U. S. AIR FORCE

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

Air Force Research Laboratory — Information Directorate

Case Number: AFRL-2023-0160

Rome Research Site, Verona Test Annex, Stockbridge Test Annex,

and Newport Test Annexes 1 and 2

DRAFT

(See INRMP signature pages for plan approval date)

ABOUT THIS PLAN

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

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

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

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DOCUMENT CONTROL

Standardized INRMP Template

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

This version of the template is current as of 26 June 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 refer to the eDASH EMP Repository to ensure they have the most current version.

Installation INRMP

Record of Review—The INRMP is updated no less than annually, or as changes to natural resource management and conservation practices occur, including those driven by changes in applicable regulations. IAW the Sikes Act and Air Force Manual (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).

The installation Natural Resources Manager (NRM), and/or a Section Natural Resources Media Manager, accomplishes annual reviews and updates. 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 agencies, 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

Integrated Natural Resources Management Plan

Air Force Research Laboratory Information Directorate

Rome Research Site, Verona Test Annex, Stockbridge Test Annex, and Newport Test Annexes

This INRMP has been prepared in accordance with regulations, standards, and procedures of the Department of Defense, United States Air Force Manual 32-7003, United States Air Force Policy Directive 32-70, and Sikes Act Improvement Act in cooperation with the USFWS, and New York State Department of Environmental Conservation. This agreement becomes effective on the date of the last signature obtained. By signing below, all parties give their agreement and acceptance of the following document.

_____ _____

Fred E. Garcia II, Colonel, USAF Date
Director, Information Directorate
Commander, AFRL/Detachment 4

_____ _____

Wendi Weber Date
Regional Director, Northeast Region
United States Fish & Wildlife Service

_____ _____

Randall Young Date
Regional Director, Region 6
New York State Department of Environmental Conservation

EXECUTIVE SUMMARY

This Integrated Natural Resources Management Plan (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, and sound management of natural resources increases the effectiveness of USAF adaptability in all environments. The Sikes Act (16 United State Code [U.S.C.] 670a-670o, as amended) is the legal driver for the INRMP.

This plan was developed to guide natural resources management at the Air Force Research Laboratory Information Directorate (AFRL/RI), which is composed of the Rome Research Site (RRS), and three Geographically Separate Units (GSUs): Verona Test Annex (VTA), Stockbridge Test Annex (STA), and Newport Test Annexes 1 and 2 (NTA), which are called Tanner (NTA1) and Irish Hill (NTA2). The Sikes Act and AFMAN 32-7003, *Environmental Conservation*, require installations with significant natural resources to prepare an INRMP and update it at least once every five years.

The Mission and Natural Resources

The primary objective of Air Force (AF) natural resources programs is to sustain, restore, and modernize natural infrastructure to ensure operational capability and no net loss in the capability of AF lands to support the military mission. The mission of the AFRL/RI is to lead, discover, develop, and deliver science, technology and innovation for Warfighters and to explore, prototype, and demonstrate high-impact, game-changing technologies that enable the Air Force and the Nation to maintain their superior technical advantage. To execute this mission, healthy, resilient, and sustainable natural infrastructure is needed to mimic real-world environments. As required by AFMAN 32-7003, this plan applies principles of ecosystem-based and adaptive management to sustainably manage resources for current and future mission use.

Development and Implementation of the INRMP

This plan was developed in collaboration with the U.S Fish and Wildlife Service (USFWS) and New York Department of Environmental Conservation (NYDEC). New development of an INRMP involves regulator review, input, and approval. INRMPs signed by regulators within the last five years are considered compliant per the Sikes Act. In accordance with the Sikes Act, regulators are required to review an INRMP regularly thereafter, but not more than every five years.

Goals of the Integrated Natural Resource Management Plan

AFMAN 32-7003, Section 3.3, directs that "The INRMP defines natural resources management goals and objectives that are consistent with the military mission, and ensures no net loss in the capability of installation lands to support the military mission." The Environmental and Real Property Office (AFRL/RIOCV) of the AFRL/RI has the ultimate responsibility for developing, updating, implementing, and overseeing completion of the goals of this INRMP. This includes ensuring compliance with federal, state, local, and AF directives and regulations. The plan also includes proactive objectives and projects designed to avoid future land restrictions and regulatory burden related to protected species. INRMP goals for the AFRL/RI are listed below.

- Maintain a dynamic natural resources program through effective data management, coordination, and training.

- Conduct inventories and assessments of native species and use that information to apply an ecosystem management approach to managing habitats as well as supporting mission needs across the installation
- Sustain healthy vegetation communities by using appropriate management techniques and addressing invasive species issues.
- Manage AFRL/RI wetlands and other water resources to protect areas with sensitive species, reduce losses of erodible soils, and improve downstream water quality while meeting mission development needs.

Implementation of the goals contained in this INRMP will constitute a significant change in management application and bearing for the AFRL/RI, represented by a shift in management philosophy from passive to active, integrated management.

Regulatory Authority

The INRMP is prepared under authority of AFMAN 32-7003, as implemented by Air Force Policy Directive (AFPD) 32-70, Environmental Quality; and DoDI 4715.03, Environmental Conservation Program. The authority to establish natural resources management programs at DoD installations is provided by the Sikes Act, Conservation Programs on Military Installations. Additional major governing laws include the federal Endangered Species Act (ESA), Clean Water Act, and the Migratory Bird Treaty Act (MBTA).

1.0 OVERVIEW AND SCOPE

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

1.1 Purpose and Scope

This document provides a new INRMP for the AFRL/RI. The Sikes Act (16 United State Code [U.S.C.] 670a-670o), as amended, and AFMAN 32-7003, *Environmental Conservation*, require installations with significant natural resources to prepare an INRMP and update it at least once every five years. The INRMP provides guidance for the conservation of natural resources on the installation and assists managers by providing the support necessary for understanding the condition of installation natural resources, management needs for those resources, and goals, objectives and projects that will protect and enhance those resources.

This INRMP is the primary guide for managing natural resources on the AFRL/RI, which is composed of the RRS and three GSUs: VTA, STA, and NTA. The purpose of the INRMP is to assure the compatibility of natural resources management with the military mission at AFRL/RI. Management strategies for AFRL/RI are intended to ensure "no net loss" in the capability of the lands to support the mission of the installation in compliance with applicable environmental laws and regulations. Beyond complying with laws and regulations, the INRMP is also intended to support sustainable ecosystems.

The implementation of this INRMP and its future updates will assist management staff with sustaining the long-term ecological integrity and biological diversity of the resources on the installation as well as the resources necessary for supporting the mission. This plan was prepared and coordinated with internal stakeholders and local representatives of the UFSWS and the NYDEC.

