Department of the Air Force

Integrated Natural Resources Management Plan

USAF Academy

Installation Supplement

ABOUT THIS PLAN

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

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

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

DOCUMENT CONTROL

Standardized INRMP Template

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

This version of the template is current as of 06/26/2020 and supersedes the 2018 version.

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

Installation INRMP

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

Annual reviews and updates are accomplished by the installation Natural Resources Manager (NRM), and/or a Section Natural Resources Media Manager. The installation shall establish and maintain regular communications with the appropriate federal and state agencies. At a minimum, the installation NRM (with assistance as appropriate from the Section Natural Resources Media Manager) conducts an annual review of the INRMP in coordination with internal stakeholders and local representatives of USFWS, state fish and wildlife agency, and NOAA Fisheries, where applicable, and accomplishes pertinent updates. Installations will document the findings of the annual review in an Annual INRMP Review Summary. By signing the Annual INRMP Review Summary, the collaborating agency representative asserts concurrence with the findings. Any agreed updates are then made to the document, at a minimum updating the work plans.

INRMP APPROVAL/SIGNATURE PAGES

Installation Supplement

This Integrated Natural Resources Management Plan (INRMP) has been prepared in accordance with the regulations, standards, and procedures of the Department of Defense, the U.S. Air Force, and the Sikes Act Improvement Act 0f 1997 (16 United States Code [U.S.C.] 670a) in cooperation with the U.S. Fish and Wildlife Service (USFWS) and Colorado Parks and Wildlife (CPW). This INRMP provides for management and stewardship of all natural resources present on the U.S. Air Force Academy (Academy).

To the extent that resources permit, the USFWS, CPW, and the Academy, by signature of their agency representative, do hereby agree to enter a cooperative program for the conservation, protection, and management of natural resources present on the Academy. The intention of this agreement is to develop functioning, sustainable ecological communities on the Academy that integrate the interests and missions of the agencies charged with conservation, protection, and management of natural heritage in the public interest. This agreement may be modified and amended by mutual agreement of the authorized representatives of the three agencies. This agreement will become effective upon the date of the last signatory and shall continue in full force for a period of 5 years or until terminated by written notice to the other parties signing the agreement.

By their signature below, or an attached letter of concurrence, all parties grant their concurrence with and acceptance of the following document.

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR THE UNITED STATES AIR FORCE ACADEMY

This Integrated Natural Resources Management Plan (INRMP) for the United States Air Force Academy, 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 United States Air Force. To the extent resources permit, the United States Air Force Academy will implement the actions associated with this plan and will 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 regional conservation and management of wildlife, forests, rare species, aquatic and terrestrial habitats, and wildland fuel hazards; and provide outdoor recreation opportunities.

DRUE DEBERRY
Colorado and Nebraska Field Supervisor, Ecological Services
U.S. Fish and Wildlife Service

Date

DAN PRENZLOW
Southeast Region Manager, Colorado Parks & Wildlife

Date

Shawn W. Campbell

10 April 2018

SHAWN CAMPBELL, Colonel, USAF
Commander, 10th Air Base Wing

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR

THE UNITED STATES AIR FORCE ACADEMY

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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 regional conservation and management of wildlife, forests, rare species, aquatic and terrestrial habitats, and wildland fuel hazards; and provide outdoor recreation opportunities.

DRUE DEBERRY
Colorado and Nebraska Field Supervisor, Ecological Services
U.S. Fish and Wildlife Service

Date

12-26-17

DAN PRENZLOW
Southeast Region Manager, Colorado Parks & Wildlife

Date

SHAWN CAMPBELL, Colonel, USAF
Commander, 10th Air Base Wing

Date

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN FOR

THE UNITED STATES AIR FORCE ACADEMY

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2/12/18

DRUE DEBERRY — Date
Colorado and Nebraska Field Supervisor, Ecological Services
U.S. Fish and Wildlife Service

DAN PRENZLOW — Date
Southeast Region Manager, Colorado Parks & Wildlife

SHAWN CAMPBELL, Colonel, USAF — Date
Commander, 10th Air Base Wing

[SIGNATURE]

This Integrated Natural Resources Management Plan (INRMP) has been developed for the U.S. Air Force Academy (Academy) and the Air Force Civil Engineer Center (AFCEC) in accordance with Air Force Manual (AFMAN) 32-7003, Environmental Conservation; Air Force Policy Directive (AFPD) 32-70, Environmental Quality; and the provisions of the Sikes Act, as amended (16 United States Code [U.S.C.] 670a et seq.). This revised INRMP provides an updated description of the Academy, the Farish Recreation Area (Farish), and Bullseye Auxiliary Air Field (Bullseye) and presents various management practices designed to mitigate impacts and enhance the local and regional ecosystems in support of the Academy's training/education mission. These recommendations have been balanced against the requirements of the Academy to accomplish its mission at the highest possible level of efficiency. To obtain an accurate assessment of the Academy's influences, analyses were conducted to determine the physical and biotic nature of the Academy and the surrounding environment, as well as the operational activities taking place.

This INRMP is a practical guide for the management and stewardship of all natural resources present on the Academy, while ensuring the successful accomplishment of the military mission. The original baseline INRMP (version 2008-2013) was developed using an interdisciplinary approach in which information was gathered from a variety of organizations, including the U.S. Fish and Wildlife Service (USFWS), Colorado Parks and Wildlife (CPW), U.S. Forest Service (USFS), and Colorado Natural Heritage Program (CNHP).

Coordination of the INRMP with USFWS and CPW satisfies the Sikes Act (16 U.S.C. §670a et seq.) requirement that the plan be prepared in mutual agreement with the USFWS and the appropriate state fish and wildlife agency. On an annual basis, the Academy meets with USFWS and CPW representatives to discuss the previous year's management accomplishments, Sikes Act compliance, and the workplan for the upcoming year. Updates or revision of the INRMP is accomplished in a timely manner by editing this eINRMP document.

The maintenance and enhancement of regional biological diversity and ecosystem function is particularly important in the management of natural resources and will be accomplished through the implementation of specific management practices identified in this INRMP. For example, by protecting the riparian corridors and their associated habitats—areas which not only protect and support regional biodiversity, but also provide and protect important ecosystem functions—this INRMP will help perpetuate the form and function of native communities and natural processes.

The Plan presents practicable alternatives and recommendations that would minimize impact on the Academy missions while providing for management and stewardship of natural resources that will conserve and enhance the regional ecosystems in which the Academy, Farish Recreation Area, and Bullseye Auxiliary Airfield, are embedded.

The overriding goals of the INRMP are as follows:

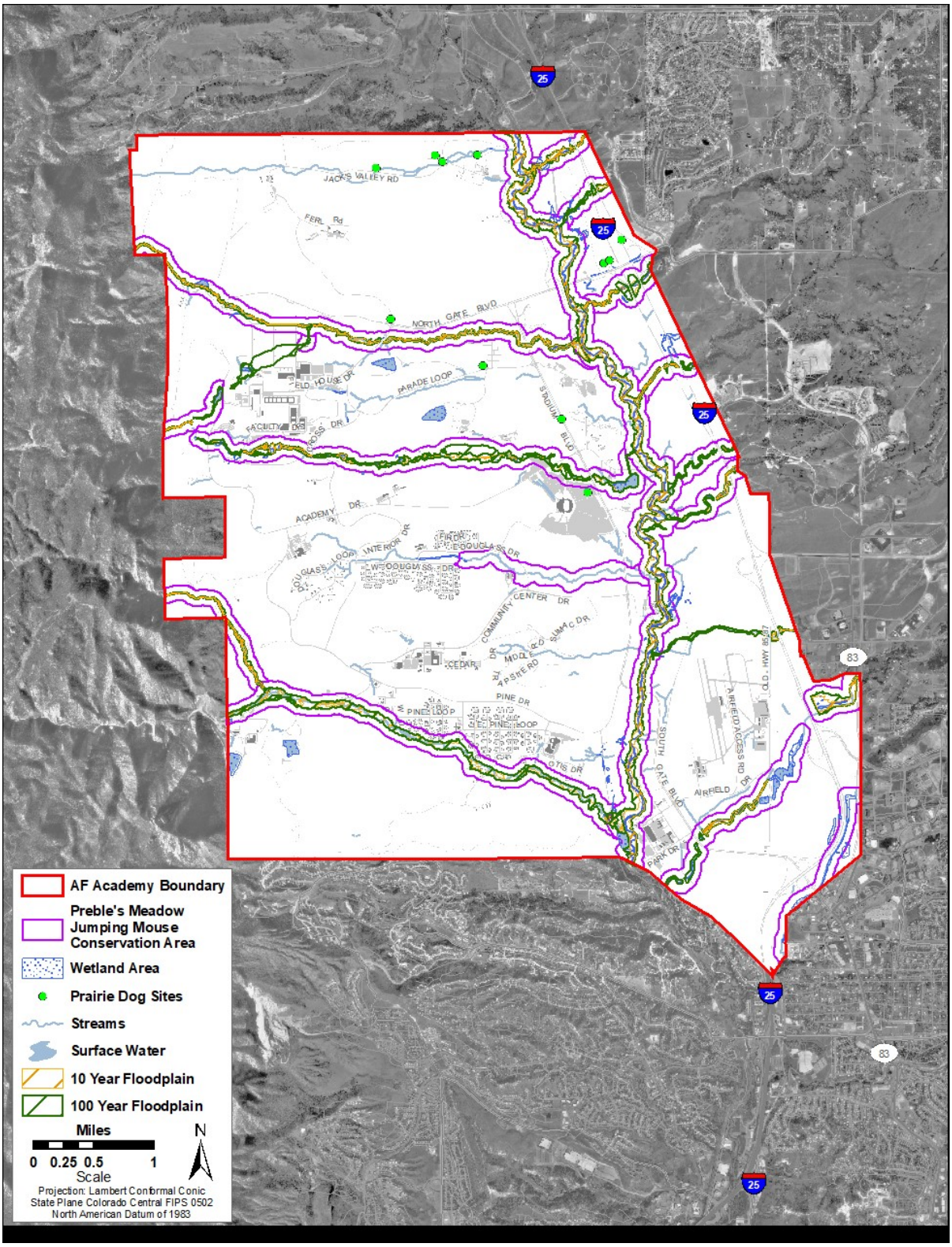
1. Manage for no net loss in the capability to support the military mission
2. Minimize habitat fragmentation and promote the natural connectivity of habitats
3. Protect native species and discourage nonnative, invasive species
4. Protect rare and ecologically important species and unique or sensitive environments
5. Maintain or mimic natural ecological processes
6. Protect genetic diversity and population-level interchange
7. Conserve and enhance species, communities, and ecosystems on a regional basis
8. Monitor and mitigate impacts on biodiversity
9. Provide quality, sustainable outdoor recreation opportunities.
10. Evaluate and mitigate the effect of climate change in natural resource management and land use practices.

From these goals, specific objectives and management actions were identified that structure this Plan's guidance and implementation. However, each of the strategies described should be monitored so that adaptive management modifications can be made during implementation as conditions change.

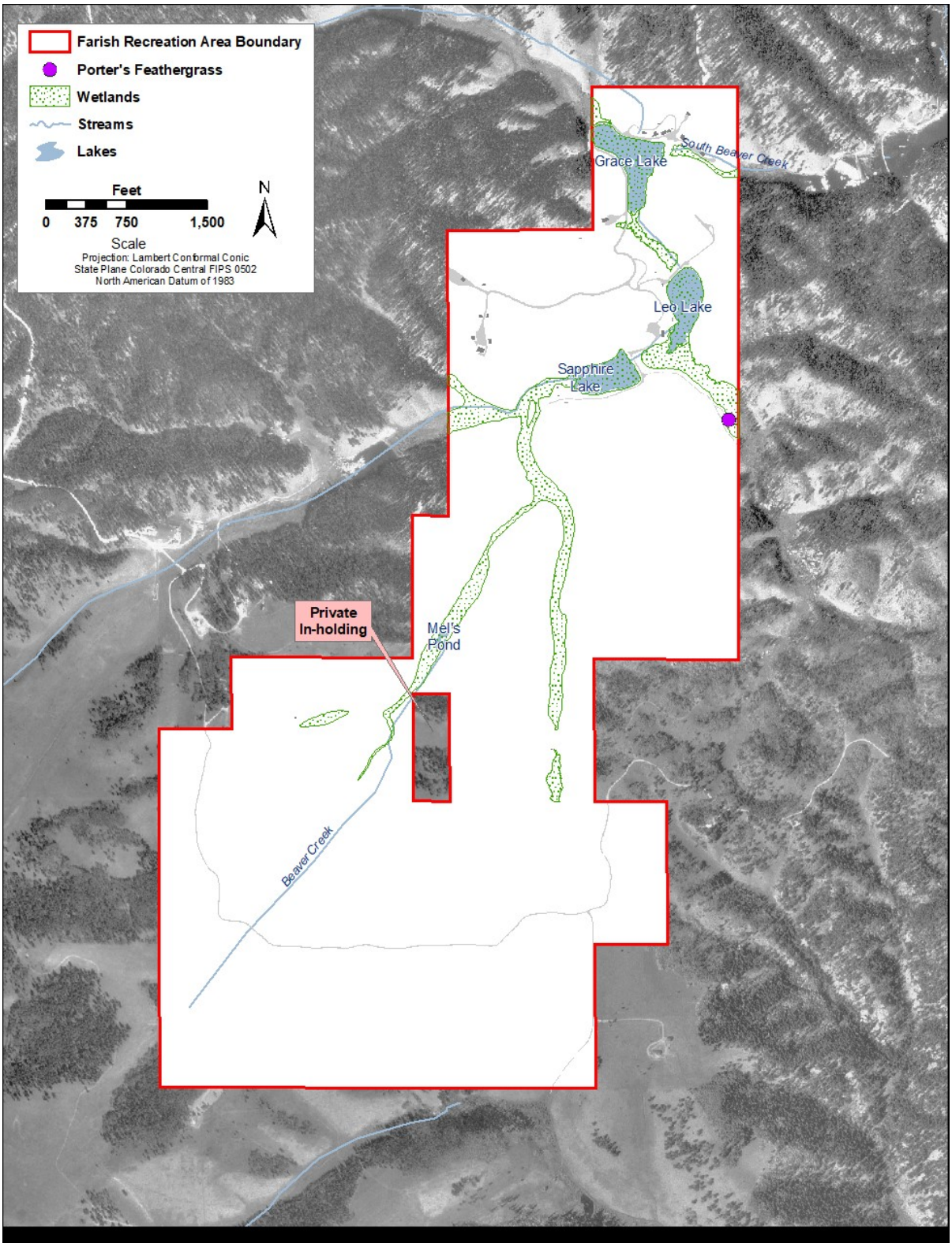
Throughout the development of this INRMP, management issues were identified in a number of natural resources subject areas. Some of these natural resource concerns could have an adverse impact on the Academy's mission or future planning operations. The potential negative impacts could range from delays in the construction of new buildings to loss of life resulting from severely damaged aircraft. One of the purposes of this INRMP is to identify goals and objectives and to obtain workable and useful solutions for each topic of concern. Examples of such issues include:

- Any projects which are anticipated to impact wetlands must acquire approval and the appropriate permits from the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), and the Colorado Department of Natural Resources (CDNR). Jurisdictional delineations must be accomplished for each potentially affected wetland.

