western Horned Owl
Common Goldeneye	Northern Flicker (Red-shafted Flicker)	Western Kingbird
Common Grackle	Northern Flicker (Yellow-shafted Flicker)	Western Marsh Wren
Common Loon	Northern Goshawk	Western Meadowlark
Common Merganser	Northern Harrier	Western Sandpiper

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Common Nighthawk	Northern Mockingbird	Western Scrub-Jay
Common Poorwill	Northern Pintail	Western Tanager
Common Raven	Northern Rough-winged Swallow	Western Tree Sparrow
Common Tern	Northern Saw-whet Owl	Western Wood-Pewee
Common Yellowthroat	Northern Shoveler	Whimbrel
Cooper's Hawk	Northern Shrike	White-breasted Nuthatch
Cordilleran Flycatcher	Northern Waterthrush	White-crowned Sparrow
Creeper	Olive-sided Flycatcher	White-faced Ibis
Dark-eyed (Gray-headed) Junco	Orange-crowned Warbler	White-rumped Sandpiper
Dark-eyed (Pink-sided) Junco	Orchard Oriole	White-throated Sparrow
Dark-eyed (Slate-colored) Junco	Osprey	White-winged Dove
Desert Horned Lark	Ovenbird	White-winged Scoter
Desert Sparrow Hawk	Pale Goldfinch	Wild Turkey
Double-crested Cormorant	Palm Warbler	Willet
Downy Woodpecker	Pectoral Sandpiper	Willow Flycatcher
Dusky Flycatcher	Peregrine Falcon	Wilson's Phalarope
Eared Grebe	Philadelphia Vireo	Wilson's Snipe
Eastern Bluebird	Pied-billed Grebe	Wilson's Warbler
Eastern Kingbird	Pigeon Hawk	Winter Wren
Eastern Phoebe	Pine Siskin	Wood Duck
Eastern Screech-Owl	Plumbeous Vireo	Wood Thrush
English Sparrow	Prairie Falcon	Worm-eating Warbler
Eurasian Collared-Dove	Prairie Warbler	Yellow Warbler
Eurasian Wigeon	Pygmy Nuthatch	Yellow-billed Cuckoo
European Starling	Red Crossbill	Yellow-breasted Chat
Ferruginous Hawk	Red-bellied Woodpecker	Yellow-headed Blackbird
Field Sparrow	Red-breasted Merganser	Yellow-rumped Warbler



**Appendix E. Fish and Wildlife Species**

MAMMALS	
<i>Cynomys ludovicianus</i>	black-tailed prairie dog
<i>Canis latrans</i>	coyote
<i>Peromyscus maniculatus</i>	deer mouse
<i>Chaetodipus hispidus</i>	hispid pocket mouse
<i>Lepus californicus</i>	jack rabbit
<i>Microtus pennsylvanicus</i>	meadow vole
<i>Sylvilagus floridanus</i>	eastern cottontail
<i>Spermophilus tridecemlineatus</i>	thirteen-lined ground squirrel
<i>Reithrodontomys megalotis</i>	western harvest mouse
<i>Mephitis mephitis</i>	striped skunk
<i>Vulpes vulpes</i>	red fox
<i>Procyon lotor</i>	raccoon