1.2 Management Philosophy

The INRMP serves as a key component of the installation-level planning, which provides background and rationale for the policies and programming decisions related to land use, resource conservation, facilities and infrastructure development, and operations and maintenance to ensure that they meet current requirements and provide for future growth. The INRMP supports the mission by identifying the natural resources present on the installation, developing management goals for these resources, and integrating these management objectives into the military requirements for mission operations/support and regulatory compliance to minimize natural resource constraints.

This INRMP outlines the steps needed to fulfill compliance requirements related to natural resources management and fosters environmental stewardship. It is organized into the following principal sections:

- An overview of the current status and potential future conditions of the natural resources
- Identification of potential impacts to or from natural resources
- The key natural resource management areas addressed
- Management recommendations that incorporate the installation's goals and objectives for natural resource management areas
- Specific work plans for effective implementation of the INRMP

This INRMP was developed using an interdisciplinary approach and is based on existing information about the physical and biotic environments, mission activities, and environmental management practices at AFRL/RI. It also identifies steps for gathering additional data to fill certain information gaps. Coordination and correspondence with installation personnel in the creation of this plan is documented in accordance with 32 Code of Federal Regulations (CFR) 989, *Environmental Impact Analysis Process (EIAP)*.

Natural resources management on AFRL/RI is guided by the principles of ecosystem management, per AFMAN 32-7003 guidance. Managing ecosystems requires thinking about the complex system of interrelated components that make up the environment. Successful ecosystem management accounts for factors such as the mission, laws and regulations, community values, and adjacent land uses in addition to the biological environment. Ecosystem management is best accomplished by adaptive management. Adaptive management is a strategy used in conservation planning where the goals for the plan are set, information is collected to evaluate whether the goals are being met, and management is adjusted if necessary to ensure success in achieving the goals (Figure 1-1). It is a process that improves understanding and management over time. As new information is gained, it is considered to adjust management objectives and actions to enhance future actions and outcomes.

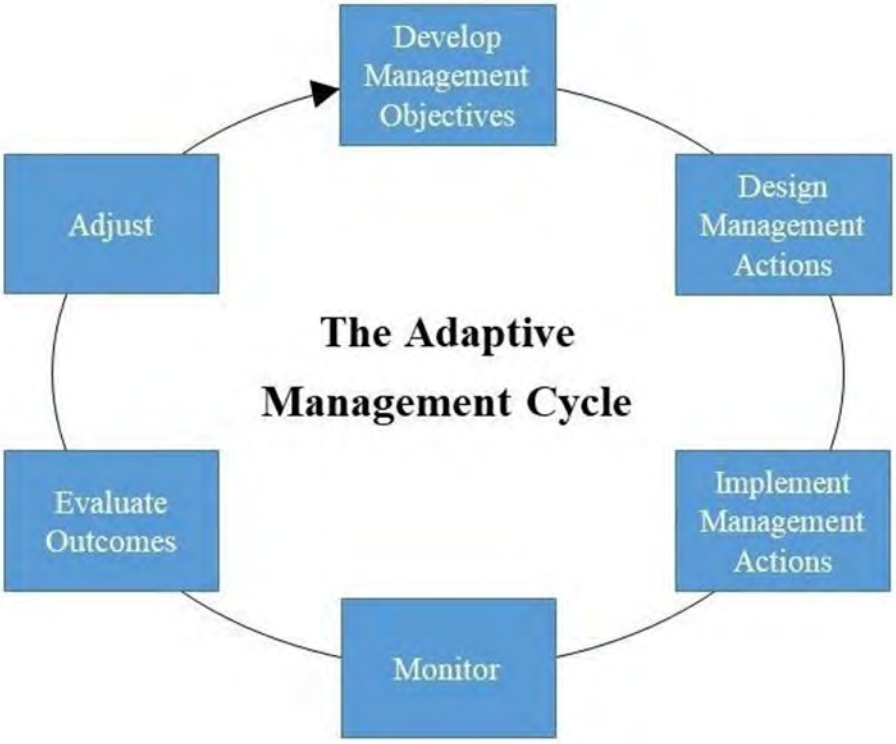

Figure 1-1. Adaptive Management Process. Figure adapted from U.S. Department of Interior *Adaptive Management Technical Guide* (Williams et al. 2009).

The INRMP should be treated as a living document that changes as needed through consultation and data sharing with internal and external stakeholders. The plan will be updated whenever there is new available data, changes in mission requirements, adverse effects to or from natural resources, or changes in regulations governing management of natural resources. In using this approach, the INRMP intends to stress the goal of natural resources management and mission compatibility. Natural resources and the mission at AFRL/RI must be continually reviewed and evaluated for impact.

1.3 Authority

The Sikes Act, 16 United States Code (USC) § 670a, requires an INRMP be written and implemented for all DoD installations with significant natural resources. In addition, it was developed under, and proposes actions in accordance with, applicable Department of Defense and USAF policies, directives, and instructions, including those listed below.

The Sikes Act, 16 USC 670 et. seq. provides for cooperation between the DoD and Department of Interior (DOI) for the protection of natural resources on military lands. On 18 November 1997, Congress passed the Sikes Act Improvement Amendment (SAIA), which requires the preparation and implementation of an INRMP to support the sustainable use by the public of natural resources to the extent that the use is consistent with the needs of fish and wildlife resources. As stated previously, the SAIA also requires the INRMP be prepared in cooperation with the USFWS and the fish and wildlife agency for the state in which the military installation is located. The cooperation between the USFWS and the state fish and wildlife agency is intended to "reflect the mutual agreement of the parties concerning conservation, protection and management of fish and wildlife resources."

Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, identifies DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. INRMPs are required to be jointly reviewed by the USFWS, National Marine Fisheries Service, state conservation agency, and military proponent for operation and effect on a regular basis, every five years or less.

Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, states: "Ecosystem management of natural resources draws on a collaboratively developed vision of desired future ecosystem conditions that integrates ecological, economic and social factors." To effectively integrate ecological, economic and social factors along with the military mission into an effective ecosystem management program, the policy directive further states: "On DoD installations, ecosystem management will be achieved by developing and implementing INRMPs and ensuring that they remain current."

AFMAN 32-7003 implements the Sikes Act and DoD directives by establishing the INRMP as the primary planning document for natural resources at AF installations. AFMAN 32-7003 establishes the Installation or Wing Commander as the signatory authority for approval of the INRMP. The Commander's signature commits the AF to the goals and objectives of the INRMP. Once signed by the cooperating agencies (USFWS and NYDEC), the INRMP takes on the status of an interagency compliance agreement.