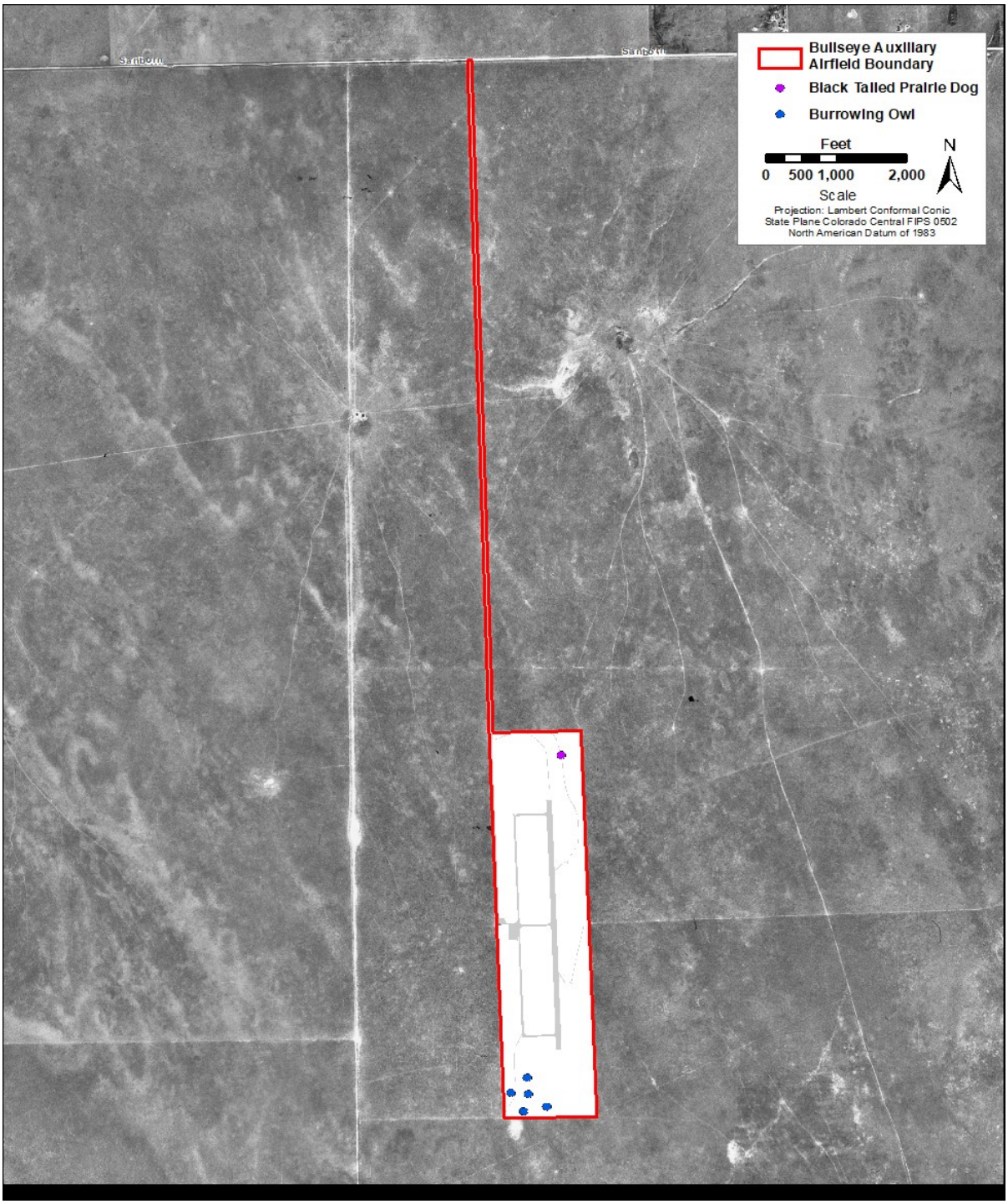
- Any projects that are anticipated to significantly impact floodplains must undergo the National Environmental Policy Act (NEPA) process per 32 Code of Federal Regulations (CFR) 989. Any projects that permanently alter the hydrology of a floodplain must be reported to the Federal Emergency Management Agency (FEMA).
- The Academy possesses populations of, and habitat features that are attractive to, species that pose a high Bird/Wildlife Aircraft Strike Hazard (BASH) threat.
- The Academy supports a population of the federally threatened Preble's meadow jumping mouse (*Zapus hudsonius preblei*) that must be protected and conserved in accordance with the Endangered Species Act and the Academy's Conservation Agreement with the USFWS.



Composite Natural Resources Constraints at the U.S. Air Force Academy



Composite Natural Resources Constraints at the Farish Recreation Area



Composite Natural Resources Constraints at the Bullseye Auxiliary Airfield. Note: Burrowing owl and black-tailed prairie dog have not been observed at Bullseye since 2012, but they still pose a potential constraint.

1 OVERVIEW AND SCOPE

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

1.1 Purpose and Scope

Installation Supplement

This Integrated Natural Resources Management Plan (INRMP) has been developed for use by the U.S. Air Force (USAF) Academy (the Academy) and the Air Force Civil Engineer Center (AFCEC) in accordance with AFMAN 32-7003, Environmental Conservation; Air Force Policy Directive (AFPD) 32-70, Environmental Quality; and the provisions of the Sikes Act (16 United States Code [U.S.C.] 670a et seq.).

This INRMP provides a description of the Academy, Farish Recreation Area, and Bullseye Auxiliary Airfield (e.g., location, history, and mission), information about the surrounding physical and biotic environment, and an assessment of the impacts on natural resources as a result of mission activities. Furthermore, the INRMP recommends various management practices, in compliance with Federal, state, and local standards, designed to mitigate negative impacts and to enhance the positive effects of the Academy's mission on local ecosystems.

This INRMP integrates all aspects of natural resources management with the rest of the base's mission, and therefore becomes the primary tool for managing the base's ecosystems while ensuring the successful accomplishment of the military mission at the highest possible levels of efficiency. The INRMP is a guide for the management and stewardship of all natural resources present on the base. A multiple-use approach is implemented to allow for mission-oriented activities, as well as environmental quality and outdoor recreation through the efficient management of natural resources.

The information presented in this INRMP is incorporated into the Installation Development Plan. The Academy's comprehensive management planning process should continually incorporate the concerns presented in this INRMP so that the growth and use of the base can progress in a manner consistent with, and complementary to, the objectives of the USAF with respect to the protection of natural resources. Note that the cultural resources present on the Academy are addressed fully in a separate Integrated Cultural Resources Management Plan (ICRMP), and, as such, are only briefly discussed in the Cultural Resources Plan section of this plan.

1.2 Management Philosophy

Installation Supplement

This INRMP presents practicable alternatives and recommendations that allow for the protection and enhancement of natural resources and conservation of existing ecosystems, while minimizing impacts on the base's missions. Consequently, the implementation of some of these recommendations will sacrifice improvement of the Academy's natural resources in deference to the safety and efficiency of the mission. The Management Philosophy and INRMP was developed through interdisciplinary input and coordination between the Air Force Academy, US Fish and Wildlife Service, and Colorado Parks and Wildlife during annual Sikes Act Coordination meetings, draft plan reviews, and other routine interactions.

The mission of the Academy's Natural Resources Office is "*In support of the military education and training mission, conserve and enhance the Air Force Academy's natural resources through the application of sound science and proactive stewardship practices.*".

1.3 Authority

Installation Supplement

This INRMP is developed under, and proposes actions in accordance with, applicable Department of Defense (DOD) and USAF policies, directives, and instructions. The Sikes Act (Title 16 U.S.C.) and AFMAN 32-7003, Environmental Conservation, provides the necessary direction and instructions for preparing an INRMP. Issues are addressed in this Plan using guidance provided under legislation, Executive Orders (EOs), Directives, and Instructions that include DOD Directive 4715.3, Environmental Conservation Program; AFPD 32-70, Environmental Quality; AFI 32-7065, Cultural Resources Management; and AFMAN 32-7003. DOD Directive 4715.3 provides direction for DOD installations in establishing procedures for an integrated program for multiple use management of natural resources. AFPD 32-70 discusses general environmental quality issues, including proper cleanup of polluted sites, compliance with applicable regulations, conservation of natural resources, and pollution prevention. Appendix A summarizes key legislation and guidance used to create and implement this INRMP.

This INRMP is a "living" document, subject to periodic updates or changes, which integrates all aspects of natural resources management at the Academy. Proper utilization of this Plan for the conservation of natural resources should not impair the ability of the base to perform its missions.

The USAF considers its goals and objectives with respect to the protection and enhancement of natural resources when planning projects and mission changes. Potential impacts are assessed, and possible alternatives that reduce negative impacts are explored through the planning and NEPA process. Applicable sections of this Plan are referenced when establishing new natural resources management strategies in response to changing missions or new projects.

Installation-Specific Policies (including State and/or Local Laws and Regulations)	
Overarching Environmental Standards	USAFA-specific Standards provided to organizations, consultants, contractors, and partners to promote environmental compliance and protection.
USAFAI 32-7001	Natural Resources on the USAF Academy, 30 January 2019
USAFA Pest Management Plan	Policies and procedures for the control and management of plant and animal pests
USAFA Erosion Control, Revegetation, and Tree Care Standards	USAFA-specific site restoration Standards included as part of the Overarching Environmental Standards
USAFA 91-212 BASH Plan	Bird-Aircraft Strike Hazard (BASH) Plan

1.4 Integration with Other Plans

Installation Supplement

AFMAN 32-7003, Environmental Conservation, requires that natural resources management is integrated with key AF programs. AFI 32-7062, Air Force Comprehensive Planning, specifies the INRMP is a key component plan of the Installation Development Plan (IDP). Additionally, AFMAN 32-7003, 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 (see Section 3M), Integrated Pest Management Plan, and Air Installation Compatible Use Zone studies are mutually supportive and not in conflict." Natural Resources Management is also integral to Readiness and Environmental Protection Integration (REPI) and Facility Excellence Plan (FEP). The purpose of INRMP integration with the IDP is to consider natural resources constraints and management strategies in conjunction with base development. 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. The purpose of INRMP integration with the BASH Plan is 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 must address habitat management techniques that can reduce the potential for wildlife hazards to aircraft operations" (AFMA 32-7003, 3.64.1). The purpose of 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 purpose of AICUZ study integration with the INRMP is to ensure AICUZ guidelines are incorporated into on-base land use planning within the natural resource program. The purpose of INRMP integration 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 mission. The purpose of INRMP integration with the FEP is to align natural resources management efforts with established design guidance for standardizing and improving the quality of the total installation environment. Specifically, the FEP'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.

2 INSTALLATION PROFILE

Installation Supplement

Office of Primary Responsibility (OPR)	10 CES/CEIEA has overall responsibility for implementing the natural resources management program and is the lead organization for monitoring compliance with applicable federal, state, and local regulations.
Natural Resources Manager/Point of Contact (POC)	Brian Mihlbachler, Ph.D. (719) 333-3308 brian.mihlbachler@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	U.S. Fish and Wildlife Service (Sikes Act) – Pam Sponholtz Colorado Parks and Wildlife (State/Local)- Brett Ackerman
Total acreage managed by installation	19,238
Total acreage of wetlands	253
Total acreage of forested land	10,500
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	ES/GJ-6-CO-00-F-009, Preble's Meadow Jumping Mouse, 12 Apr 2000 Biological Opinion and Conservation Agreement documents are maintained at 10 CES/CEIEA
Natural Resources Program Applicability (Place an X in the brackets "[X]" next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	[X] Fish and Wildlife Management [X] Outdoor Recreation and Access to Natural Resources [ ] Conservation Law Enforcement [X] Management of Threatened, Endangered, and Host Nation-Protected Species [X] Water Resource Protection

	[X] Wetland Protection [X] Grounds Maintenance [X] Forest Management [X] Wildland Fire Management [ ] Agricultural Outleasing [X] Integrated Pest Management Program [X] Bird/Wildlife Aircraft Strike Hazard (BASH) [ ] Coastal Zone and Marine Resources Management [X] Cultural Resources Protection [X] Public Outreach [X] Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

Installation Supplement

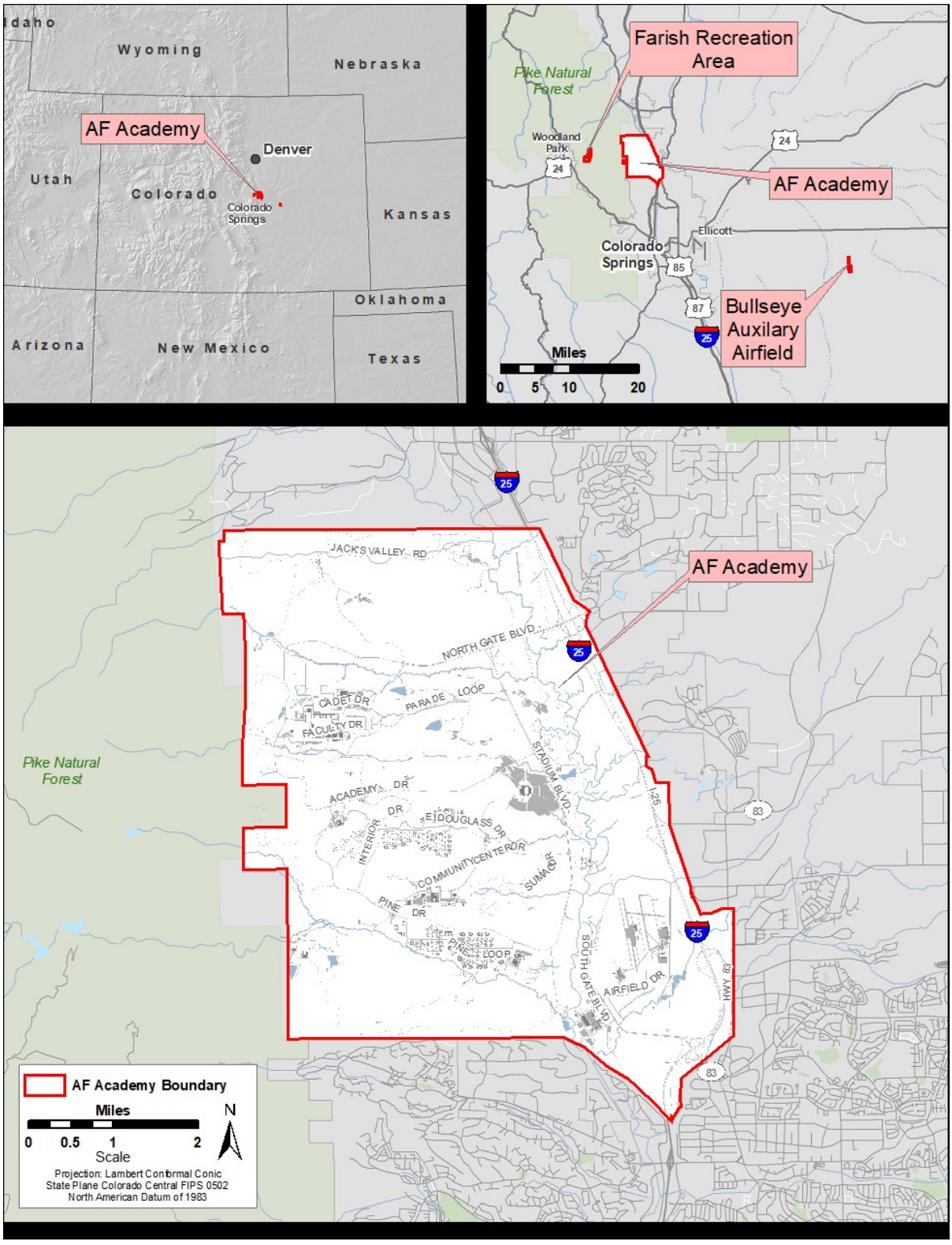
The 18,455-acre Academy is situated along the Rocky Mountain Front Range in Colorado about 6 miles north of downtown Colorado Springs and approximately 60 miles south of Denver. The Academy land covers an area that is about 5 miles wide by 7 miles long. The Rampart Range, which forms the western boundary of the Academy, is a north-south trending uplift within the Front Range that extends from Platte Canyon near Denver south to Pikes Peak. The Academy's shares its western boundary with the USFS Pike National Forest. Private property north, east, and south of the installation has rapidly developed, for both commercial and residential use, since the early 2000's. The Academy is bisected north-south by the Union Pacific railway, Interstate 25, and El Paso County's New Santa Fe Trail easement.