**Appendix F. Floristic Species**

NOXIOUS WEEDS	
<i>Acroptilon repens</i>	Russian knapweed
<i>Aegilops cylindrical</i>	jointed goatgrass
<i>Bromus tectorum</i>	downy brome (cheatgrass)
<i>Carduus nutans</i>	musk thistle
<i>Centaurea diffusa</i>	diffuse knapweed
<i>Centaurea maculosa</i>	spotted knapweed
<i>Cirsium arvense</i>	Canada thistle
<i>Convolvulus arvensis</i>	bindweed
<i>Cynoglossum officinale</i>	houndstongue
<i>Descurania Sophia</i>	tansy mustard
<i>Dipsacus fullonum</i>	common teasel
<i>Elymus repens</i>	quackgrass
<i>Euphorbia esula</i>	leafy spurge
<i>Iris pseudacorus</i>	yellow flag iris
<i>Kochia scoparia</i>	kochia
<i>Lepidium draba</i>	hoary cress
<i>Linaria dalmatica</i>	dalmation toadflax
<i>Linaria vulgaris-uncertain id</i>	yellow toadflax- uncertain id
<i>Onopordum acanthium</i>	scotch thistle
<i>Salsola iberica</i>	Russian thistle
<i>Tamarix ramosissima</i>	saltcedar
<i>Tribulus terrestris</i>	puncturevine
<i>Verbascum Thapsus</i>	common mullein
EXOTIC PLANT SPECIES	
<i>Agropyron cristatum</i>	crested wheatgrass
<i>Allysum parviflorum</i>	allysum
<i>Bromus inermis</i>	smooth brome
<i>Camelina microcarpa</i>	false flax
<i>Cardaria pubescens</i>	whitetop
<i>Dactylis glomerata</i>	orchard grass
<i>Elaeagnus angustifolia</i>	Russian olive
<i>Erodium cicutarium</i>	crane's bill
<i>Grindelia squarrosa</i>	gumweed
<i>Medicago lupulina</i>	black medic
<i>Medicago sativa</i>	alfalfa
<i>Melilotus officinale</i>	yellow sweet clover
<i>Poa pratensis</i>	Kentucky bluegrass
<i>Rumex crispus</i>	curly dock
<i>Salvia reflexa</i>	sage
<i>Secale cereal</i>	rye grass
<i>Sisymbrium altissimum</i>	Jim Hill mustard
<i>Taraxacum officinale</i>	dandelion
<i>Thalaspia arvense</i>	pennycress
<i>Tragopogon dubius</i>	salsify
<i>Verbena bracteata</i>	vervain
NATIVE PLANT SPECIES	

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<i>Achillea lanulosa</i>	yarrow
<i>Allium textile</i>	wild onion
<i>Aphylon fasciculatum</i>	Broomrape
<i>Apocynum adrosaemifolium</i>	dogbane
<i>Aristida purpurea</i>	three-awned grass
<i>Artemisia frigida</i>	silver sage
<i>Asclepias speciose</i>	milkweed
<i>Astragalus gracilis</i>	milkvetch
<i>Astragalus longicarpus</i>	milkvetch
<i>Bouteloua curtipendula</i>	sideoats grama
<i>Bouteloua gracilis</i>	blue grama
<i>Buchloe dactyloides</i>	buffalo grass
<i>Carex sp.</i>	sedge
<i>Castilleja sp.</i>	paintbrush
<i>Chenopodium berlandieri</i>	goosefoot
<i>Chrysothamnus sp.</i>	rabbitbrush
<i>Cirsium canescens</i>	thistle
<i>Distichlis spicata</i>	saltgrass
<i>Echinocereus Viridulus</i>	hedgehog cactus
<i>Eleocharis palustris</i>	spikerush
<i>Elymus elymoides</i>	rye
<i>Elymus trachycaulus</i>	rye
<i>Equisetum arvense</i>	horsetail
<i>Eriogonum effusum</i>	wild buckwheat
<i>Erysimum sp.</i>	wallflower
<i>Gaura coccinea</i>	scarlet beeblossom
<i>Gaura parviflora</i>	Velvetweed
<i>Guttierizia sarothrae</i>	snakeweed
<i>Hedeoma hispida</i>	pennyroyal
<i>Helianthus anua</i>	sunflower
<i>Heterotheca canescens</i>	golden aster
<i>Hordeum jubatum</i>	barley
<i>Koeleria macrantha</i>	june grass
<i>Kraschenikovia lanata</i>	winter fat
<i>Lathyrus c.f. eucosmus</i>	peavine
<i>Linum lewisii</i>	flax
<i>Oenothera sp.</i>	evening primrose
<i>Opuntia polyacantha</i>	prickly pear
<i>Packera tridenticulata</i>	groundsel
<i>Penstemon albens</i>	beard-tongue
<i>Plantago patagonica</i>	wooly plantain
<i>Poa arida</i>	plains bluegrass
<i>Populus acuminata</i>	cottonwood
<i>Populus deltoids</i>	cottonwood
<i>Psoralidium tenuiflorum</i>	Scurfy Pea
<i>Rhus trilobata</i>	skunkbrush
<i>Ribes aurea</i>	gooseberry
<i>Rosa woodsia</i>	wild rose
<i>Salix exigua</i>	sandbar willow

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<i>Schedonnardus paniculatus</i>	tumblegrass
<i>Scirpus americanus</i>	bulrush
<i>Spheralcea coccinea</i>	globemallow
<i>Sporobolus cryptandrus</i>	dropseed
<i>Stipa comate</i>	needle-thread grass
<i>Stipa viridula</i>	needle grass
<i>Tradescantia occidentalis</i>	spiderwort
<i>Vicia Americana</i>	vetch
<i>Vulpia octoflora</i>	six week fescue
<i>Yucca glauca</i>	yucca