The "Annotated Summary of Key Legislation Related to Design and Implementation of the INRMP" Table (Appendix A) summarizes key legislation and guidance used to create and implement this INRMP. Refer to that complete listing of AFIs, AFMANs, the Federal Register, and the USC to ensure that all applicable guidance documents, laws, and regulations are reviewed. Installation-specific policies, including state and local laws and regulations are summarized in the table below.

1.4 Integration with Other Plans

The INRMP is multidisciplinary and provides the summary of natural resources at AFRL/RI. The NRM must ensure that the INRMP and any other plans that may affect natural resources are mutually supportive and not in conflict. However, the AFRL/RI has relatively few plans to be considered in this section. Some of the plans described below will be developed in the future per the Goals, Objectives, and Projects within this INRMP.

Examples of other plans include an Installation Development Plan, Invasive Species Management Plan, Forest Management Plan, Integrated Cultural Resources Management Plan (ICRMP), Integrated Pest Management Plan (IPMP), Wildland Fire Management Plan (WFMP), or other grounds maintenance plans. This INRMP will incorporate information from these various plans once they are developed. The AFRL/RI mission does not require a Bird/Wildlife Aircraft Strike Hazard (BASH) Plan due to the lack of any historical aircraft strikes, in addition to the insignificance of strike outcomes based on aircraft type.

1.4.1 Integrated Cultural Resource Management Plan

The purpose of the AFRL/RI Integrated Cultural Resource Management Plan (ICRMP) is to provide guidance on managing cultural resources properly while maintaining mission activities and readiness. The ICRMP is being currently developed and will be signed in 2023. The ICRMP and INRMP are mutually supportive in that each plan contains measures to eliminate impacts on the opposite's resources. The INRMP often describes management techniques to support cultural resources or indicates areas to avoid in management to protect cultural resources.

1.4.2 Integrated Wildland Fire Management Plan

The purpose of an integrated wildland fire management plan (WFMP) is to reduce wildfire potential, protect and enhance valuable infrastructure and natural resources, and implement ecosystem resiliency goals and objectives on Air Force-managed properties (AFMAN 32-7003). The AFRL/RI WFMP will be developed following the implementation of the INRMP, in cooperation with the Joint Base McGuire-Dix-Lakehurst Wildfire Support Module. The WFMP and INRMP are closely connected and interrelated plans based on their subject resource. These two plans are mutually supporting in achieving the other's goals due to the direct connection of existing natural resources and wildland fire risk. The INRMP often contains management projects to conduct prescribed fire for ecological reasons, but this also reduces wildfire risk concurrently. Both plans support each other in maintaining mission critical areas and landscapes.

1.4.3 Integrated Pest Management Plan

The purpose of the Integrated Pest Management Plan (IPMP) is to incorporate continuous monitoring, education, record-keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment (AFMAN 32-7003). Although not developed as of 2022 for the AFRL/RI, it may be developed due to future needs, or as an outcome from the implementation of this INRMP. The subject resources of the IPMP and INRMP are closely interconnected as pests are classified as natural resources. Often both plans aim to achieve the same goal, the eradication of pests and pest damage, but through different methods. The INRMP supports the IPMP by managing and enhancing native species landscapes that often are free of pest species.

2.0 INSTALLATION PROFILE

Office of Primary Responsibility (OPR)	Environmental Engineering and Real Property Element have overall responsibility for implementing the natural resources management program and are the lead organizations for monitoring compliance with applicable federal, state, and local regulations.
Natural Resources Manager/Point of Contact (POC)	Name: Jaclyn A. Holbritter Phone: 315.330.2643 Email: Jaclyn.Holbritter@us.af.mil
State and/or local regulatory POCs (Include agency name for Sikes Act cooperating agencies)	New York State Department of Environmental Conservation Herkimer and Oneida Region 6 Headquarters 317 Washington Street, Watertown NY 13601-3787 315.785.2239 Madison County Region 7 Headquarters 615 Erie Blvd. West, Syracuse NY 13204-2400 315.426.7400 United States Fish and Wildlife Service New York Ecological Services Field Office 3817 Luker Road, Cortland NY 13045-9385 607.753.9334
Total acreage managed by installation	1060
Total acreage of wetlands	350
Total acreage of forested land	300
Does installation have any Biological Opinions? (If yes, list title and date, and identify where they are maintained)	No
Natural Resources Program Applicability (Place a checkmark next to each program that must be implemented at the installation. Document applicability and current management practices in Section 7.0)	☒ Fish and Wildlife Management ☒ Outdoor Recreation and Access to Natural Resources ☒ Conservation Law Enforcement ☒ Management of Threatened, Endangered, and Host Nation-Protected Species ☒ Water Resource Protection ☒ Wetland Protection ☒ Grounds Maintenance ☒ Forest Management ☒ Wildland Fire Management ☒ Agricultural Outleasing ☒ Integrated Pest Management Program ☐ Bird/Wildlife Aircraft Strike Hazard (BASH) ☐ Coastal Zone and Marine Resources Management ☒ Cultural Resources Protection ☒ Public Outreach ☒ Geographic Information Systems (GIS)

2.1 Installation Overview

2.1.1 Location and Area

The AFRL/RI properties, which together encompass over 1000 acres, are all located in the vicinity of Rome, New York (Figure 2-1). The properties are situated between the city of Oneida, to the west, and the town of Schuyler, to the east. The RRS is located just east of Rome in Oneida County at the former Griffiss Air Force Base (AFB) and is primarily office and laboratory space (Figure 2-2). The VTA is located just west of Rome, and north of the town of Verona, in Oneida County. The major highways serving the facility are State Routes 31, 46, and 365 (Figure 2-3). The STA is the westernmost GSU, approximately 18 miles southwest of Rome, in Madison County. STA is located just south of Oneida, with access from State Route 46 (Figure 2-4). The NTA1 and NTA2 are located in Herkimer County, approximately 30 miles southeast of Rome. Access to these sites is from State Routes 8, 12, and 28. NTA1 and NTA2 are situated on two adjacent hilltops (Tanner and Irish Hills, respectively), 1.5 miles apart across a 400-foot-deep valley (Figure 2-5). A description of each site can be found in Table 2-1.