Farish Recreation Area

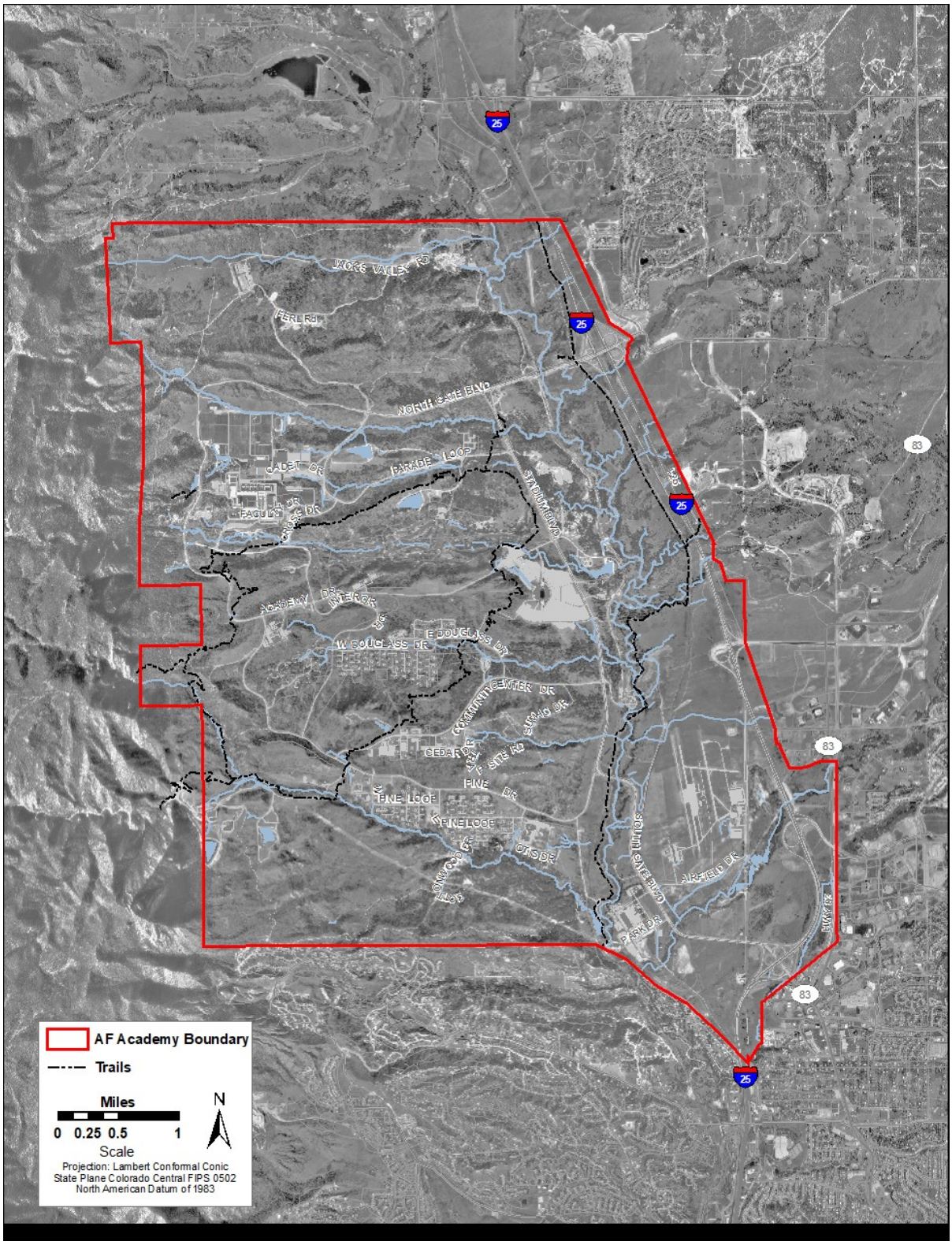
The 655-acre Farish Recreation Area is a detached unit to the Academy approximately 4.5 aerial miles northeast of Woodland Park in El Paso County in the Rampart Range. Farish is accessed from the Academy by car via U.S. Highway 24 and Rampart Range Road, or by foot or horseback via Pike National Forest Trail 707/721 through Stanley Canyon. Farish is bordered by private property and the Pike National Forest.

Bullseye Auxiliary Airfield

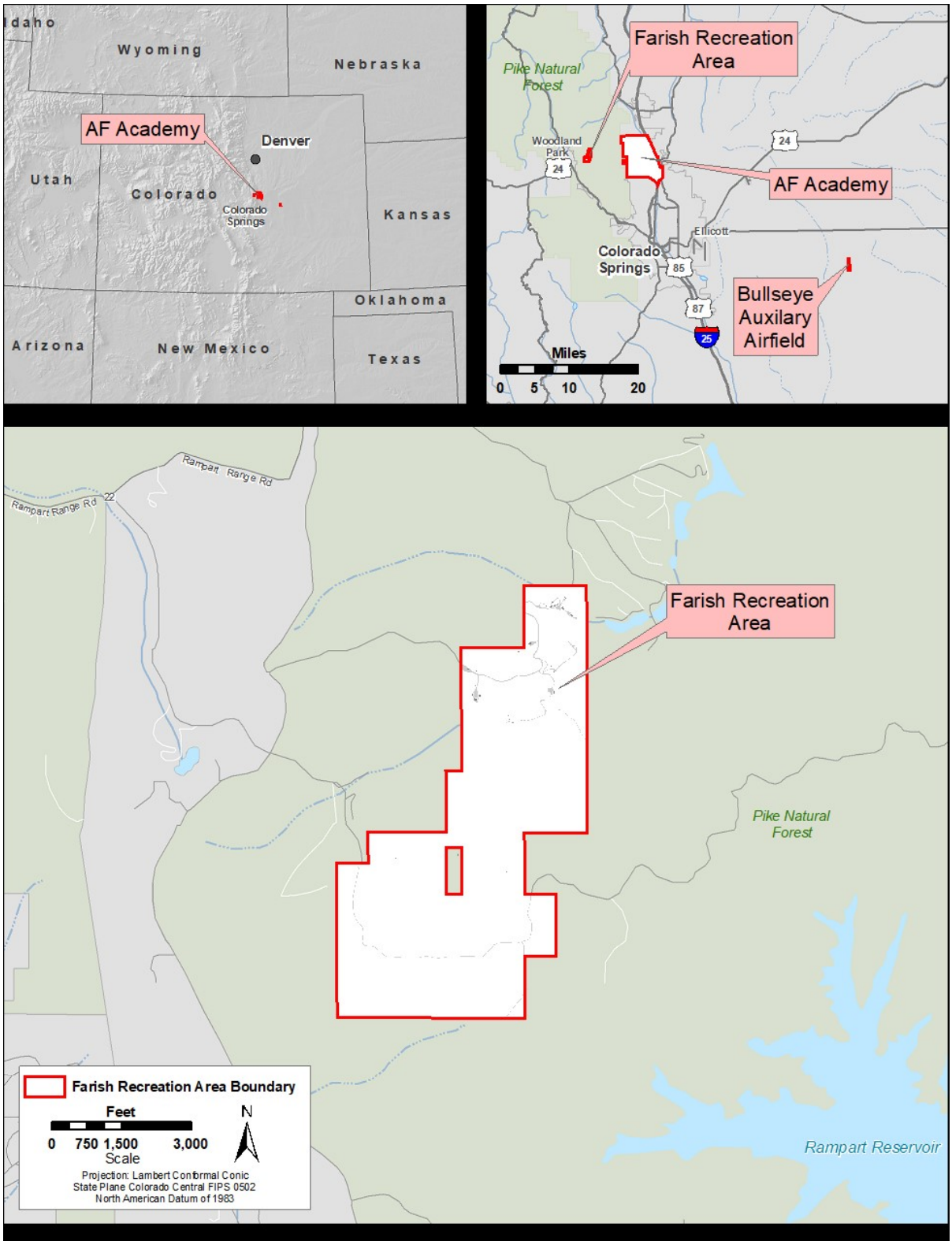
The 197-acre Bullseye Auxiliary Airfield is approximately 8 aerial miles east-southeast of Ellicott, El Paso County, Colorado on rural land leased from the Colorado State Land Board.



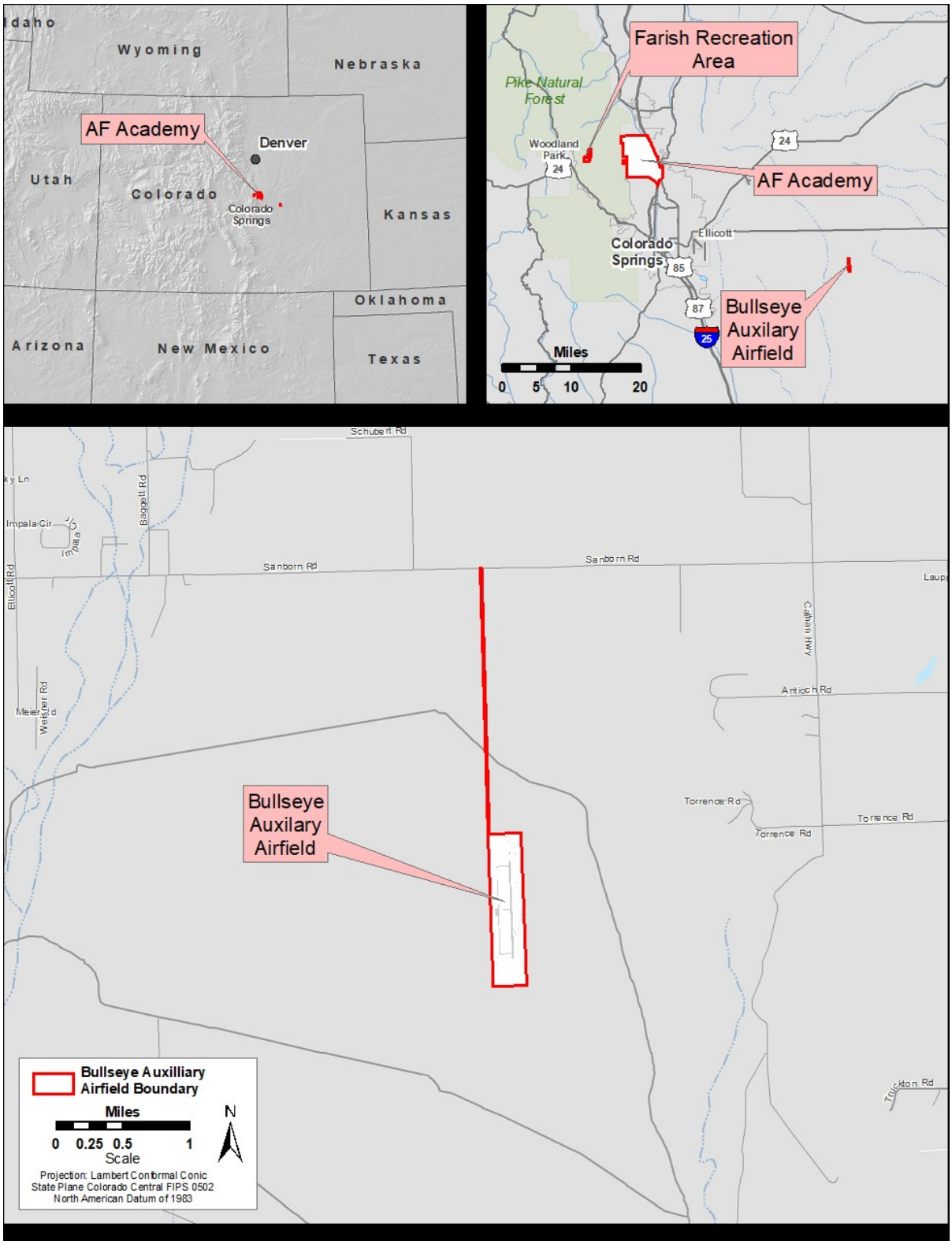
Academy Location and the Surrounding Region



Network of Roads and Trails Within and Immediately Adjacent to the Academy



Location of the Farish Recreation Area



Location of the Bullseye Auxiliary Airfield

Installation/GSU Location and Area Descriptions

Installation/ Geographically Separated Unit (GSU)	Main Use/Mission	Acreage	Addressed in INRMP?	Describe Natural Resource Implications

Farish Recreation Area	Recreation: camping, hiking, fishing, wildlife viewing	655	*yes*	No federally listed species. Forestry, trails, noxious weeds, and recreational fisheries are primary management concerns
Bullseye Auxiliary Airfield	Flight training	197	yes	No federally listed species. Migratory bird/BASH and other wildlife issues are primary management concerns
US Air Force Academy	Military training, education	18,455	yes	Federally threatened species present. Forestry, fish and wildlife, range and watershed protection, wildland fire, outdoor recreation are primary management concerns

2.1.2 Installation History

Installation Supplement

The idea for the Academy surfaced almost six decades ago, but did not become a reality until April 1, 1954, when President Dwight D. Eisenhower signed the bill establishing the USAF Academy. The legislation required that a five-member commission be appointed to advise the Secretary of the USAF of a permanent location for the Academy. The site-selection criteria the commission developed were similar to those of the first site-selection board, with the addition of size. They determined that a minimum of 15,000 acres would be required to accommodate academic facilities, flight training, rifle and machine gun ranges, maneuver areas, athletic fields, and space for future expansion. The group also foresaw that the Academy would become a national monument, as had the U.S. Military Academy at West Point, New York, and the U.S. Naval Academy at Annapolis, Maryland, and decided that consideration should be given to the natural beauty of the site.

Congress authorized creation of the Academy in 1954. Harold E. Talbott, then Secretary of the USAF, visited three possible sites presented to him by the site selection commission, and on June 24, 1954, he selected the Colorado Springs site. Commission members were favorably impressed by the fact that both the City of Colorado Springs and the State of Colorado wanted the Academy. They also cited the natural beauty of the site and the way the scenic quality appropriately symbolized USAF character and tradition.

On July 11, 1955, the same year construction began, the first class of 306 men was sworn in at a temporary site at Lowry Air Force Base, Denver. Lt. Gen. Hubert R. Harmon, a key figure in the development of the Academy since 1949, was recalled from retirement to become the first superintendent.

Two years later, Maj. Gen. Briggs took over as the Academy's second superintendent. During his tour, on Aug. 29, 1958, the wing of 1,145 cadets moved to its present site from Denver. Less than a year later the Academy received accreditation. On March 3, 1964, the authorized strength of the Cadet Wing was increased to 4,417 and later reduced to its present number of 4,000.

President Gerald R. Ford signed legislation Oct. 7, 1975, permitting women to enter the nation's military academies. Women entered the USAF Academy for the first time on June 28, 1976. The first class with women graduated in May 1980.

The Academy supports a total population of 11,903, including 4,135 cadets, 1,716 active-duty military residents, and 3,493 commuting civilians. Its sporting events and recreational opportunities attract thousands of visitors annually, and its scenic beauty creates a magnificent entry to the City of Colorado Springs.

Farish Recreation Area History

The Farish Recreation Area has been owned and operated as an off-base military recreation area since 1959 when a 60-acre parcel containing two lodges was purchased and donated to the Academy. Its purpose is to provide an off-base, high-quality, natural, mountain outdoor recreation setting for the DOD community. The land was given in memory of First Lieutenant William S. Farish Jr. who lost his life in the service of the Army Air Corps in World War II. Subsequent gifts and land purchases occurred in 1963, 1967, and 1969 bringing Farish to its current size of 655 acres. The two lodges and the caretaker's residence were designed by Colorado Springs architect Charles E. Thomas in the 1920s and 1930s. Grace Lake was created in 1930, Leo Lake was formed in the 1950s, and Sapphire Lake was built in 1965. Ranching, potato farming, and a small amount of mining have occurred in the southern part of the site, and there are remnants of agricultural fields, an icehouse, and a stock corral.

Since the USAF acquired the Farish Recreation Area, the property has been modified to meet the recreation needs of the Academy community. The area contains hiking trails and three fishing lakes. Entrance fees as well as overnight lodging and camping fees are charged. Paddleboats, cross-country skis, mountain bikes, fishing poles, and other equipment are available for rent. Facilities include small lodges, RV and tent campsites, picnic pavilions, cottages, a multipurpose building, a program barn, an entrance station and store, a bathhouse, and camper cabins.

Bullseye Auxiliary Airfield History

The Academy acquired the use of the Bullseye Auxiliary Airfield in 1988 through a long-term lease from the State of Colorado to accommodate increases in T-41 pilot training, glider activity, and other types of aircraft operations that exceeded the capacity of the existing airfield while saturating the available airspace. Considerations of safety, operational efficiency, and the Academy mission to better prepare cadets for more advanced pilot training established the need for a new auxiliary airfield.