**Appendix G. Internal and External Stakeholders**

<b>Primary Internal Natural Resources Management Stakeholders and Responsibilities</b>		
<b>Organization</b>		<b>Responsibilities</b>
B GAR/CC	Wing Commander	Chairperson, Environmental, Safety, and Occupational Health Council
B GAR/JA	Judge Advocate	Regulatory Interpretation Off-Base Dispute-Complaint Resolution Legal Representation
460 PA/PA	Public Affairs	Dissemination of Information
460 SFS	Security Forces Squadron	Restricted Area Enforcement
460 MDG/SGOJ	Medical Group – Bioenvironmental	Zoonosis Monitoring (e.g., plague and hantavirus)
460 CES/CEO	Civil Engineer Squadron Operations Flight	Pest Management Grounds Maintenance
460 CES/CEN	Civil Engineer Squadron Engineering Flight	Base General Plan
460 CES/CEIE	Civil Engineer Squadron Environmental Element	NEPA Compliance Cultural Resources Program Water Quality Program Environmental Restoration Program Wetlands Management Ecosystem Management Public Awareness Programs
460 FSS	Force Support Squadron	Outdoor Recreation Programs
460 SW/SE, 140 WG/SE	B GAR Safety Office and Air National Guard Flight Safety	BASH Plan
140 WG/OG	Air National Guard Operations Group	Flight line O&M to include Airfield Management

140 CES	Air National Guard Civil Engineer Squadron	Flight Line Maintenance (e.g., mowing, entomology)
140 CES/CEV	Air National Guard Environmental Flight	Coordinates with 460 CES/CEV regarding natural resource issues affecting flying

<b>Noes:</b>					
CC	=	Commander	SW	=	Space Wing
CES	=	Civil Engineering Squadron	JA	=	Judge Advocate
MSG	=	Mission Support Group	OG	=	Operations Group
SE	=	Safety	SFS	=	Security Forces
FSS	=	Force Support Squadron	WG	=	Wing
CEV	=	Environmental Element	CEN	=	Engineering Flight
CEO	=	Operations Flight	PA	=	Public Affairs
MDG	=	Medical Group	B GAR	=	Buckley Garrison

**Primary External Natural Resources Management Stakeholders**

U.S. Fish and Wildlife Service (USFWS)

Animal and Plant Health Inspection Service (APHIS), Wildlife Services

Colorado Parks and Wildlife (CPW)

Native American Tribes Affiliated with BSFB

<b>Federally Listed Tribes Associated with BSFB (2021)</b>	
Apache Tribe of Oklahoma	Northern Arapaho Tribe
Assiniboine and Sioux Tribes	Northern Cheyenne Tribe
Blackfeet Nation	Oglala Sioux Tribe
Cheyenne and Arapaho Tribes of Oklahoma	Pawnee Nation of Oklahoma
Cheyenne River Sioux Tribe	Pueblo of Taos
Comanche Nation of Oklahoma	Pueblo of Zuni
Crow Creek Sioux Tribe	Rosebud Sioux Tribe
Crow Tribe	Santee Sioux Nation
Eastern Shoshone Tribe	Southern Ute Indian Tribe
Flandreau Santee Sioux Tribe	Spirit Lake Nation
Fort Sill Apache Tribe	Standing Rock Sioux Tribe
Jicarilla Apache Tribe	Three Affiliated Tribes of the Mandan, Hidatsa & Arikara Nation
Kiowa Tribe of Oklahoma	Ute Indian Tribe of the Uintah & Ouray Reservation
Little Shell Tribe of Chippewa Indians	Ute Mountain Ute Tribe

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Mescalero Apache Tribe	Yankton Sioux Tribe
Navajo Nation	

**15.0 ASSOCIATED PLANS**

*Tab 1 – Noxious Weed Survey of BAFB*

*Tab 2 – Wildland Fire Management Plan (WFMP)*

*Tab 3 – FOUO Bird Aircraft Strike Hazard (BASH) Plan*

*Tab 4 – Integrated Cultural Resources Management Plan (ICRMP)*

*Tab 5 – FOUO Grounds Maintenance BSFB Installation Facility Standards (IFS)*

*Tab 6 – Integrated Pest Management Plan (IPMP)*