Table 2-1. Installation and /GSU Location and Area Descriptions

Installation and Geographically Separated Unit (GSU)	Main Use/ Mission	Acreage	Addressed in INRMP?	Describe Natural Resource Implications
Rome Research Site	Laboratory research	100.2	Throughout the INRMP	None. Facility is either buildings or landscaped area
Verona Test Annex GSU	Currently deactivated	495	Throughout the INRMP	Wetlands, wildlife habitat
Stockbridge Test Annex GSU	Field research and testing	295	Throughout the INRMP	Forest, shrubland, and grassland habitats
Newport Test Annex No. 1 (Tanner Hill) GSU	Field research and testing	37	Throughout the INRMP	Forest and grassland habitats
Newport Test Annex No. 2 (Irish Hill) GSU	Field research and testing	133.6	Throughout the INRMP	Forest and grassland habitats

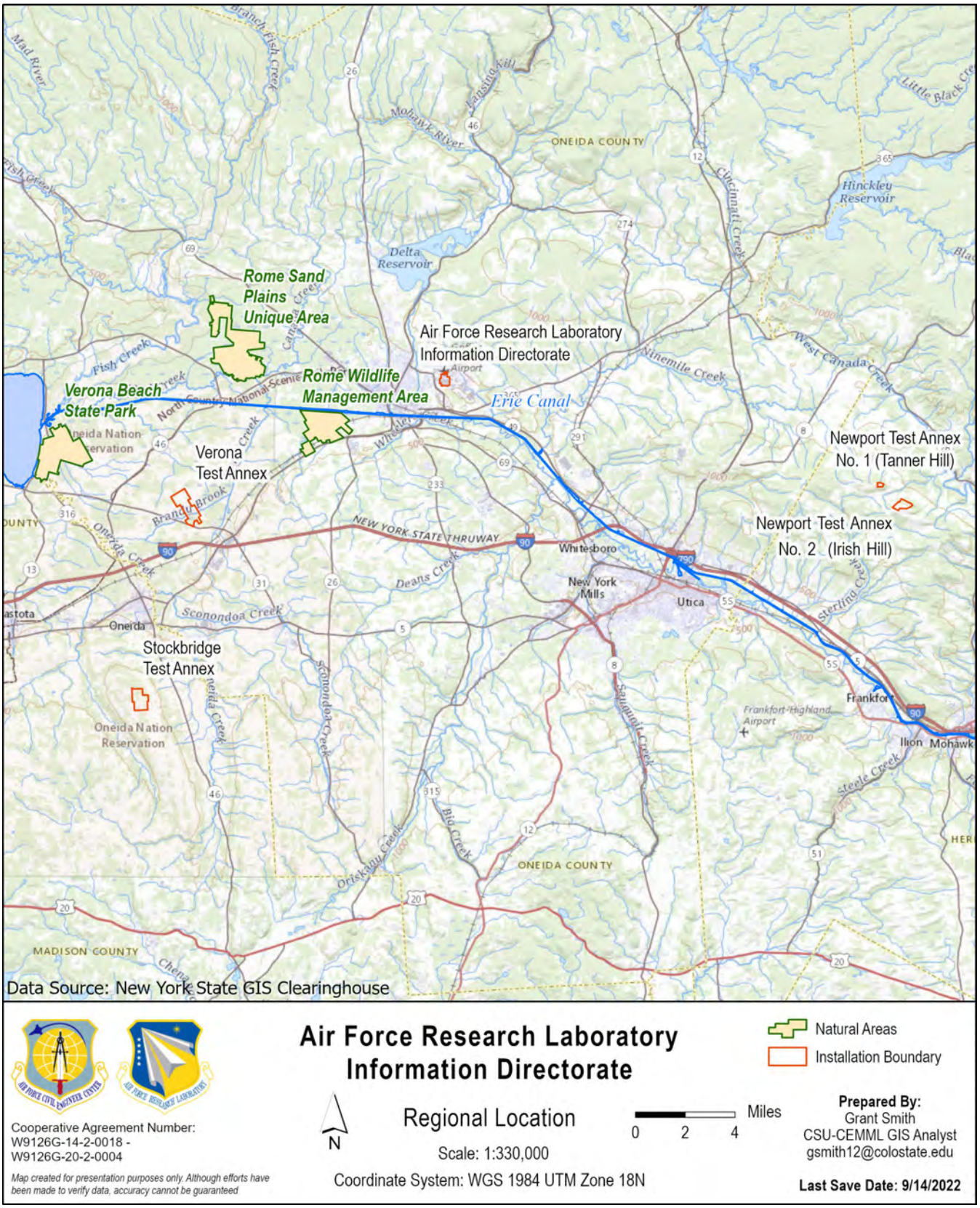

Figure 2-1. Air Force Research Laboratory Information Directorate Regional Location