2.1.3 Military Missions
Installation Supplement

The Academy's mission is to educate and train cadets to be future leaders of the USAF and provide direct support for cadets and the base community. The natural resources management mission is to help the Academy maintain the natural setting for training and enjoyment, comply with environmental laws and regulations, and maintain healthy forest, range, and wildlife resources that provide multiple opportunities for consumptive and non-consumptive use. Oversight of the Academy's natural resource management is the responsibility of the 10th Air Base Wing, 10th Mission Support Group, and 10th Civil Engineer Squadron. Significant coordination also occurs with the Cadet Training Wing, the 306th Flight Training Group, and the Force Support Squardron .

Listing of Tenants and Natural Resources Responsibility

Tenant Organization	Natural Resources Responsibility
U.S. Fish and Wildlife Service, Colorado Fish and Wildlife Conservation Office, Upper Colorado Basin Region	*Through a Cooperative Agreement, the U.S. Fish and Wildlife Service manages the Academy's Natural Resources Office and all natural resources on the installation*

2.1.4 Natural Resources Needed to Support the Military Mission
Installation Supplement

The landscape of the Air Force Academy is a diverse assemblage of plant communities that offer a varied and challenging military training environment. Forests, shrublands, grasslands, and riparian areas offer realistic land resources for conducting close-combat training scenarios. Proper management of the natural landscape is critical for sustaining the long-term use and quality of the land-based resources needed to provide the required training environment. Revegetation and soil erosion control, noxious weed and fire management, watershed protection and restoration, and forest insect and disease control are management activities necessary to sustain the training landscape, aesthetics of the Academy, and outdoor recreation amenities.

Off-road vehicle (ORV) use can have a negative impact on natural areas and military training lands. The development of new roads and trails by ORV's and military vehicles can cause vegetation damage, soil erosion, habitat and training lands fragmentation, and the spread of noxious weeds. For these reasons, ORV use is strictly limited to official government and military training support activities.

2.1.5 Surrounding Communities

Installation Supplement

The Academy is in El Paso County, which has a total population of 720, 403 (2019). Within the county are two small towns north of the Academy, Palmer Lake (population 2,887) and Monument (population 7,398). The City of Colorado Springs, with 464,871 residents, is south and southeast of the Academy. Commercial and residential development north and east of the Academy is expanding and has created airfield noise and airspace encroachment concerns, stormwater management problems, and wildlife habitat (including T&E species) and wetlands impacts. The Academy pursues partnerships with local governments, developers, and private landowners to address these issues.

2.1.6 Local and Regional Natural Areas

Installation Supplement

The Rampart Range, which forms the western boundary of the Academy, is a north-south trending uplift within the Front Range that extends from Platte Canyon near Denver south to Pikes Peak. The Academy's western boundary is contiguous with that of the Pike National Forest. Other local natural areas include the Garden of the Gods Regional Park, Monument Fire Center, Fox Run Regional Park, and Black Forest Regional Park.

Farish Recreation Area

The Farish Recreation Area is embedded within the Pike National Forest and is also bordered by low-density private home sites and ranchettes.

Bullseye Auxiliary Airfield

The Bullseye Auxiliary Airfield is surrounded by shortgrass and mixed grass prairie rangeland used for cattle grazing. Land ownership around Bullseye is owned by the State Land Board (SLB) and most is designated as State Stewardship Trust. This designation conveys additional resource "protection" above that on other SLB property.

2.2 Physical Environment

2.2.1 Climate

Installation Supplement

The Academy has a semi-arid climate, receiving approximately 15 inches of annual precipitation as rainfall and snow. Most precipitation occurs from April through September, with the highest amounts occurring as rainfall in July and August. Temperatures range from a mean of 25 degrees Fahrenheit (°F) in December to 67°F in July. The prevailing wind direction is from the north-northwest, with an average wind speed of 10 miles per hour. Wind velocities in excess of 70 miles per hour can occur, especially during the winter.

The weather data below summarizes information collected at the USAFA airfield from 1967-2018.

OPERATIONAL CLIMATIC DATA SUMMARY (OCDS-II)

LOCATION ID	STATION NAME	PERIOD OF RECORD	UTC TO LST
FAA_KAFF	AIR FORCE ACADEMY, CO	Mean: 2008/01/01 - 2017/12/31 Extreme: 1967/11/27 - 2018/10/31	-7
LOCATION(DEGREES)		**ELEVATION(FEET)**	**PREPARED BY**
N 38.969 W 104.813		6572	557WW /14WS
YEAR(S)		**DETAILED POR**	
Period of Record (see detailed POR >>>)		1967-1970, 1977-2017	

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

Back to front page

TEMPERATURE

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Temperature Extreme Maximum (°F)	73	74	78	82	93	99	100	97	91	86	79	70	100
Temperature Mean Maximum (°F)	45	45	56	60	67	81	84	81	76	64	54	44	63
Temperature Mean (°F)	27	28	36	41	50	65	67	65	59	46	36	25	46
Temperature Mean Minimum (°F)	17	19	26	32	40	50	55	53	47	35	26	16	35
Temperature Extreme Minimum (°F)	-21	-22	-8	0	18	27	39	36	21	-4	-12	-21	-22
Temperature Maximum Range (°F)	50	58	50	50	49	52	47	49	52	49	54	56	58
Days With Temperature >= 90°F	0	0	0	0	0	4	6	1	0	0	0	0	10
Days With Temperature <= 32°F	29	26	25	20	6	0	0	0	0	14	25	30	175
Days With Temperature <= 0°F	3	2	0	0	0	0	0	0	0	0	1	3	8

* = No Data T = Trace # = Occurrences rounded to 0

PRECIPITATION

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Precipitation Period Maximum (In)	1.1	1.1	3.2	8.4	10.3	6.4	6.7	6.3	5.7	4.1	2.0	1.5	23.5
Precipitation Period Mean (In)	0.3	0.3	0.8	1.4	2.0	1.9	2.6	2.8	1.3	0.7	0.5	0.4	15.2
Precipitation Period Minimum (In)	0.0	0.0	0.0	0.1	0.0	0.1	0.4	0.3	0.1	0.0	0.0	0.0	7.5
Precipitation Period Daily Maximum (In)	0.8	0.6	1.6	4.1	2.4	3.4	3.6	3.1	2.9	2.4	1.3	1.5	4.1
Snowfall Period Maximum (In)	13.6	23.0	23.0	22.6	14.0	0.4	0.0	0.0	8.2	21.5	21.2	15.7	90.1
Snowfall Period Mean (In)	4.9	5.3	7.1	6.8	1.4	0.0	0.0	0.0	0.5	2.5	4.5	4.8	36.8
Snowfall Period Daily Maximum (In)	7.8	16.3	9.4	14.0	10.0	0.4	0.0	0.0	5.0	12.5	10.0	14.9	16.3
Days with liquid >= Trace	8	7	7	9	9	9	9	9	7	7	5	8	94
Days with liquid >= 0.01"	2	3	4	7	11	8	13	13	6	5	2	2	76
Days with liquid >= 0.5"	0	#	#	1	1	#	2	1	1	#	0	0	7
Days with snow >= Trace	5	4	5	4	2	#	#	#	1	2	4	4	31
Days with snow >= 0.05"	4	4	5	4	1	0	0	0	#	2	4	4	28
Days with snow >= 1.5"	1	1	2	2	#	0	0	0	#	1	1	1	9

* = No Data T = Trace # = Occurrences rounded to 0

Farish Recreation Area

Farish is approximately 2500-feet higher in elevation than the Academy, therefore the average temperature is expected to be lower and the amount of precipitation is expected to be higher than at the Academy. Woodland Park, Colorado has the most similar weather and climate.

Bullseye Auxiliary Airfield

Bullseye is east of the Academy on the Plains, therefore the average temperature is expected to be higher and the amount of precipitation is expected to be lower than at the Academy. Ellicott, Colorado has the most similar weather and climate.

2.2.2 Landforms

Installation Supplement

Boundaries for the Academy were based on the need for airspace, land-based military training, room for future expansion, and viewshed protection. The Academy was comprehensively master planned before construction began. The original master plan clustered development into separate functional use areas and devoted nearly 70 percent of the base to open space. The master plan regarded open space as integral to the overall design concept of the Academy, with uses intended to preserve views, restrict development in environmentally unsuitable areas, separate and buffer subareas and functions, and provide for recreation.

Installation Supplement

Topography and Geology at the Academy

The physiography of the Academy generally consists of a series of west-to-east trending ridges interspersed by valleys. Valley streams drain eastward into Monument Creek. Gentle southwest-trending slopes drain toward Monument Creek from the areas east of the Academy. The western boundary of the west-to-east traveling mesas and valleys is formed by an abrupt, north-south trending ridge of sedimentary rock, with the steep slopes of the Rampart Range forming the visual and physical backdrop to the Academy. Elevations range from 6,376 feet at Monument Creek near the South Gate to 7,800 feet at the base of the Rampart Range at Stanley Canyon.

The dominant physiographic feature and geologic influence in this area is the Pikes Peak batholith, a huge mass of magma that pushed its way upward through existing rock approximately one billion years ago. The resultant rock type, reddish-pink Pikes Peak granite, is prevalent. An associated formation, the Dawson Arkose, underlies much of the Academy and is visible at several areas, especially along Monument Creek where it is exposed, and in several picturesque geologic monuments known locally as "hoodoos," including Cathedral Rock on the western end of Jacks Valley. These formations consist of sandstones that have been created by the weathering of the Pikes Peak Granite.

Farish Recreation Area

The topography of the Farish Recreation Area is characterized by rolling terrain associated with South Beaver Creek and several unnamed tributaries that flow to the northeast across the recreation area. Sapphire, Leo, and Grace Lakes are impoundments along the main stem of Beaver Creek in the northeast section of the recreation area. Elevations in the recreation area range from approximately 9,360 feet in its southwest corner to approximately 9,040 feet in its northeast corner where South Beaver Creek flows off of the recreation area.

The Farish Recreation Area is located in the Rampart Range which is part of the eastern edge of the Front Range. The north striking Rampart Range Fault forms the east flank of the Rampart Range and extends from near Larkspur, south toward Colorado Springs, where it ends near State Highway 24. The fault occurred as a result of uplifting of the Pikes Peak Granite during the Laramide Orogeny, dating from the Late Cretaceous, 70-80 million years ago to the Oligocene, 23-36 million years ago.

Bullseye Auxiliary Airfield

The topography of Bullseye Auxiliary Airfield is characterized by a gently sloping to a nearly level plain of low topographic relief. The elevation of the airfield is approximately 6,000-feet.

Bullseye lies within the southern portion of the Denver Basin structural province. No bedrock is exposed at the site. Subsurface bedrock contacts are not inferred because the entire site is covered by a surficial deposit of windblown sand. This sand deposit is geographically extensive in the southeastern section of El Paso County. Presently, the sand is stabilized by vegetation. It is probable that the material was deposited during the early Holocene period (the present to 10,000 years ago) and the Pinedale Glaciation when climatic conditions were different.

Soils at the Academy

The protection of soil and water resources is required under the following laws, regulations, and policies:

- Clean Water Act of 1977, as amended
- EO 11514, Protection and Enhancement of Environmental Quality
- Federal Land Policy and Management Act of 1976
- Federal Water Pollution Control Act of 1977
- Soil and Water Conservation Act
- Food Security Act of 1975.

The following are examples of criteria the Natural Resources Conservation Service (NRCS) uses to describe soils:

- Slope. Slope is the inclination of the land surface from horizontal. The percentage of slope is defined as the vertical distance divided by the horizontal distance.
- Erodibility Index. A numerical expression of the potential of a soil to erode, considering the physical and chemical properties of the soil and climatic conditions where it is located. The higher the index, the greater the investment needed

to maintain the sustainability of the soil resource base if intensively cropped. Erodibility Index scores of 8 or above are equated to highly erodible land.
- Water Permeability. Permeability refers to the ability of water to move downward through saturated soil. It is measured in inches per hour.
- Shrink-Swell. Shrink-swell is the contraction (shrinking) of soil when dry and expansion (swelling) when wet. This can cause damage to roads, dams, building foundations, and other structures.

Most of the soils at the Academy are derived from a granitic parent material that is are moderately to highly erodable. They are generally very shallow (horizons are not defined) and have very little fine or organic material. Deeper soils with finer particles and organic matter occur as outwash deposition in the valleys. Soils in a few areas (surrounding the airfield, in the vicinity of Falcon Stadium and Douglass Valley Housing, and just east of the Community Center, cemetery, and golf course) have a slight-to-moderate erosion potential. Most of these areas are already associated with some type of fairly intensive human use. Very thin soils found on the steeper slopes of the southern and western boundaries have an extremely high erosion potential.

The NRCS identifies 26 soil mapping units on the Academy (NRCS 2006). The mapping units are composed of phases of 19 soil series and urban land. The following text provides general descriptions of the soil series mapped on the Academy.

Ascalon. The Ascalon series consists of deep, well-drained soils that formed in mixed alluvium and wind-laid materials. These soils are on uplands. They have slopes of 1 to 9 percent.

Blakeland. The Blakeland series consists of deep, somewhat excessively drained soils. These soils formed in arkosic sandy alluvium and eolian sediment on uplands. They have slopes of 1 to 20 percent.

Blendon. The Blendon series consists of deep, well-drained soils that formed in sandy arkosic alluvium. These soils are on terraces, floodplains, and in drainageways. They have slopes of 0 to 3 percent.

Besser. The Besser series consists of deep, well-drained soils that formed in alluvium and residuum derived from arkosic sedimentary rock. They have slopes of 0 to 20 percent.

Columbine. The Columbine series consists of deep, well-drained to excessively drained soils that formed in very gravelly arkosic alluvium. These soils are on terraces, floodplains, and alluvial fans and in drainageways. They have slopes of 0 to 3 percent.

Cruckton. The Cruckton series consists of deep, well-drained soils that formed in arkosic sandy loam deposits. These soils are on uplands. They have slopes of 1 to 9 percent.

Cushman. The Cushman series consists of moderately deep, well-drained soils that formed in calcareous loamy materials derived from weakly consolidated beds of mixed mineralogy. These soils are on uplands. They have slopes of 1 to 15 percent.

Ellicott. The Ellicott series consists of deep, somewhat excessively drained soils that formed in non-calcareous stratified sandy alluvium derived from arkose beds of granite. These soils are on terraces and floodplains. They have slopes of 0 to 5 percent.

Jarre. The Jarre series consists of deep, well-drained soils that formed in alluvium derived from sandy sediment. These soils are on alluvial fans or old terraces. They have slopes of 1 to 30 percent.

Kutler. The Kutler series consists of moderately deep, somewhat excessively drained soils that formed in material weathered from granite bedrock. These soils are on mountains. They have slopes of 25 to 65 percent.

Kettle. The Kettle series consists of deep, well-drained soils that formed in sandy arkosic deposits. These soils are on fans and uplands. They have slopes of 3 to 40 percent.

Kutch. The Kutch series consists of moderately deep, well-drained soils that have formed in calcareous clay over shale. These soils are on uplands. They have slopes of 3 to 20 percent.

Perrypark. The Perrypark series consists of deep, well-drained soils that formed in arkosic alluvium derived from sedimentary and granite bedrock. These soils are on alluvial fans and valley side slopes. They have slopes of 3 to 9 percent.

Peyton. The Peyton series consists of deep, well-drained soils that formed in arkosic alluvium and residuum. These soils are on uplands. They have slopes of 1 to 15 percent.

Pring. The Pring series consists of deep, well-drained soils that formed in arkosic sandy sediment. They have slopes of 3 to 30 percent.

Sampson. The Sampson series consists of deep, well-drained soils that formed in alluvium derived from sedimentary rock. These soils are on alluvial bottom lands that are commonly in small, closed basins. They have slopes of 0 to 3 percent.

Tomah. The Tomah series consists of deep, well-drained soils that formed in alluvium or residuum derived from arkose beds. These soils are on upland alluvial fans, hills, and ridges. They have slopes of 3 to 15 percent.

Travessilla. The Travessilla series consists of shallow, well-drained soils that formed in residuum derived from sandstone. These soils are on rocky uplands. They have slopes of 0 to 75 percent.

Truckton. The Truckton series consists of deep, well-drained soils that formed in alluvium and residuum derived from arkosic sedimentary rock. These soils are on uplands. They have slopes of 0 to 20 percent.

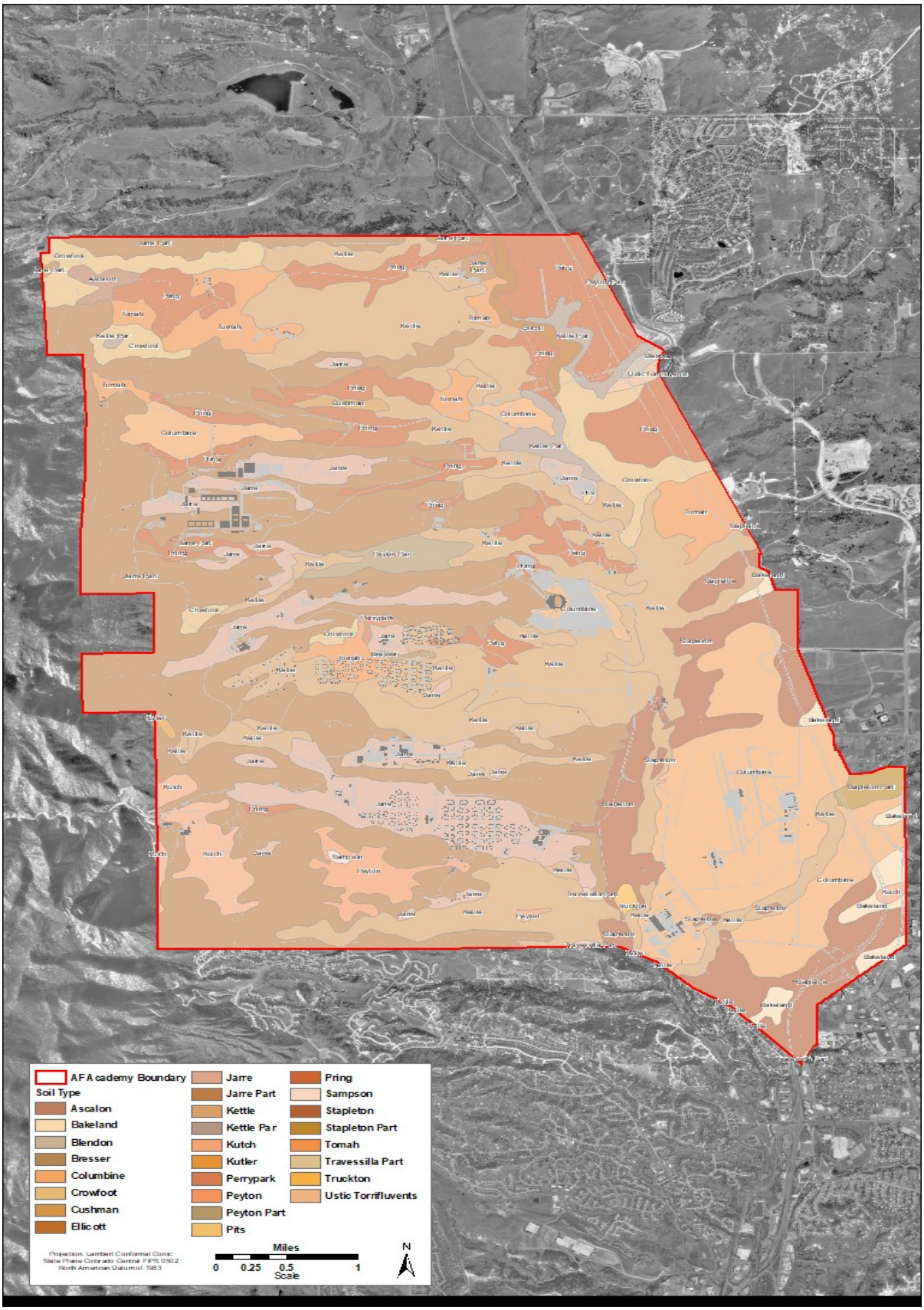
Farish Recreation Area

The soils at Farish are composed mainly of weathered Pikes Peak granite. Sphinx gravelly coarse sandy loam is the dominant soil type. This soil is well-drained, yet due to soil particle size, steep slopes, and intensive thunderstorms, the erosion potential is extreme. The depth of the organic layer varies with location, but it is generally less than 4 inches. Because the soil is formed of decomposing rock, natural fertility is low. Depth to bedrock is 10 to 20 inches. Aquolls, the soil type found in drainageways and valley bottoms, are much deeper. They typically have a top organic layer about 12 inches deep with a layer of very fine sandy loam as much as 60 inches in depth. The NRCS has not mapped the soils at Farish.

Bullseye Auxiliary Airfield

The NRCS identifies one soil mapping unit on the Bullseye Auxiliary Airfield, Wigton loamy sand, with 1 to 8 percent slopes. The typical Wigton soil profile in El Paso County is composed of surface soil of brown loamy sand to a depth of 19 inches, underlain by very pale brown sand to a depth of 60 inches or more. The soil is rapidly permeable and dry because of its high sand content. Precipitation percolates rapidly, enhancing drainage.

The Wigton loamy sand map unit also includes small areas of Bijou loamy sand, with 1 to 8 percent slopes; Bijou sandy loam, with 1 to 3 percent slopes; Bijou sandy loam with 3 to 8 percent slopes: and Valent sand, with 1 to 9 percent slopes. Bijou soils differ from Wigton by having a subsoil horizon of slightly finer texture where some clay has accumulated. Valent soils have predominately fine and very fine sand whereas Wigton soils have a high proportion of medium and coarse sand.



Soils Mapped on the Academy

2.2.4 Hydrology

Installation Supplement

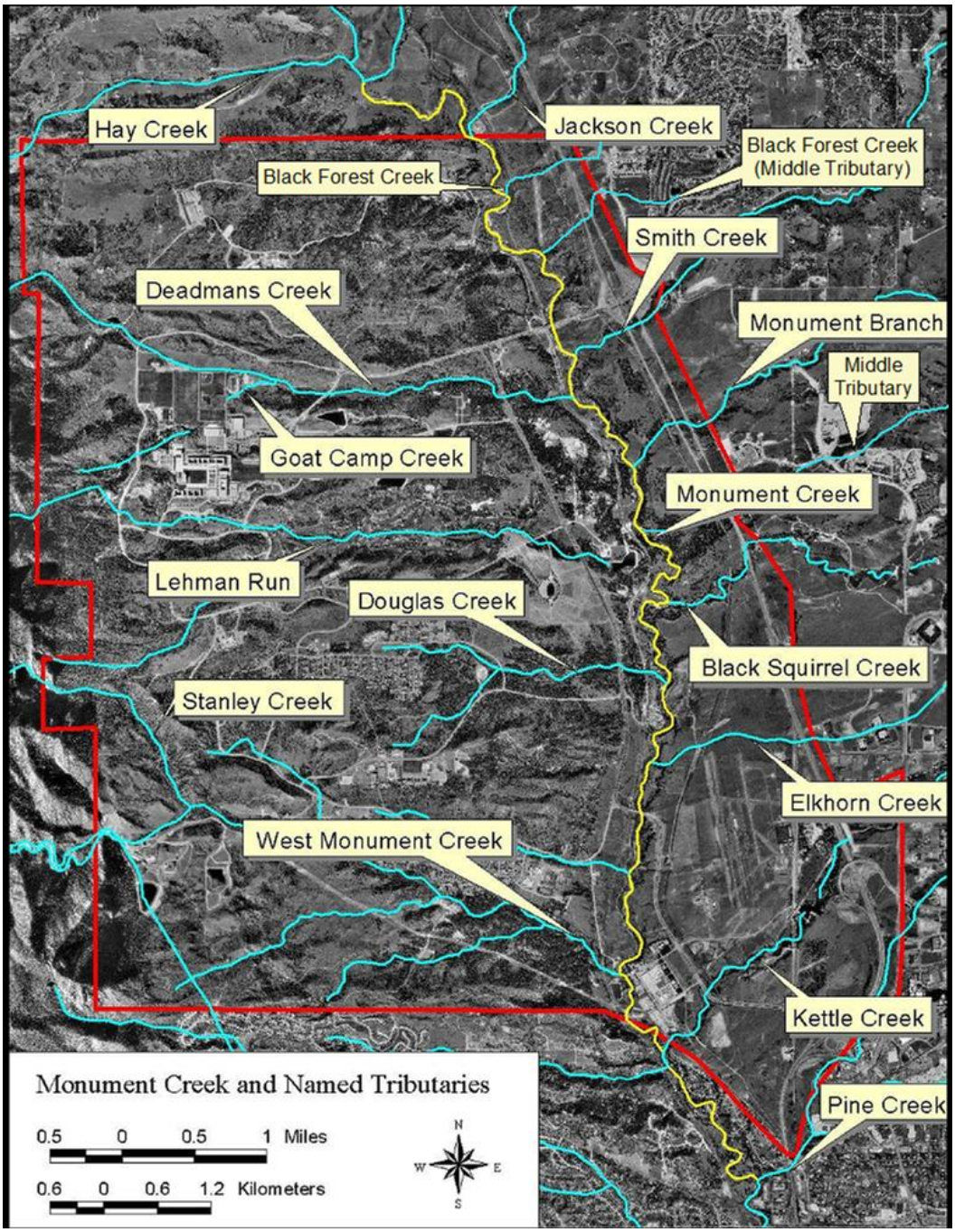
The stream corridors are among the most important natural resources features on the Academy, representing areas of concentrated biodiversity and important habitats. The predominant surface water feature on the base is Monument Creek, which runs from north to south on the east side of the Academy. The headwaters of Monument Creek are in springs in the Rampart Range north and west of the Academy. The Academy covers approximately 12% of the Monument Creek Watershed, but nearly 75% of the watershed's drainage flows though the base in Monument Creek before exiting the southern boundary. The Academy has preserved Monument Creek, and it represents one of the best remaining plains streams in the upper Arkansas River drainage. Monument Creek is a refuge for several species of rare plants and for the Preble's meadow jumping mouse, a federally-threatened species.

Other perennial and intermittent streams on base are very poor to good condition depending on floodplain and channel erosion and riparian vegetation cover. All tributary streams flowing into Monument Creek from the east have been eroded by increased stormwater volume from urban development. Some of the western tributaries have also been degraded by increased runoff from on-base development. Open water on the Academy consists of five recreational lakes and four non-potable reservoirs.

Riparian vegetation at the lower elevations is primarily willow (*Salix* spp.)/cottonwood (*Populus angustifolia* and *P. deltoides*), changing to alder (*Alnus* spp.) and then to spruce (*Picea*)/Douglas fir (*Pseudotsuga menziesii*) at higher elevations. These corridors function as vital links between the different plant communities described in the Vegetation section (2.3.2).

Open Water on the Academy

Name	Surface Area (Acres)	Volume (Acre Feet)
Non Potable Reservoir No. 1	8.89	145
Non Potable Reservoir No. 2	11.68	335
Non Potable Reservoir No. 3	8.92	150
Non Potable Reservoir No. 4	3.0	35
Deadmans Lake	2.08	14
Ice Lake	5.39	28
Kettle Lake No. 1	2.06	18.2
Kettle Lake No. 2	3.5	33
Kettle Lake No. 3	6.75	47



Monument Creek and its Tributaries

Farish Recreation Area

Water from springs originating on Farish and surrounding lands forms South Beaver Creek, which flows eastward out of the Rampart Range into Monument Creek. The Monument Creek corridor bisects the eastern part of the Academy and drains into Fountain Creek and eventually the Arkansas River at Pueblo, Colorado. Except for Grace Lake, Leo Lake, Sapphire Lake, and Mel's Pond, which are all man-made impoundments, there is little perennial surface water on Farish.

Open Water at the Farish Recreation Area

Name	Surface Area (Acres)	Volume (Acre Feet)
Grace Lake	5.05	14.96

Mel's Pond	0.09	Unknown
Sapphire Lake	3.55	Unknown

Bullseye Auxiliary Airfield

There are no surface drainages or water bodies found on or in the vicinity of the Bullseye Auxiliary Airfield due to the flat topography and deep sandy soils which have a rapid permeability.

Water Quality at the Academy

Surface water quality at the Academy can be detrimentally impacted by fuel or other hazardous material spills or leaks, air pollution sources, seepage from Environmental Restoration Program (ERP) sites, and off-base land use. Pollutants from these sources can degrade water quality either through toxicity effects on organisms in the water or through ancillary effects such as high Biological Oxygen Demand (BOD) from increased microbial activity in the water, or eutrophication due to excess nutrient loads (e.g., phosphorus or nitrogen). High BOD can result in fish kills and other damage to surface water ecology. Monument Creek is currently on the state's 303(d) List of Impaired Water Bodies for *Escherichia coli*, manganese, macroinvertebrates (provisional), and temperature.

Sedimentation due to erosion also impacts water quality. Erosion disturbs existing plant communities, and the resulting siltation in streams can degrade benthic habitat and fish spawning grounds. In an effort to protect surface water quality, the Academy employs certain soil erosion/construction BMPs and watershed protection controls, and has an aggressive channel and habitat restoration program.

The Academy's Stormwater Pollution Prevention Plan identifies BMPs that prevent hazardous materials from contacting and contaminating stormwater runoff. Examples of BMPs include secondary containment structures, covered (sheltered) work areas, and personnel training. Stormwater BMPs were developed for Jacks Valley (URS Group 2006a), the Cadet Area (URS Group 2006b), the Community Center (URS Group 2006c), the Main Airfield (URS Group 2006d), and the base composting facility. The Monument Creek Watershed Restoration Master Plan (2016) also identifies numerous on-base and off-base projects and priorities for controlling erosion and sedimentation throughout the watershed.

Farish Recreation Area

Threats to water quality at Farish occur from erosion and sediment transport after intense rainstorms, especially from roadways and campsites, and from potential POL from the maintenance facility in the floodplain of South Beaver Creek, below Grace Lake dam.

Bullseye Auxiliary Airfield

There is no surface water at the Bullseye Auxiliary Airfield; therefore, there are no water quality issues.

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

Installation Supplement

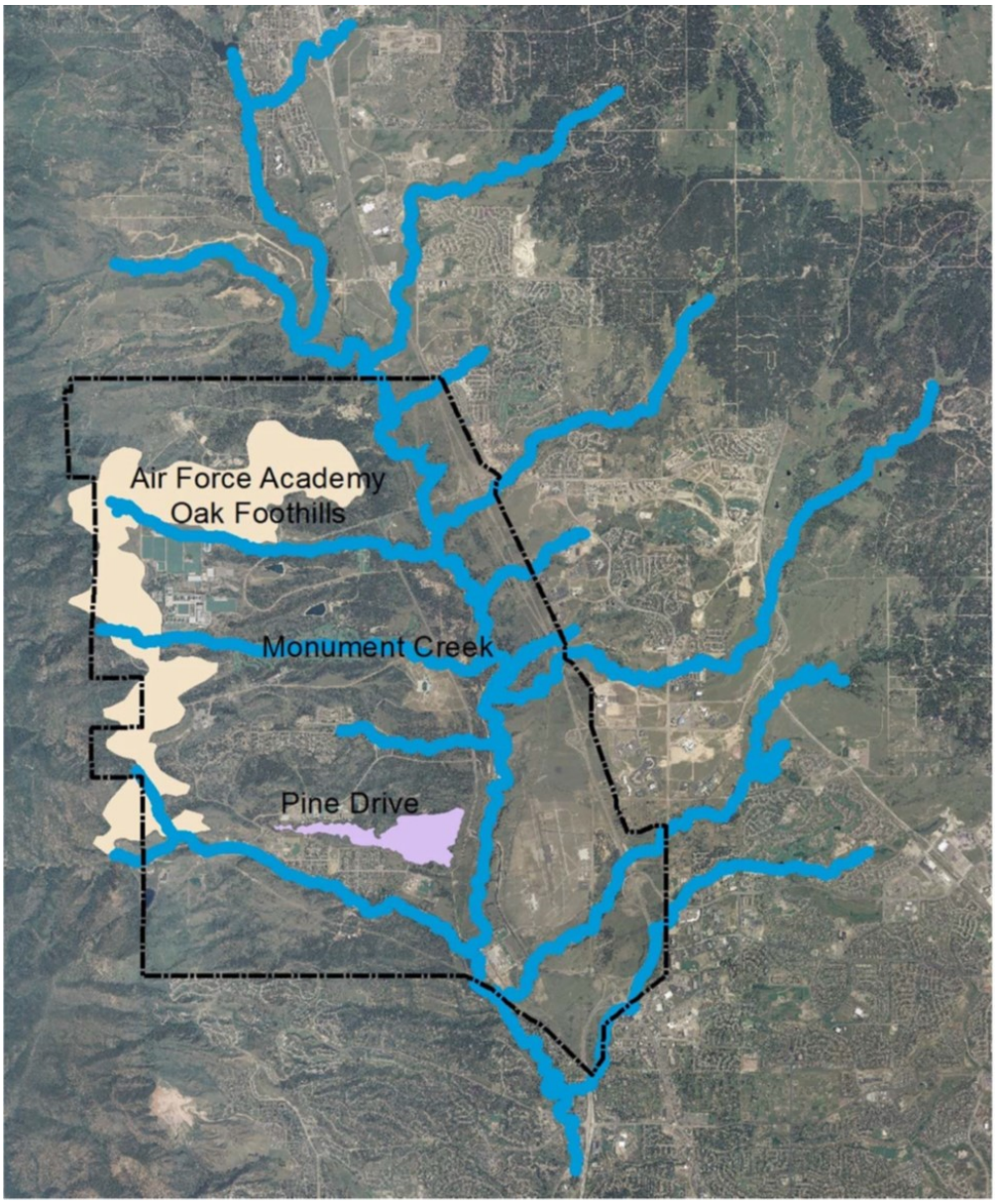
The Academy represents a rapidly disappearing Front Range transitional ecosystem of varied wildlife habitats. Similar habitats north and south of the Academy are rapidly being lost to development. Development on the Academy has resulted in selective habitat fragmentation and degradation.