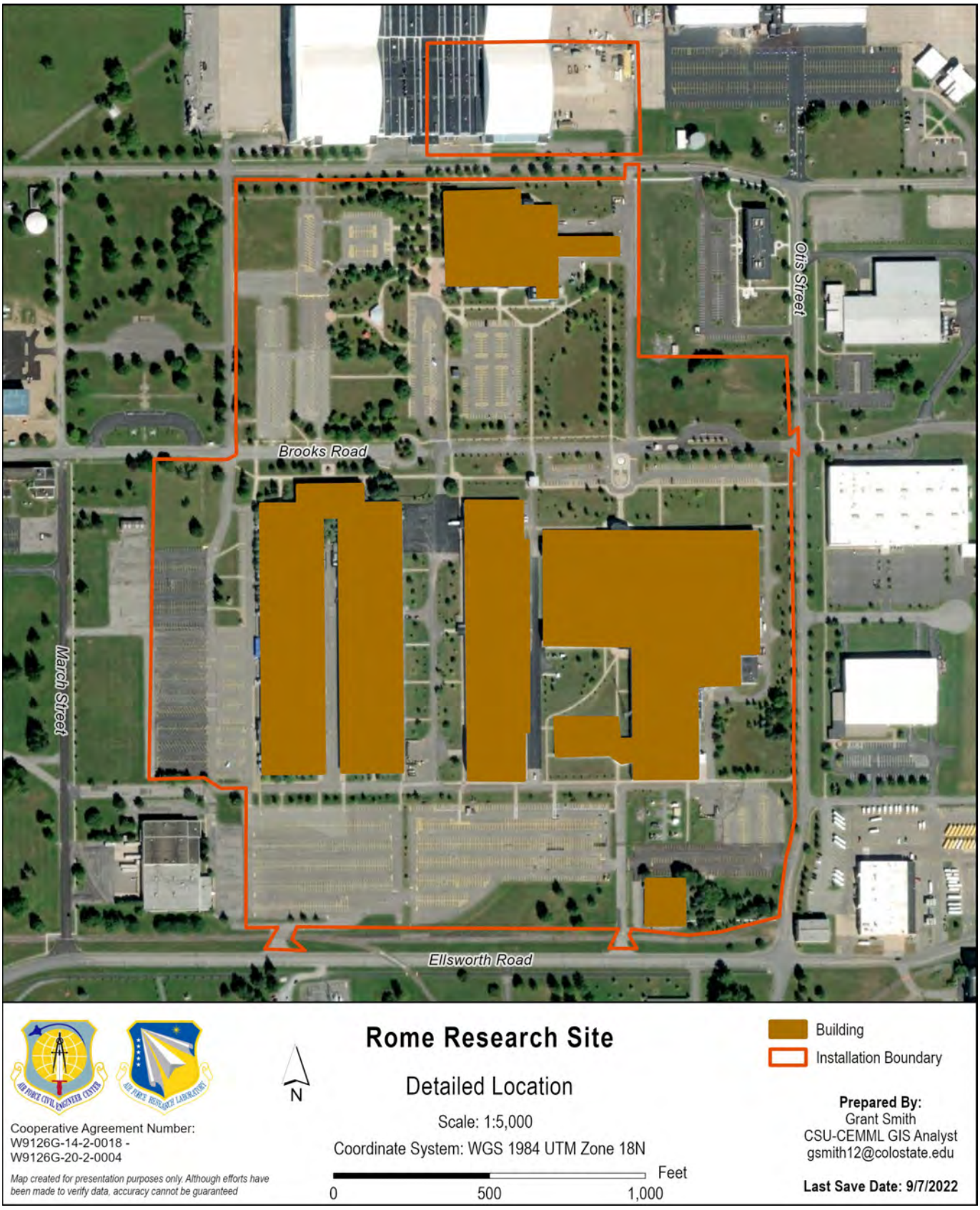

Figure 2-2. Rome Research Site Detailed Location

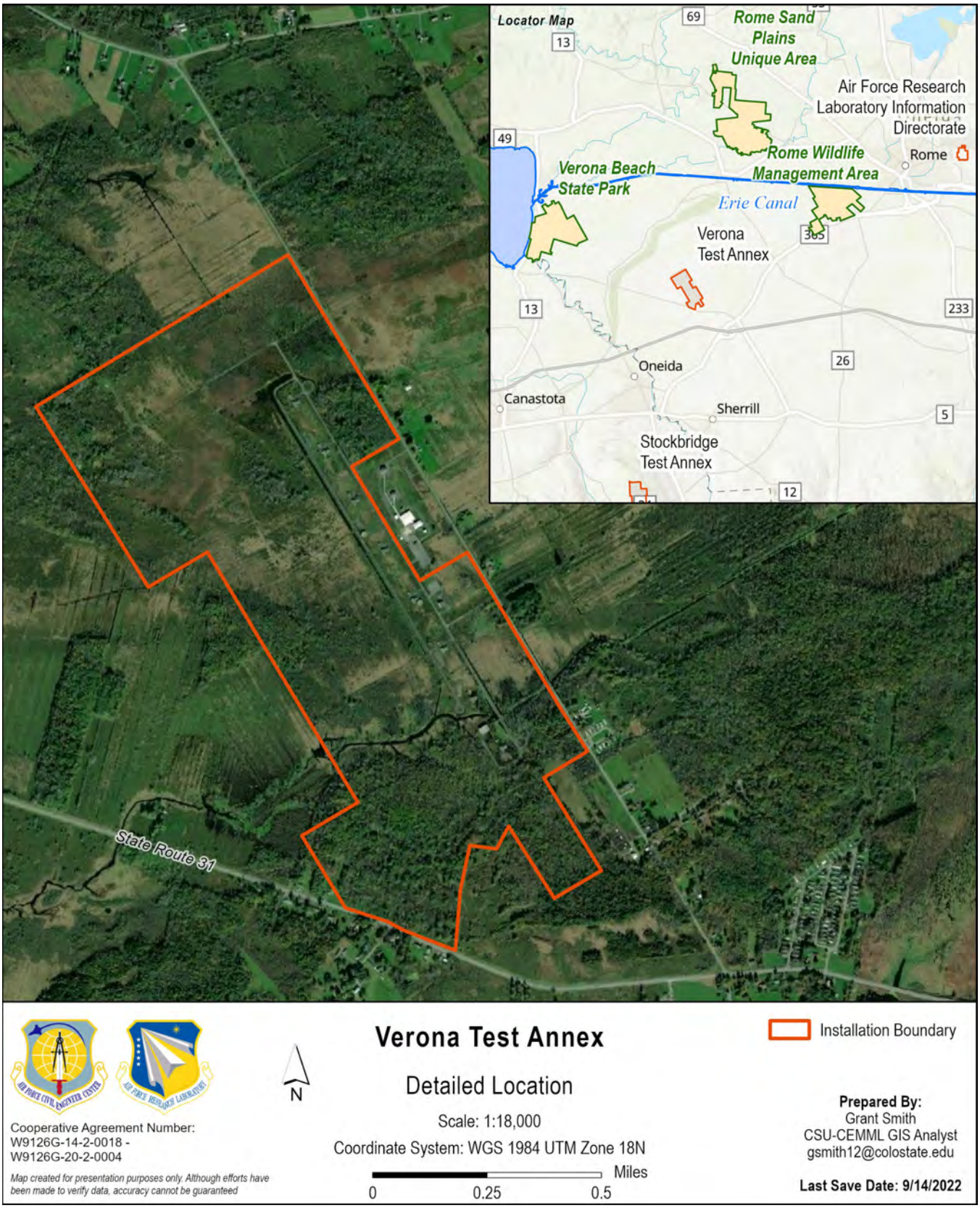

Figure 2-3. Verona Test Annex Detailed Location

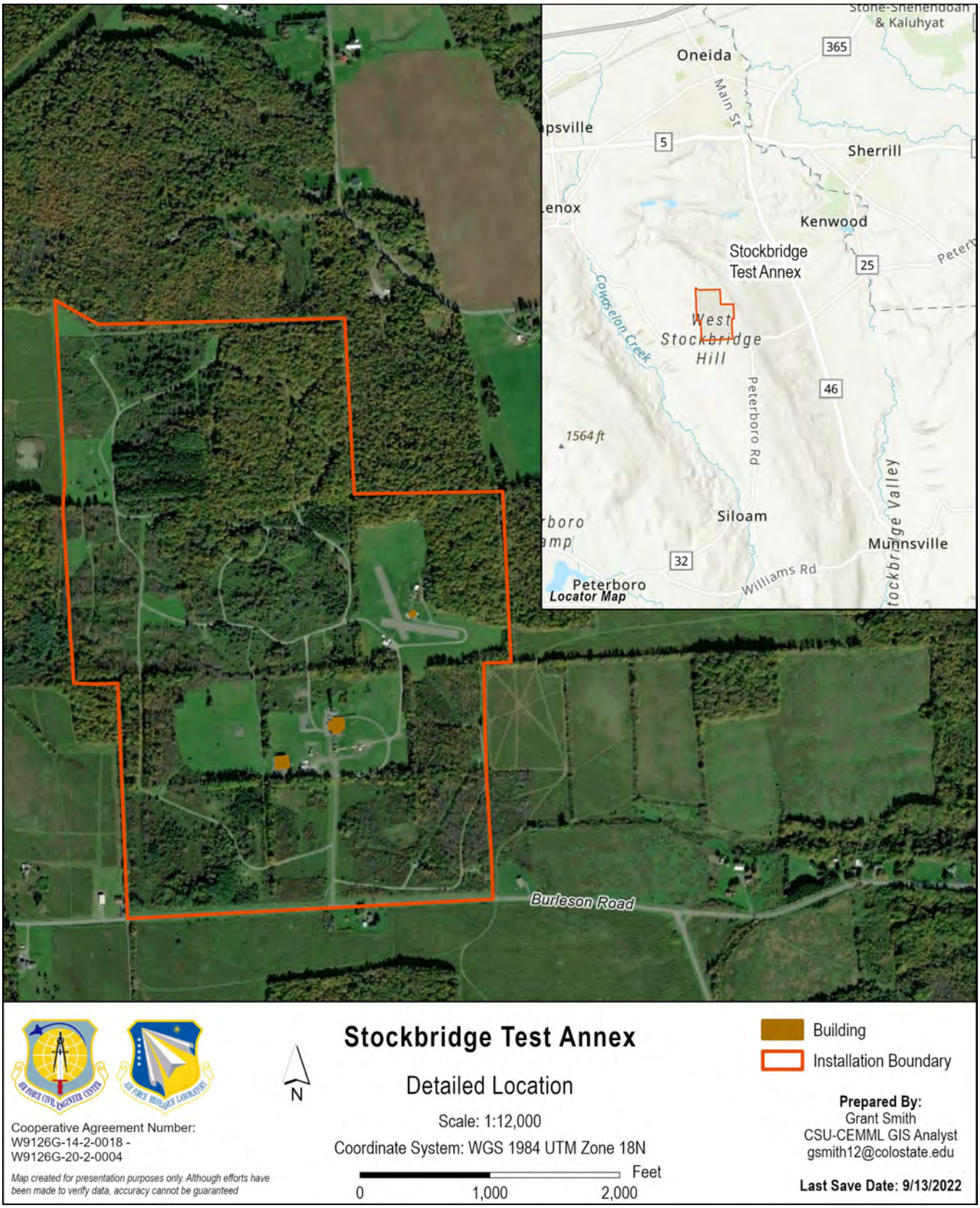

Figure 2-4. Stockbridge Test Annex Detailed Location

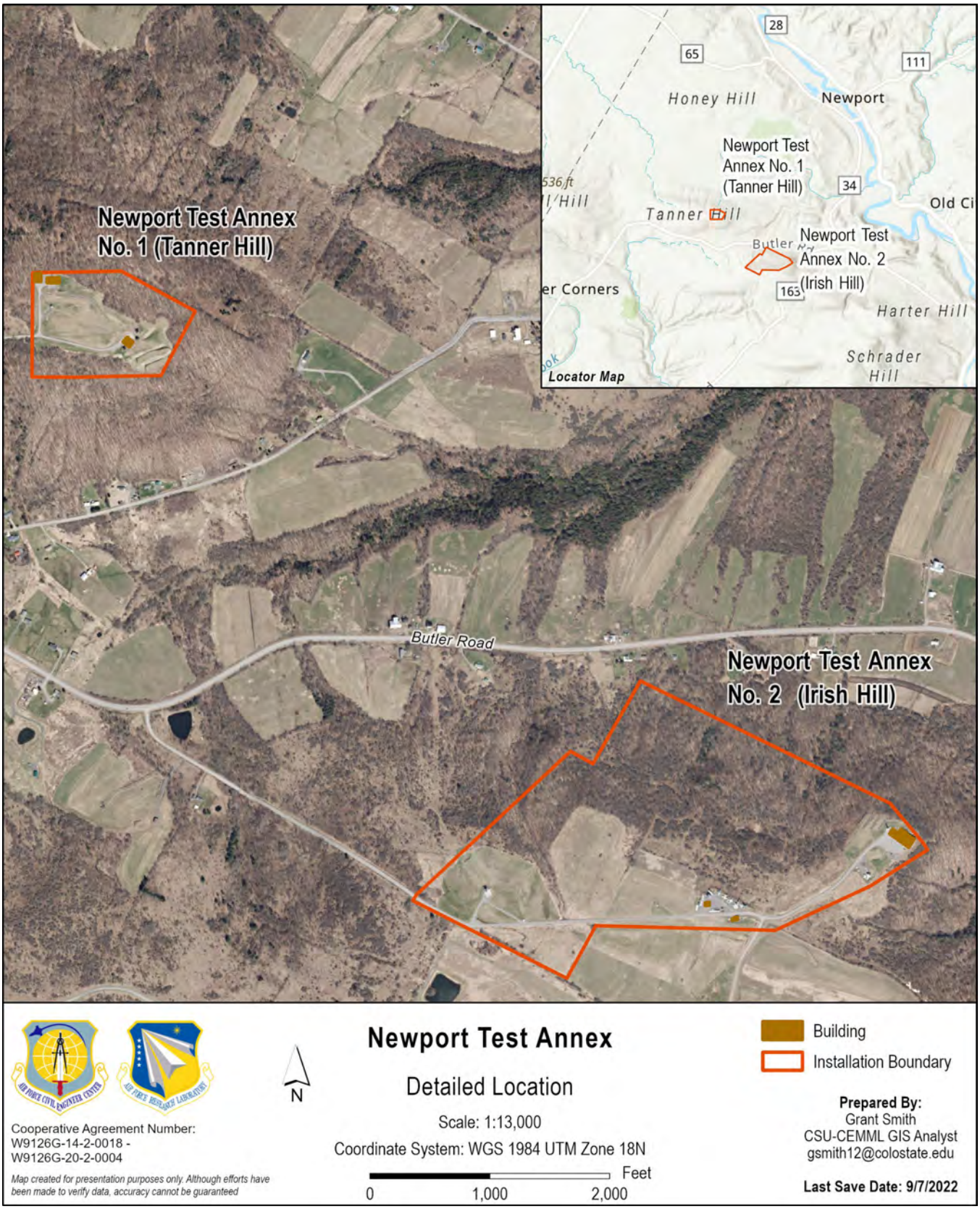

Figure 2-5. Location map of Newport Test Annexes 1 and 2

2.1.2 Installation History

RRS is on the site of the former Rome Army Air Depot, which was renamed Griffiss AFB in 1948. Griffiss AFB was named after Lt. Colonel Townsend E. Griffiss, a New York state resident and the first American aviator killed in action in the European theater of operations during World War II. During that war, the installation repaired and maintained aircraft and stored and shipped supplies. The former Griffiss AFB closed in 1995 and its airfield is now part of Griffiss International Airport. The rest of the installation was realigned for civilian and non-combat purposes, including the development of the RRS as part of the AFRL/RI.