Because of habitat diversity and preservation efforts, there are more native wildlife species on the Academy than would be expected in an area of equivalent size and proximity to an urban center. For example, 247 (55%) of the 444 bird species found in Colorado occur at the Academy, and about 70 (56%) of the 125 mammal species known to occur in Colorado are found on the Academy.

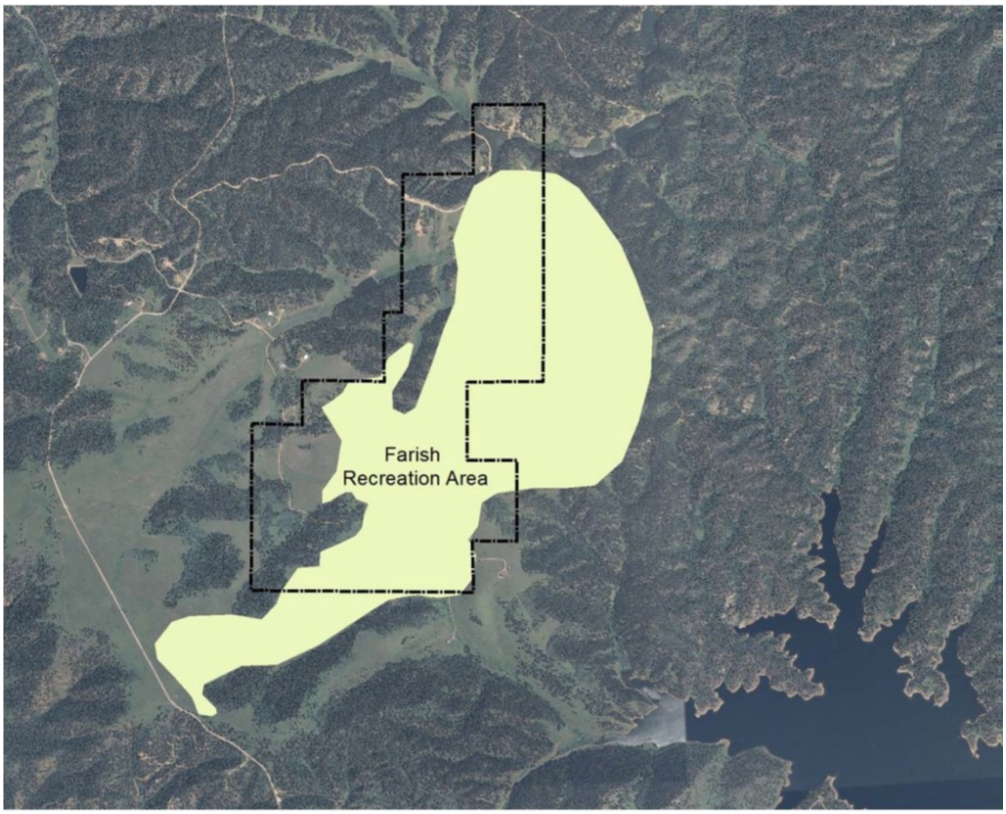
Factors contributing to the high biodiversity on the Academy are the topographic variation, the location at the convergence of north-south and plains-mountains transition zones, the presence of high-quality riparian habitat, and the proximity to the undeveloped forested expanses of the Pike National Forest. The large percentage of undeveloped natural areas on the base and the numerous vegetation types and their resulting mosaic, or pattern, provide a high degree of connectivity between habitat types and maintain essential movement corridors for mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*), American elk (*Cervus elaphus*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*).

Monument Creek and its tributaries are important riparian habitats for wildlife, especially white-tailed deer, Preble's meadow jumping mouse, amphibians, neotropical migratory birds, and native fish species. The highest diversity of species occurs in the riparian and shrub communities. Mature ponderosa pine stands with a grass understory provide habitat for Abert's squirrel (*Sciurus aberti*). Ridges and valleys that run west to east across are common wildife travel corridors. South-facing slopes are important feeding and warming areas for deer and elk and north slopes are often used as bedding and thermal cover areas.

Areas containing natural resources warranting special protection have been identified and designated by the Colorado Natural Heritage Program and the Academy as Potential Natural Areas and Species of Concern. Through vegetation and noxious weed surveys, wildlife monitoring activities, and biological inventories (CNHP 2012, 2019), several plant communities and plant or animal species that represent the natural, historic biological diversity of the Academy and Farish Recreation Area have been identified. Data from those surveys is cataloged in the Colorado Natural Heritage Program's Biodiversity Tracking and Conservation System (BIOTICS) for future use in conservation planning and management.



Potential Conservation Areas on the Academy (CNHP 2012)



Potential Conservation Area on Farish Recreation Area (CNHP 2012)

2.3.2 Vegetation
Installation Supplement

The following sections describe the vegetative environment on the Air Force Academy, Farish Recreation Area, and Bullseye Auxiliary Airfield. Due to variation in topography, elevation, hydrology, soils, and historical land use, these properties sustain high diveristy of native and non-native plant species and vegetative communities.

2.3.2.1 Historic Vegetation Cover
Installation Supplement

The vegetation of the Academy includes the Southern Rocky Mountain EcoRegion (Crystalline Mid-Elevation Forests) and the Southwestern Tablelands EcoRegion (Foothilss Grasslands), represented by montane, foothill, and grassland zones (Ripley 1994). Plant communities of coniferous forest, shrubland, grassland, and riparian dominated the historic landscape and still persist today. Grazing, mining, agriculture, fire suppression, and logging activities in the area as early as the 1860's, however, significantly altered the plant cover and diversity, and likely contributed to current management issues such as noxious weed invasion, soil erosion, and stream instability.

Montane forest, with interspersed with grassy meadows, dominated the historic landscape at Farish and still persist today. Much of the grassland meadows were historically modified and used for livestock grazing and potato farming, resulting in the invasion of non-natives grasses (e.g., smooth brome [*Bromis inermis]*). With wildfire suppression, coniferous forest of spruce and fir has also slowly encroached on the meadows.

The historic landscape at Bullseye was characterized as shortgrass and mixed-grass prairie, which still persists today. Despite a long-history of livestock grazing in the area, non-native species, including noxious weeds, are virtually non-existent.

2.3.2.2 Current Vegetation Cover
Installation Supplement

In his 1994 book, *Vegetation of the U.S. Air Force Academy and the Adjacent Regions of the Pike National Forest, El Paso County, Colorado*, Dr. Douglas Ripley listed 649 different plant species on the Academy and adjacent Pike National Forest lands. Of those, 528 (81.3 percent) are native plants and 121 (18.7 percent) are introduced. About 70 percent of the flora of El Paso County and 20 percent of all the plants in Colorado are represented on the Academy (Ripley 1994).

The Academy's vegetation resources are significant in that they encompass the elevation-related gradient from prairie grasslands to montane forests. The mosaic, or the pattern that the different plant communities create in relationship to one another, is a critical aspect of the biodiversity found at the Academy. Using data from the 2020 CEMML vegetation classification and GIS mapping project, the combined natural and semi-natural vegetated area of the Academy, Farish, and Bullseye combined is approximately 17,153 acres, or 88% of the total installation area.

Because the foothills are prime development areas along the Front Range, relatively intact foothills vegetation communities are declining in number and area. The Academy, along with Roxborough State Park (about 50 miles to the north), represents one of the last remaining relatively "untouched" mature ponderosa pine (*Pinus ponderosa*)/scrub oak (*Quercus gambelli*) habitat type on the Front Range. Fire is a known disturbance mechanism affecting the health and distribution of these vegetation communities.

Ecological research in the Front Range, starting in the early 20th Century, has identified trends in the vegetation composition as influenced by fire and other disturbances. The major compositional trend of the vegetation over time is toward an increased density of conifers, especially in the montane zone. Forests that were open woodlands prior to European settlement are now often densely populated with smaller trees. In the absence of natural fires, many grasslands are succeeding to forests. This trend is dramatic in many cases and is a widespread pattern throughout the Western United States. Three factors that have contributed to these changes include a shift toward a more mesic climate, overgrazing by livestock, and fire suppression.

There are many types of vegetative cover on the Academy that are influenced by local site conditions, hydrology, soils, topography, elevation, and aspect.

Vegetation Zones on the Academy

Vegetation types on the Academy can be generally divided into montane and foothill zones. The montane zone includes the mixed conifer forests between 8,000 and 9,000 feet elevation. The foothill zone occurs between 6,000 and 8,000 feet elevation. The foothills zone is further subdivided into the Douglas-fir/white fir woodlands, ponderosa pine woodlands, oak shrubland, grasslands, and riparian community types (USAFA 2003).

Montane Zone (8,000 to 9,000 feet). This zone consists of mixed conifer forests along the western edge of the Academy and the steep slopes of the Rampart Range. Species include Douglas-fir (*Pseudotsuga menziesii*), ponderosa pine, white fir (*Abies concolor*), limber pine (*Pinus flexilis*), blue spruce (*Picea pungens*), Englemann spruce (*Picea englemannii*), and common juniper (*Juniperus communis*). Dominant shrubs include kinnikinnik (*Arctostaphylus adenotricha*), waxflower (*Jamesia americana*), and mountain mahogany (*Cercocarpus montanus*).

Foothills Zone (6,000 to 8,000 feet). This zone is subdivided into four community types:

1. Woodlands dominated by Douglas-fir, with some white fir occurring on moist, north-facing slopes. In some areas, white fir occurs with high frequency, such as on the slopes west of the Visitor Center. Important associates include common juniper, waxflower, and mountain mahogany.
2. Ponderosa pine woodlands are the most prevalent woodland community in the foothills. This community occurs on sites drier than those supporting Douglas-fir/white fir, but moister than those dominated by grasslands. Trees are often clumped in groups of a few individuals separated by openings with a sparse herb cover in a parklike setting. Common associates are gooseberries and currants (*Ribes aureum* and *R. cereum*), yellow mountain parsley (*Pseudocymopterus montanus*), mountain muhly (*Muhlenbergia montana*), ninebark (*Physocarpus monogynus*), and Gambel oak (*Quercus gambelii*).
3. The oak shrubland community dominates the mesas and dry, south-facing slopes in the foothills. The dominant species is Gambel oak. The oak often forms in dense clumps on sites with the deepest soils. Piñon pine (*Pinus edulis*) and one-seeded juniper (*Sabina monosperma*) are small trees found in this community in the southern parts of the Academy. Also, occasional ponderosa pines occur in this community. Important shrubs include mountain mahogany, ocean spray (*Holodiscus dumosus*), Boulder raspberry (*Oreobatus deliciosus*), and snowberry (*Symphoricarpus albus*). This shrubland represents a mixture of plains and foothill species.

4. Grasslands occur on much of the eastern portion of the Academy. The grasslands community is dominated by short-grass prairie species that include blue grama (*Bouteloua gracilis*), little bluestem (*Schizchyrium scoparium*), fringed sage (*Artemisia frigida*), and Spanish bayonet (*Yucca glauca*). It extends into forested communities of the upper foothills zone. Grassland composition has been somewhat altered by historical grazing prior to the 1950s.

Three grassland complexes are of particular interest:

a.A Parry's oatgrass (*Danthonia parryi*) grassland, which occurs at two sites along the Academy's west boundary. This might represent a once-dominant assemblage that has been reduced by historic grazing, as well as fire suppression.
b.Tallgrass prairie species merging with ponderosa pine and Gambel oak, including sandreed (*Calamovilfa longifolia*), big bluestem (*Andropogon gerardii*), little bluestem, and needle-and- thread grass (*Stipa comata*), east of Monument Creek and south of Falcon Stadium.
c.Tallgrass and mixed grass prairie communities west of Interstate 25 (I-25) and south of the South Gate are dominated by big bluestem, needle-and-thread grass, sandreed, and fringed sage.

Monument Creek is the most important and extensive of the riparian communities. The creek and its major tributaries are lined with cottonwoods (*Populus angustifolia* and *P. deltoides*) and willows. Stream banks along smaller waterways leaving the Rampart Range are characterized by many showy herbs such as shooting star (*Dodecatheon pulchellum*), bunchberry (*Chamaepericlymenum canadense*), and twinflower (*Linnea borealis*).

In 2020, the Center for Environmental Management of Military Lands (CEMML) at Colorado State University conducted a vegetation classification and GIS mapping project for the Academy, Farish, and Bullseye (CEMML 2020). The classification followed the National Vegetation Classification system (version 2.03, March 2019), using a minimum mapping unit of 0.5 hectare (1.236 acres) for natural communities. A minimum mapping unit of 0.25 hectare (0.618 acre) was used for cultural (artificial) plant communities. A total of 38 vegetative communities and land cover types were idenfified, with forest, shrubland, and grassland communities being dominant.

Urban Habitats

The Cadet Area, housing areas, the Community Center, the median strip on South-Gate, Stadium, and North-Gate Boulevards, elementary schools, and the Air Academy High School comprise about 1,900 acres, or 10 percent of the total Academy area. These areas are largely characterized by nonnative vegetation including Kentucky bluegrass and ornamental trees and shrubs. Semi-natural habitats such as the Eisenhower Golf Course, and the remainder of the Academy primarily contain native shrub and tree canopies, but also include some bluegrass groundcover.

Farish Recreation Area

Farish falls within the montane vegetation zone. Ponderosa pine (Pinus ponderosa), limber pine, and Engelmann spruce (*Picea engelmannii*) occur on dry areas; and Douglas-fir (*Pseudotsuga menziesii*) occur on the more moist slopes. Aspen (*Populus tremuloides*) occurs on areas that have had prior natural disturbance. A variety of tree species exist where vegetation communities converge. Ponderosa pine, Douglas-fir, limber pine, Englemann spruce, and aspen grow on a ridge along the east boundary. Rolling meadows contain Arizona fescue (*Festuca arizonica*), Parry's oatgrass (*Danthonia parryi*), and mountain muhly (*Muhlenbergia montana*). Prairie sage (*Artemisia ludoviciana*), fringed sage (*Artemisia frigid*), yarrow (*Achillea lanulosa*), and Colorado loco (*Oxytropis lambertii*) are common in sunny areas. Drainages are characterized by willows (*Salix* spp.), shrubby cinquefoil (*Pentaphylloides floribunda*) and other grasses and sedges. Porter feathergrass (*Ptilagrostis porteri*), a state rare grass species in Colorado, was discovered in a bog at Farish (ESCO Associates, Inc. 1992) and warrants special monitoring and protection.

The Farish Recreation area also possesses a significant grassland in the southern conservation zone bordered by Schubarth Road. Prior to fire suppression early in the 20th Century, wildfires, coupled with earlier ranching and agricultural practices helped to maintain these grasslands. As discussed in the Landscape Fire Ecology section, fire suppression and the curtailment of agricultural practices are resulting in a gradual invasion of these grasslands by coniferous forests. Without some level of management, these grasslands will eventually succeed to forest land.

Bullseye Auxiliary Airfield

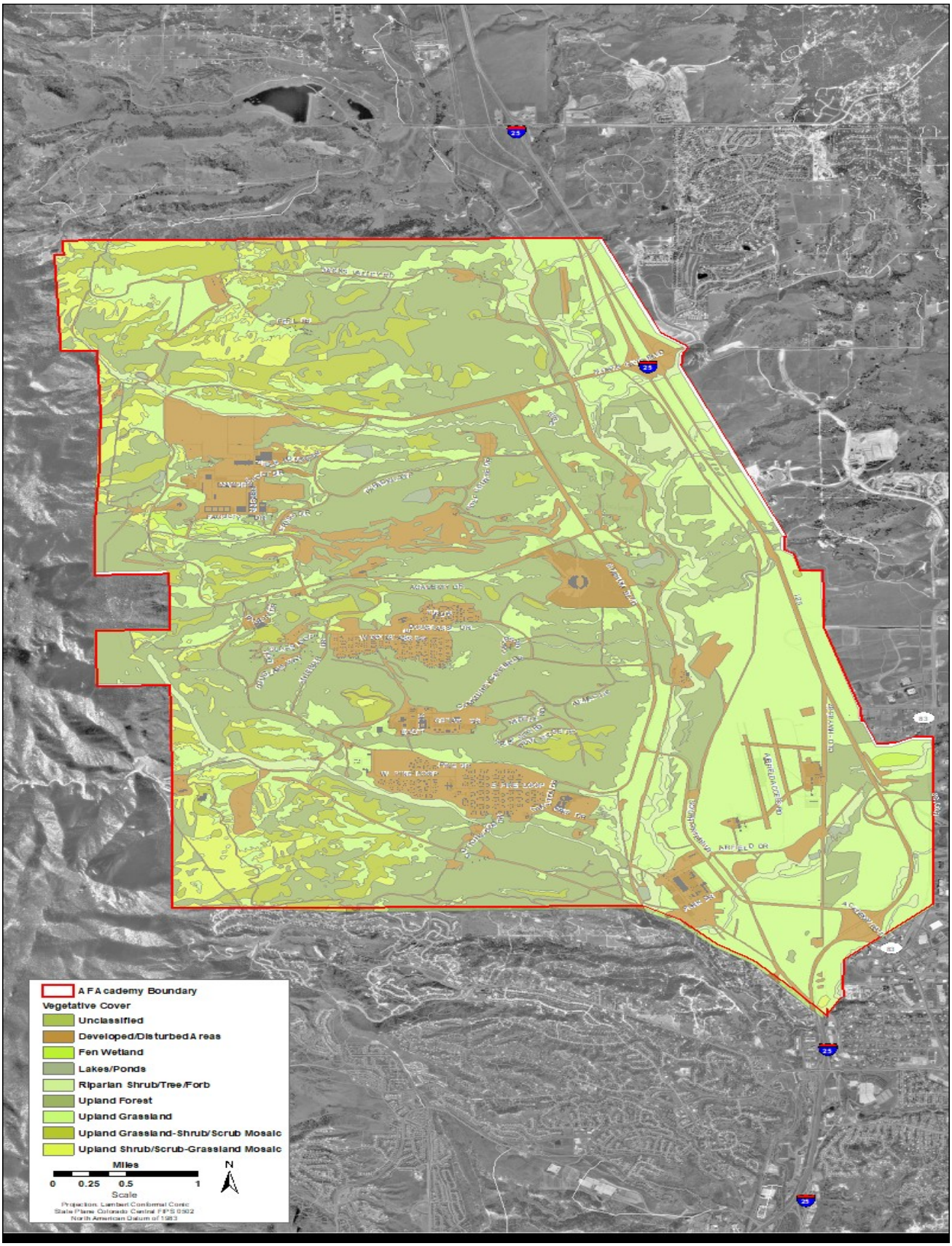
Bullseye is part of a large rangeland ecosystem comprised of units of agricultural land, short grass prairie, and mixed grass prairie. The short grass prairie is dominated by blue grama (*Bouteloua gracilis*). The agricultural land produces hay crops. The mixed grass prairie is dominated by tall grasses such as blowout grass (*Redfieldia flexuosa*) and sand bluestem (*Andropogon hallii*) with an understory of blue grama. Other species of grasses observed on Bullseye include red threeawn (*Aristida longiseta*), needle-and-thread, sedge species (*Carex sp.*), and sand dropseed (*Sporobolus cryptandrus*).

Species of forbs observed include greenthread (*Thelesperma megapotamicum*), annual buckwheat (*Eriogorum annum*), penstemon (*Penstemon sp.*), trailing fleabane (*Erigeron flagellaris*), goosefoot (*Chenopodium sp.*), and stickseed (*Lappula redowskii*).

Species of shrubs observed include fringed sage (*Artemisia frigida*), spreading eriogonium (*Eriogonum effusum*), calylophus (*Calylophus sp.*), and prickly pear (*Opuntia polyacantha*).

The Bullseye Auxiliary Airfield falls within the Central Shortgrass Prairie Ecoregion. In 2006, the Nature Conservancy of Colorado, working with land managers, landowners, state and federal agency representatives, including from the Academy, and scientists conducted an assessment of the conservation needs for this ecoregion. This project conducted a collaborative ecoregional assessment and developed a conservation implementation strategy, identified a set of conservation areas that best represent the native species, natural communities, ecosystems, and ecological processes of the ecoregion; developed critical data, analyses, and tools to support biodiversity conservation; established an ecological context to help facilitate effective management at multiple scales; and prepared a set of management guideline to facilitate conservation action for species at risk (Neely et al. 2006).

While the Bullseye Auxiliary Airfield represents but a very small fraction of the Central Shortgrass Prairie Ecoregion, it lies within the Chico Basin conservation site identified by the Central Shortgrass Prairie Ecoregion Initiative (Neeley et al. 2006). It is also surrounded by the Bohart Ranch, a site managed for its conservation values by The Nature Conservancy (TNC) and a local ranch family.



Vegetative Cover on the Academy

2.3.2.3 Future Vegetation Cover
Installation Supplement

Maintaining the native vegetation cover is critical for sustaining and protecting the military training environment, wildlife habitat, soil and water resources, and the aesthetics of the installation. As envisioned by the original Academy master plan, the Natural Resources program consistently advocates for sustaining at least 70% of the installation as designated natural open space. Land management activities such as forest thinning, noxious weed control, prescribed fire, erosion control, and revegetation with native species is utilized to maintain native plant communities and vegetation that is resilient to various environmental stressors, including the long-term effects of drought and climate change.

2.3.2.4 Turf and Landscaped Areas
Installation Supplement

Approximately 854 acres of the Academy is turf/landscaped area (CEMML 2020), including the Cadet Area, golf course and athletic fields, road medians, cemetery, base housing, and administrative areas. Bluegrass irrigated with both potable and non-potable water is the main turf grass. A variety of deciduous and coniferous trees and shrubs are used for screening and landscaping. The base has reduced its irrigation requirements by removing turf areas and replacing with more drought tolerant, low maintenance landscaping.

There are no turf or landscaped areas at Farish or Bullseye.

2.3.3 Fish and Wildlife
Installation Supplement

The opportunity to view an abundance and diversity of wildlife in their natural habitat is an important part of what makes the Air Force Academy a unique military base and educational institution. Numerous mammals, reptiles, amphibians, fish, and birds make their home in the installation's open space and natural areas. The Academy works closely with US Fish and Wildlife Service and Colorado Parks and Wildlife biologists to protect and manage the habitat and wildlife, which is vulnerable to human activity and development.

Examples of birds in the area include the red-tailed hawk (*Buteo jamaicensis*), Merriam's turkey, prairie falcon (*Falco mexicanus*), scrub jay (*Aphelocoma coerulescens*), and spotted towhee (*Pipilo erythrophthalmus*). Grassland birds include rough-legged hawk (*Buteo lagopus*), prairie falcon (*Falco mexicanus*), Western kingbird (*Tyrannus tyrannus*), Western bluebird (*Sialia mexicana*), and vesper sparrow (*Pooecetes gramineus*). Representative birds occurring in or near riparian areas include great blue heron (*Ardea herodias*), spotted sandpiper (*Actitis hypoleucos*), orange-crowned warbler (*Vermivora celata*), common yellowthroat (*Geothylpis trichas*), Wilson's warbler (*Wilsonia pusilla*), yellow warbler (*Dendroica petechia*), American goldfinch (*Carduelis tristis*), and broad-tailed hummingbird (*Selasphorus platycercus*). The many reservoirs, lakes, and beaver ponds on the Academy support a variety of waterbirds such as green-winged teal (*Anas crecca*), mallard (*Anas platyrhynchos*), American coot (*Fulica americana*), Canada goose (*Branta canadensis*), great blue heron (*Ardea herodias*), and belted kingfisher (*Ceryle alcyon*). An extensive list of 160+ bird species observed on the Academy is available at eBird.org.

Reptiles including the shorthorned lizard (*Phrynosoma douglassi*), bullsnake (*Pituophis melanoleucus*), and Western rattlesnake (*Crotalus viridis*) occur in various habitats. Chorus frog (*Pseudacris triseriata*), northern leopard frog (*Lithobates pipiens*), and other amphibians live in the riparian areas.

Mammals in the grasslands community include coyote, red fox, Gunnison's prairie dog (*Cynomys gunnisoni*), spotted ground squirrel (*Spermophilus spilosoma*), northern pocket gopher (*Thomomys talpoides*), and Western harvest mouse (*Reithrodontomys megalotis*). Mammals common to the riparian communities are white-tailed deer, beaver (*Castor canadensis*), several bat species, muskrat (*Ondatra zibethica*), gray fox (*Urocyron cinereoargenteus*), cottontail rabbit, and raccoon (*Procyon lotor*), meadow vole (*Microtus pennsylvanicus*), Montane shrew (*Sorex monticolus*), and Preble's meadow jumping mouse. Black bears can be a nuisance in housing areas and at other facilities, but the problem has been successfully managed with the provision of bear-proof dumpsters. Sightings of mountain lions are infrequent, and no human-lion encounters have resulted in injury. Smaller mammals such as coyote (*Canis latrans*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) are frequent visitors in the housing areas.

The Academy's coldwater streams (West Monument and Stanley Creek) support reproducing populations of brook trout (*Salvelinus fontinalis*). Nine species of native nongame fish occur in the warmer water of Monument Creek: white sucker (*Catostomus commersoni*), longnose sucker (*Catostomus catostomus*), longnose dace (*Rhinichthys cataractae*), creek chub (*Semotilus atromaculatus*), brook stickleback (*Culaea inconstans*), fathead minnow (*Pimephales promelas*), Central stoneroller (*Campostoma anomalum*), bigmouth shiner (*Notropis dorsalis*), and green sunfish (*Lepomis cyanellus*). The Arkansas darter (*Etheostoma cragini*) and greenback cutthroat trout (*Oncorhynchus clarki stomias*) have been extirpated from Monument Creek and its tributaries.

The recreational fishing lakes are stocked with hatchery-raised rainbow trout (*Oncorhynchus mykiss*) and channel catfish (*Ictalurus punctatus*). Sterile hybrid grass carp (*Ctenopharyngodon idella*) are also stocked to control aquatic weeds.

Farish Recreation Area

Wildlife species found on Farish are similar to those occurring on the Academy. Common species include turkey, mule deer, elk, and black bear. Bear sightings are frequent and can be a potential nuisance in the camping areas. Frequent and heavy elk use, particularly during the winter, is evident from the browsing damage on aspen trees and the lack of young aspen sprouts.

The Farish lakes are stocked with rainbow trout and grass carp.

Bullseye Auxiliary Airfield

Wildlife species at Bullseye are typical of the short-grass prairie. Some of the more common species include pronghorn (*Antilocapra americana*), black-tailed prairie dog (*Cynomys ludovicianus*), coyote, red-tailed hawk (*Buteo jamaicensis*), vesper sparrow (*Pooecetes gramineus*), and horned lark (*Eremophila alpestris*). The uniformity of the vegetation and terrain and the absence of habitat features such as large trees, rock outcrops, and water account for the relatively low diversity and abundance of wildlife on Bullseye, however, BASH incidents, especially involving horned lark, can be significant.

2.3.4 Threatened and Endangered Species and Species of Concern

Installation Supplement

Birds of Conservation Concern

The U.S. Fish and Wildlife Service has identified numerous birds of conservation concern for the region occupied by the Academy (USFWS 2021, https://www.fws.gov/mountain-prairie/migbirds/prioritySpecies.php).

Potential Birds of Conservation Concern on the Academy

USFWS Regional Birds of Conservation Concern	Reported on USAFA (Defusco and Cassel 1988) and eBird
Ferruginous Hawk	**X**
Golden Eagle	**X**
Bald Eagle	**X**
Peregrine Falcon	**X**

Long-billed Curlew	**X**
Buff-breasted Sandpiper	
Upland Sandpiper	**X**
Marbled Godwit	**X**
Flammulated Owl	
Western Burrowing Owl	**X**
Sprague's Pipit	
Cassin's Sparrow	
Grasshopper Sparrow	**X**
Henslow's Sparrow	
Band-Tail Pigeon	
Hudsonian Godwit	
Sandhill Crane	
Trumpeter Swan	
Cinnamon Teal	**X**

Species of Special Concern and Habitats at the Academy

In 2012 and 2018, the Colorado Natural Heritage Program conducted surveys for rare species, species of special concern, intact natural plant communities, and Potential Conservation Areas on the Academy, Farish, and Bullseye (CNHP 2012,2018). Animals studied included Gunnison's prairie dog, Hops azure butterfly, Northern leopard frog, Ovenbird, and Preble's. Plants included dwarf wild indigo, grassy slope sedge, plains frostweed, Rocky Mountain blazing star, Southern Rocky Mountain cinquefoil, Porter's feathergrass, American currant, and plains ironweed. High-quality natural plant communities consist of mixed-mountain shrublands, montane grasslands, and Great Plains mixed grass prairie. The Potential Conservation Areas highlight Monument Creek and its tributary creeks, the Academy's oak foothills, and much of the Farish forest and meadows.

Field surveys by Ellington et al. (1996) also previously identified numerous plant communities and species of conservation interest, including:

Monument Creek. This area was identified as being of very high significance for biodiversity, and the area contains important native fish communities (described above) and habitat for the following significant species: Preble's meadow jumping mouse, Hops azure butterfly (*Celastrina humulus*), southern Rocky Mountain cinquefoil (*Potentilla ambigens*), New Mexico cliff fern (*Woodsia neomexicana*), cedar waxwing (*Bombycilla cedrorum*), gray catbird (*Dumatella carolinesis*), and northern leopard frog (*Lithiobates pipiens*).

Stanley Canyon. This site spans the transition from montane canyon to foothills stream. It supports several bird and butterfly species that are rare within Colorado, including ovenbird (*Seiurus aurocapillus*), evening grosbreak (*Coccothraustes vespertinus*), Snow's skipper butterfly (*Paratrytone snowi*), and Morrison skipper butterfly (*Stinga morrisoni*).

Jacks Valley. Habitat on this site supports Moss' elfin (*Callophrys mossii*), a butterfly that is rare in Colorado. The prevalence of suitable habitat in Jack's Valley indicates that the area might support a large number of butterflies.

East Pine Valley. A small patch of remnant midgrass prairie provides high-quality habitat for the Merriam's shrew (*Sorex merriami*), a rare mammal in Colorado.

Lehman Run. Lehman Run near the intersection of Cross Drive and Interior Drive provides habitat for the small-leaved leadplant (*Amorpha nana*), known from only a few scattered populations in Colorado.

Pine Creek. Pine Creek south of South-Gate Entrance, near Interstate 25 provides habitat for the American gooseberry (*Ribes americanum*), a State of Colorado rare plant species.

South Leo Lake, Farish Recreation Area. Habitat for Porter's feathergrass (*Ptilagrostis porteri*), a globally rare plant species.

Shortgrass and Mixed Grass Prairies of the Academy. Although not yet documented, these areas may provide habitat for the rare pocket mouse (*Peromyscus fasciatus infraluteus*) (Siemers et al. 2003).