The Air Force Research Laboratory (AFRL) officially launched in 1997 to consolidate the four former Air Force laboratories and the Air Force Office of Scientific Research. The laboratory and its predecessors have overseen more than 100 years of critical research for the USAF and DoD. Some of the technology breakthroughs from this laboratory include the F-117 Nighthawk, B-2 Spirit, C-17 Globemaster, and the F-22 Raptor. The research laboratory has been part of important advancements in communications, electronics, manufacturing, and medical research and products. Technology needs of both the USAF and Space Force are integrated at AFRL. The headquarters of AFRL is located at Wright-Patterson AFB in Ohio, but it has facilities in nine other states, including the RRS in Rome, New York.

The VTA site was purchased in 1952 from multiple landowners. In 1989, the first Space Surveillance Squadron was activated at VTA. This site supported missions for radar, communication equipment, millimeter wave research, and information technology systems demonstrations, and was deactivated in 1995. Reactivation is desired and would require development and maintenance in areas that are categorized as improved and semi-improved but have shifted to wetland vegetation.

The STA site was purchased in 1958 and used to conduct low frequency antenna testing. Since then, the mission has changed multiple times due to changes in mission focus and adversaries. Recent improvements to the site have included the installation of experimentation pads, which host moveable antenna towers to create different testing scenarios.

The NTA site was purchased in the early 1950s from multiple landowners. A minor land acquisition project was completed in 2017 on 92.67 acres of land the land between NTA1 and NTA2 to reduce communications interference during testing operations at the site

2.1.3 Military Missions

The mission of the AFRL is to lead, discover, develop, and deliver science, technology, and innovation for Warfighters. The mission of the Information Directorate (RI) is to explore, prototype, and demonstrate high-impact, game-changing technologies that enable the Air Force and the Nation to maintain their superior technical advantage. The mission at RRS is to support research in a laboratory setting, while STA, NTA1, and NTA2 support research and testing in a field setting. VTA currently has no active military mission, and all activities and experiments there have ceased. However, potential future use of the VTA may involve cybersecurity and Counter-Unmanned Aircraft System research and development. The infrastructure at STA supports experimentation in multiple technology areas, including radio frequency communications, spectrum, networking, cyber, sensor, and information. The antenna range at the NTA is used to evaluate antenna performance on full-scale aircraft; measure antenna radiation patterns, antenna-to antenna-isolation, radio frequency system performance; and develop state-of-the-art antenna measurement technologies.

There are no tenant organizations at AFRL/RI.

2.1.4 Natural Resources Needed to Support the Military Mission

The RRS is located on a developed site and does not rely on natural resources directly to achieve its research mission. Good soil stability across installation lands is important to avoid habitat loss and degradation as well as deterioration of infrastructure such as roads, pipelines, and buildings that are vulnerable to erosion. Overall good ecosystem health contributes to the ability of the environment to withstand both natural and man-made disturbances and be more resilient over the long term, even in developed areas.

The other GSUs are all situated in areas with more natural landscapes. At these properties, the mission requires healthy native ecosystems, quality habitat for wildlife, healthy vegetation, stable soils, and clean water for riparian ecosystems and watershed health. Native ecosystems and species prevent increased regulatory burden for the installation if additional species listings can be avoided. They also provide real-world testing environments which is a critically useful quality when testing or training. Testing ranges at the various GSUs require various environments to satisfy desired range environments. For example, desired range environments at the STA include open (grasslands and shrublands) and healthy forest habitats, whereas desired range environments at the NTA only include open (grasslands) habitats. Since VTA has been deactivated for many years, baseline surveys are needed to gain a better understanding of the natural resources present at the site. Once more information is available from that site, and potential future missions are known, then an evaluation of how those resources support the mission can occur.

2.1.5 Surrounding Communities

Rome, Utica, and Oneida are the larger communities in the vicinity of AFRL/RI. Rome and Utica are located in Oneida County, which had an estimated population in 2020 of 232,125. The county population declined by 1.2% between 2010 and 2020 (United States Census Bureau 2020). Major industries that support the county's economy are government, health care, and manufacturing.

The city of Rome covers an area of 74.85 square miles. The estimated population is 32,127 as of the 2020 Census. The population declined 4.7% between 2010 and 2020. The city of Utica, the county seat of Oneida County, covers 16.72 square miles. The estimated population of Utica is 65,283 as of the 2020 Census, and the population increased 4.9% between 2010 and 2020 (United States Census Bureau 2020).

The city of Oneida is in Madison County. Oneida had an estimated population of 10,329 as of the 2020 Census, a decline of 9.3% from 2010. The county population declined 7.4% over the same period (United States Census Bureau 2020). The largest industries in Madison County are health care, education, and retail.

The larger city of Syracuse lies approximately 50 miles to the west of Rome, and Albany is approximately 110 miles east of Rome.

2.1.6 Local and Regional Natural Areas

Most of the land immediately surrounding the AFRL/RI RRS and its GSUs is privately owned, but several local or regional natural areas or publicly owned lands are found within a five-mile radius. The natural areas protect unique landscapes and diverse habitats amid lands developed for agricultural or urban use. Local and regional natural areas found in the vicinity of AFRL/RI include:

- Delta Lake State Park
- Rome Wildlife Management Area
- Pitch Pine Bog Conservation Area and Nature Trail
- Oriskany Battlefield State Historic Site
- Oxbow Falls Park

- Mt. Hope Park
- Vernon National Shooting Preserve
- Steuben Hill State Forest

In addition, the southern boundary of Adirondack Park is approximately 20 miles northeast of Rome. This park comprises 2.7 million acres of state-owned lands classified as Forest Preserve. Lake Ontario and a portion of the Great Lakes Seaway Trail National Scenic Byway are approximately 40 miles northwest of Rome, with abundant history and natural resources.