Threatened or Endangered Species

Threatened and endangered species are federally protected plants and animals that are in danger of becoming endangered or extinct, respectively. Such species are threatened or endangered for a variety of reasons, mainly due to specialized habitat needs or habitat destruction. The Endangered Species Act (ESA) of 1973 protects listed species against any action that would adversely affect them, including "taking," defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Further, any adverse impact on the habitat of a listed species is strictly prohibited.

All DOD installations are required to perform threatened and endangered species surveys periodically and prior to any activities that disturb land potentially occupied by listed species. The Academy has completed extensive surveys to document the status of rare species, including a 1992 natural areas inventory, a 1996 survey of significant natural heritage resources, biological Inventories (CNHP 2012, 2018) and annual Preble's meadow jumping mouse surveys since 1997. In addition, numerous biological inventories and surveys have been conducted by faculty members and cadets in the Academy's Department of Biology. Examples include Ripley (1994) for plants, DeFusco and Cassel (1988) for birds, and Langlois and Munson (1991) for mammals. The CNHP has also identified several new rare plant sites while conducting noxious weed monitoring and inventories.

Preble's Meadow Jumping Mouse

The federally-threatened Preble's meadow jumping mouse is a small rodent with a conspicuous dark dorsal band, large well-developed hind legs and feet, and an extremely long tail. This meadow jumping mouse subspecies only occurs in foothill riparian systems from southeastern Wyoming to central Colorado in the North Platte, South Platte, and Arkansas River watersheds. In Colorado, the subspecies is currently documented in seven counties, with one of the larger and more stable populations occurring on the Academy within the Monument Creek watershed and Arkansas River drainage (Siemers et al. 2003). Because there are only a handful of medium and large populations targeted for conservation in the Preble's Recovery Plan (USFWS 2018), the Academy population is invaluable for rangewide recovery of the subspecies.

Initially found on the Academy in 1994 by the CNHP, the Preble's was listed as threatened by the USFWS in May 1998. Following listing, the Academy entered formal ESA Section 7 consultation with USFWS and in April 2000 received a "no jeopardy" Biological Opinion for the Academy's proposed infrastructure repair and maintenance actions in mouse habitat. The USFWS declined to designate Critical Habitat for Preble's on the Academy at that time due to the conservation provisions already included in the INRMP. Conditions of the "no jeopardy" Biological Opinion included the development of a conservation agreement which the Academy and USFWS signed in June 2000. Since its inception, the Academy has adhered to the terms and conditions of the conservation agreement and it has been renewed every 5-years.

The primary reason for Preble's decline is habitat loss along and near riparian corridors throughout its range (USFWS 2018). Loss and fragmentation of habitat is attributed to urban development, construction of highways and bridges, water development, increased runoff and flood control, mining (sand, gravel), and overgrazing. The most significant issue for Preble's management and conservation on the Academy is riparian habitat loss caused by damaging storm water runoff from urban development. Since the listing of Preble's in 1998, the landscape east of the Academy has experienced a dramatic increase in residential and commercial development. The associated increase in impervious surface has increased the frequency, rate, and volume of storm water runoff and the degree of flooding that occurs on the Academy. This impacts not only the population of Preble's at the Academy, but also jeopardizes the conservation of the subspecies in the southern part of its range and the ultimate success of the Recovery Plan.

A Conservation Zone, which includes both riparian and upland mouse habitat, covers approximately 3,300 acres of the installation. The Conservation Zone is based on a delineation of habitat within 300-feet of the upper edge of a 100-year floodplain.

Preble's Meadow Jumping Mouse

Potential Threatened and Endangered Species

Other threatened, endangered, or candidate species, and Colorado species of concern that could potentially occur on the Academy include the Mexican spotted owl (*Strix occidentalis lucida*), Arkansas darter (*Etheostoma cragini*), and the orchid Ute ladies' tresses (*Spiranthes diluvialis*), but previous surveys for these species have been negative. Mexican spotted owl has been observed in the higher elevation canyons west of the Academy on the Pike National Forest. Eastern black rail (*Laterallus jamaicensis*), listed as threatened in 2020, could potentially occur on the Academy but its preferred wetland marsh habitat is very limited. A black rail habitat assessment and possible surveys are planned depending on further guidance from USFWS and CPW.

Other Animal Species of Special Concern

The CNHP biological Inventoriesy (CNHP 2012, 2018) of the Academy observed Gunnison's prairie dog (*Cynomys gunnisoni*), Hops Azure (*Celastrina humulus*), Northern Leopard Frog (*Lithobates pipiens*), and Ovenbird (*Seiurus aurocapillus*), which are state species of conservation concern.

The monarch butterfly (*Danaus plexippus*) was considered for federal listing in 2020 but is currently recognized as a candidate species. Long-time Academy biologists recall rarely observing monarch's 30+ years ago, and then mostly along Monument Creek. Over the past several decades the frequency of monarch sightings on the Academy has declined even more. The installation is situated along the western fringe of the butterfly's typical spring and fall migration route. Grassland communities on the Academy are known to include small, dispered patches of milkweed (*Asclepias speciosa, A. viridiflora*) that the butterfly prefers as a food source.

The list below of Federal and State of Colorado threatened, endangered, special concern, and candidate species that occur or could occur in El Paso County is based on information from USFWS, CPW, and CNHP.

Farish Recreation Area

No plant or animal species listed as threatened or endangered occur on Farish. Porter's feathergrass, a state species of conservation concern, is found in a small wetland fen.

Bullseye Auxiliary Airfield

No plant or animal species listed as threatened or endangered occur at Bullseye. Burrowing owl, a state species of conservation concern, has been previously observed nesting in the area when prairie dog burrows were available. Burrowing owl have not been documented since the prairie dog colony was controlled for BASH reasons. Swift fox have been observed hunting and denning within the Bullseye fenced area, and several animals have been trapped and relocted with CPW guidance.

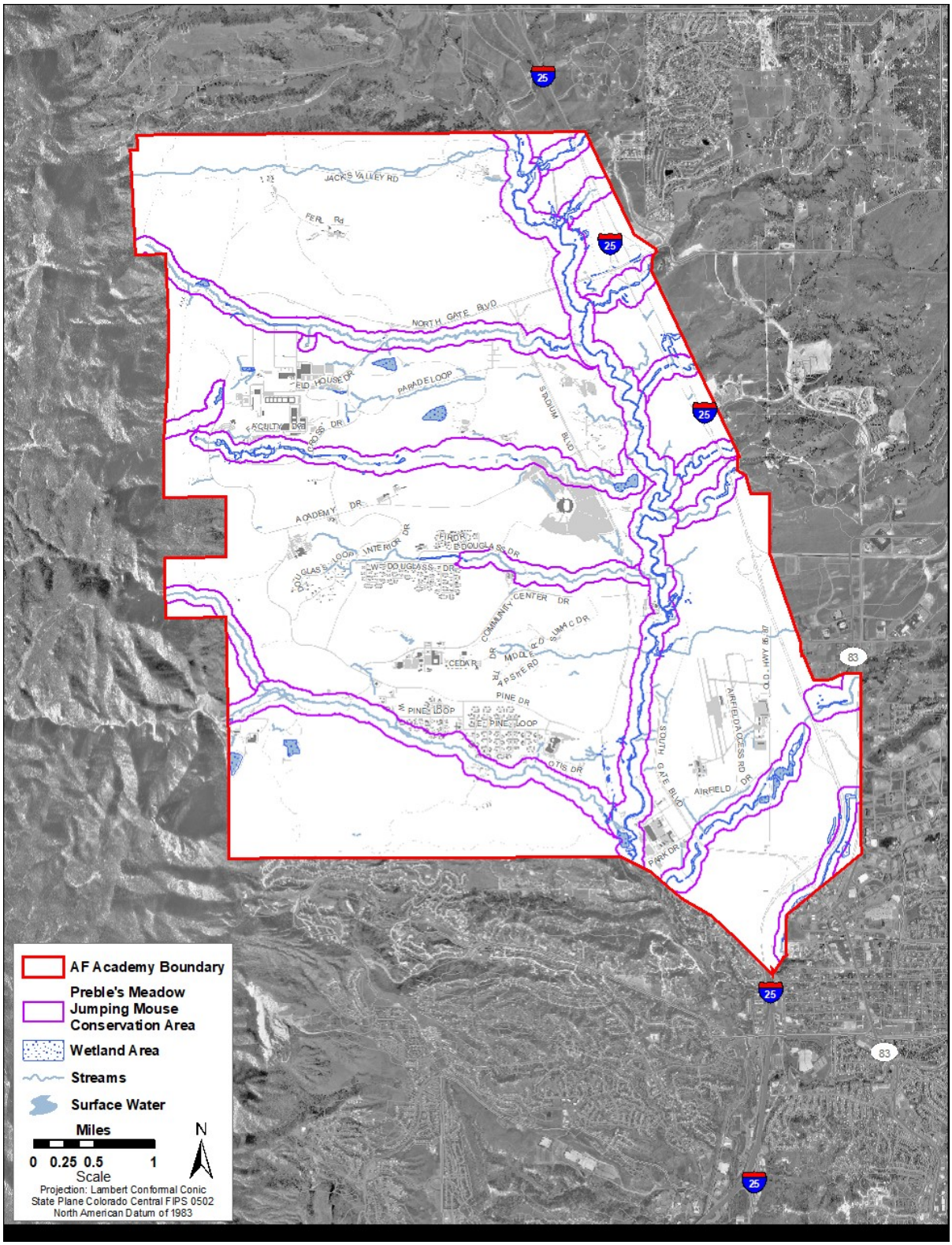
Federal and State-Listed Species Found in El Paso County

Species		Status *	
Common Name	**Scientific Name**	**Federal**	**Colorado**
Fish			
Arkansas darter	***Etheostoma cragini***	**C**	**T**
Greenback cutthroat trout	***Oncorhynchus clarki stomias***	**T**	**T**
Plants			
American currant	***Ribes americanum***	**C**	**-**
Rocky Mountain blazing star	***Liatris ligulistylis***	**-**	**SC**
Slender moonwort	***Botrychium lineare***	**-**	**SC**
Streaked ragweed	***Ambrosia lineris***	**-**	**SC**
Ute ladies'-tresses orchid	***Spiranthes diluvialis***	**T**	**SC**
Plains Ironwood	***Vernonia marginata***		**SC**
Frostweed	***Crocanthemum bicknellii***		**SC**
Southern rocky Mountain Cinquefoil	***Potentilla ambigens***		**SC**
Porter's Feathergrass	***Ptilagrostis porterii***		**SC**
Birds			
American Peregrine falcon	***Falco peregrinus anatum***	**-**	**SC**
Burrowing Owl	***Athene cunicularia***	**-**	**SC**
Mexican spotted owl	***Strix occidentalis lucida***	**T**	**T**
Mountain plover	***Charadrius montanus***	**-**	**SC**
Mammals			
Black-footed ferret	***Mustela nigripes***	**E**	**E**
Preble's meadow jumping mouse	***Zapus hudsonius preblei***	**T**	**T**
Insects			

Monarch butterfly	***Danaus plexippus***	**C**	**SC**

***Notes:**

- **T - Threatened**
- **E - Endangered**
- **C - Candidate**
- **SC - State Special Concern (not a statutory category)**



Preble's Meadow Jumping Mouse Conservation Zone

2.3.5 Wetlands and Floodplains

Installation Supplement

Wetlands on the Academy

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands are typically found along streams, rivers, springs, ponds, and drainage ditches. Riparian areas refer to banks associated with ponds and streams that support a variety of vegetation not typically found in drier upland areas and are often a subset of the wetlands classification. Vegetation along riparian corridors supports a variety of habitats and associated plant and wildlife species. Riparian zones serve as nutrient filters, sediment traps, climatic regulators, and wildlife refuges; thus, their disturbance can have far-reaching effects on the structure and function of stream and watershed ecosystems.

Jurisdictional wetlands are defined by the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (USACE 1987) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." The majority of jurisdictional wetlands (i.e., those wetlands protected by the Clean Water Act [CWA]) meet three wetland delineation criteria: (1) a prevalence of wetland-associated vegetation, (2) hydric (wetland-type) soils, and (3) wetland hydrology.

All areas potentially impacted by Federal actions must be assessed for wetlands and a jurisdictional determination needs to be made by the Albuquerque District of the USACE. EO 11990, Protection of Wetlands, requires all Federal agencies to consider wetland protection in their decision-making process. The CWA requires any action that would directly involve the placement of fill material in wetlands or other waters of the United States to be subject to the permit requirements of Section 404. Under Section 404 (b)(1), the permitting of fill activities will not be approved unless the following conditions are met: no practicable, less environmentally damaging alternative to the action exists; the activity does not cause or contribute to violations of state water quality standards or jeopardize endangered or threatened species; the activity does not contribute to significant degradation of waters of the United States; and all practicable and appropriate steps have been taken to minimize potential adverse impacts on the aquatic ecosystem (Title 40 CFR 230.10). The USACE administers Section 404 of the CWA and in Colorado has primary jurisdictional authority to regulate wetlands and waters of the United States.

As a result of the above-mentioned Federal and state regulations, it is the responsibility of the USAF to identify and locate jurisdictional waters of the United States (including wetlands) occurring on USAF installations where these resources have potential to be impacted by base activities. Such impacts could include construction of roads, buildings, runways, taxiways, navigation aids, and other appurtenant structures or activities as simple as culvert crossings of small intermittent streams, riprap placement in stream channels to curb accelerated erosion, and incidental fill and grading of wet depressions.

Previously, the Academy's wetland data consisted of 1993 National Wetland Inventory (NWI) maps that were produced by the USFWS. In 2002, wetland delineation was completed for the Academy using aerial photographs, the NWI maps, existing data on project-specific jurisdictional delineations, and extensive field surveys and ground-truthing of site vegetation and surface hydrology indicators (URS 2002). The purpose of conducting a wetland survey was to provide a database that could facilitate initial master planning, construction planning, and environmental management. A jurisdiction determination from USACE was not obtained for the wetlands delineated in the study. A formal delineation of wetland boundaries is required for proposed projects that could affect a wetland or other waters of the United States.

The Academy supports both riverine (wetlands within a channel) and palustrine (nontidal wetlands dominated by trees, shrubs, or emergent plants) wetland habitats. Of the 301 wetlands and other waters of the United States identified on base, 67 areas are in riverine systems (2.2 acres) and 234 areas are within the palustrine system (210.4 acres). Monument Creek, the largest perennial stream on the Academy, was mapped as palustrine habitat because wetland vegetation occupies both banks and low islands within the stream, and typically covers a greater width than the stream itself.

The 2002 survey also identified historic wetlands that have had their hydrology modified, and therefore are no longer wetlands, due to severe channel down-cutting (natural or accelerated by increased runoff). A general shrinking of many of the hillside seeps along Monument Creek was also observed, which could be the result of the recent drought and/or development impacts on groundwater recharge and surface drainage patterns. Any loss of wetland habitat along Monument Creek has the potential to negatively affect the resident population of the federally threatened Preble's meadow jumping mouse and other associated wildlife species.

Farish Recreation Area Wetlands

The URS study (2002) delineated 12 palustrine wetlands that encompass 40.33 acres, including the open water habitat of the three recreational fishing lakes.

Bullseye Auxiliary Airfield Wetlands

The Bullseye Auxiliary Airfield has not been formally surveyed for wetlands, but none exist based on the dominant grassland vegetation, lack of surface hydrologic features, and highly permeable soils.

Floodplains at the Academy

Floodplains at the Academy are most prevalent along Monument Creek and its tributaries. The Academy's 10-year and 100-year floodplains were mapped in 2003 (URS 2003a, 2003b) to help establish the boundary of the Preble's Conservation Zone, defined as the area within 300-feet of the edge of the 100-year floodplain.

Floodplains at Farish Recreation Area

The potential for hazardous flooding of South Beaver Creek at Farish was evaluated in 1997 in conjunction with an assessment of dam safety for the three lakes. Water surface elevations at cross sections within the South Beaver Creek were computed based on future basin development conditions. Those elevations were plotted in profile for the 10-year and 100-year flood peaks.

Floodplains at Bullseye Auxiliary Airfield

Bullseye is not located in a floodplain.