2.2 Physical Environment

2.2.1 Climate

The AFRL/RI is in the Moist Continental Mid-Latitude, Humid Continental climate zone, characterized by warm summers and severe winters with no dry season (Kottek et al. 2006). Weather patterns in this region are characterized by eastward-moving weather fronts, although seasonal variations may occur. During summer, equatorial air masses move northward and bring moisture to the region. In winter, the reverse occurs, allowing cold air masses from the north to move south into the region (Kottek et al. 2006, Arnfield 2022).

Average annual temperature in this region from 2007–2022 was 47.1 °F. Summers are humid and warm, with the average monthly temperature peaking at 70.8 °F in July (NWS 2022a). Winters are typically long and snowy, with consistent snow cover for multiple months. Average monthly temperatures are 32 °F or below from December to March, and they reach a minimum of 21.4 °F in January.

Precipitation occurs regularly in all seasons. Late spring and summer (April, May, June, and July) represent periods of highest average monthly precipitation, typically over four inches per month. Precipitation peaks in October as well, averaging 5.42 inches (NWS 2022a). Snowfall typically occurs from November through April in the Syracuse area, and averages 121.8 inches per year. Snowfall peaks during January and February, averaging over 30 inches per month (NWS 2022b).

Severe weather events, such as tornadoes, thunderstorms, and tropical storms are uncommon but not rare in this region of New York. Flooding is uncommon but may occur from rapid snowmelt, moderate rains falling on wet soil conditions, and/or extreme precipitation events (Shaw and Riha 2011).

2.2.1.1 Climate Change Projections

Colorado State University Center for Environmental Management of Military Lands (CSU CEMML; hereafter ‘CEMML’) developed site-level climate projections for the area encompassing the AFRL/RI properties. CEMML used the U.S. National Center for Atmospheric Research Community Climate System Model (CCSM4) simulations prepared for the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report (Gent et al. 2011; Hurrell et al. 2013; Moss et al. 2007, 2010). They generated simulations for two Representative Concentration Pathway (RCP) scenarios: a moderate emissions scenario (RCP 4.5) and a higher emissions scenario (RCP 8.5). They used these scenarios to produce time series of daily climate values for the decades centered around 2030 (2026–2035) and 2050 (2046–2055). After running CCSM4 simulations across both scenarios and timeframes, they downscaled the results to a six-kilometer spatial resolution (Pierce et al. 2014) and averaged daily values to produce annual averages. They then compared the results to weather station data from a 30-year historical baseline (1976–2005).

The results (Table 2-2) indicate a general trend of increasing temperatures by mid-century. Minimum and maximum temperatures increase under both emissions scenarios and timeframes. Both scenarios project

increases in annual average temperature over the historical average by 2030, with an increase of 2.5 °F for RCP 4.5 and 2.9 °F for RCP 8.5. Both emissions scenario projections show higher warming by 2050, with RCP 4.5 projecting an increase of 3.4 °F and RCP 8.5 projecting an increase of 3.8 °F. Across all scenarios, projections show increases in days reaching temperatures >90 °F, and reductions in days below 32°F. Precipitation is projected to increase in all but one model scenario.

AFRL/RI's general climate will likely persist through mid-century, with cold, snowy winters followed by warm but overall mild growing seasons, albeit with increased average temperatures and steadily climbing occurrence of days with higher-than-normal temperatures. As a result, the portion of precipitation falling as rain as opposed to snow may increase.

Table 2-2. Summary of modeled historical and projected climate data for AFRL/RI[1]

Variable	Historical	RCP 4.5		RCP 8.5	
		2030	2050	2030	2050
PRECIP (inches)	44.1	47.2	44.6	43.4	47.4
TMIN (°F)	37.8	39.9	40.7	40.4	41.3
TMAX (°F)	56.6	59.5	60.6	59.8	60.7
TAVE (°F)	47.2	49.7	50.6	50.1	51.0
GDD	2813.2	3218.9	3455.0	3301.8	3448.3
HOTDAYS	5.6	17.5	28.7	25.0	28.1
COLDDAYS	141.2	126.0	126.5	128.0	123.2
WETDAYS	0.4	0.8	0.3	0.4	1.1
DRYDAYS	250.7	249.8	252.6	250.2	247.4
FTDAYS	50.3	46.3	50.2	48.1	42.9

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

2.2.2 Landforms

The Ecoregions of New York classifications were developed by the Environmental Protection Agency (EPA), United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS), New York Natural Heritage Program (NYNHP), NYDEC, and The Nature Conservancy (EPA 2021). According to this classification system, the AFRL/RI is mostly located in the Eastern Great Lakes Lowlands ecological region. This region is generally composed of smoothed, low-relief features such as valleys and lowlands, which were shaped by glacial lakes and flooding. The RRS and various GSUs have distinct landforms, as described below.

<u>Rome Research Site</u>

RRS is located along the border of the Mohawk Valley and Ontario Lowlands ecoregions and may contain landforms of both. The topography of these regions has been shaped by glacial lakes and episodic glacial flooding and can be described as irregular and hilly (NYDOT 2012, EPA 2021). The Ontario Lowlands region is generally flat, though, because it was once covered by Glacial Lake Iroquois. The RRS sits on the former Griffiss AFB, which was previously cleared of vegetation and leveled. Streams in the area were channelized and stormwater infrastructure was built to control flows. The site is heavily developed, and

adjoins the city of Rome, New York. The elevation of RRS is 470 feet and does not change appreciably across the site.

Verona Test Annex

Similar to RRS, VTA is located along the border of the Mohawk Valley and Ontario Lowlands ecoregions and may contain landforms of both. The site has mild topographical features, with gentle slopes across the entire area. Brandy Brook, which runs southeast to southwest across the southern portion of the site, lies at the lowest elevation, approximately 440 ft. The landscape gradually slopes upward away from Brandy Brook, both to the operations area in the northeast and the forest in the far southeast. The southeastern forest is located at the site's highest elevation, at approximately 460 feet. The wetlands west of the operations area are generally flat, with elevations similar to Brandy Brook. The addition of roads and buildings to the northeastern portion of the site has leveled what was once gently sloping topography. The area surrounding the VTA is relatively undeveloped and consists of forests and wetlands interspersed with agricultural land.

Stockbridge Test Annex

The STA is located to the south of the RRS and VTA and within a different ecological region, the Northern Allegheny Plateau. This ecological region is characterized by rolling hills, open valleys, and low mountains at higher elevations than in ecoregions to the north. Within this region, the STA is within the Finger Lake Uplands and Gorges sub-ecoregion, characterized by U-shaped valleys created by glacial movement generally running north-south. The location of the STA on West Stockbridge Hill represents the far northern terminus of the Allegheny Plateau, where it drops into the Lowlands region (NYDOT 2012, EPA 2021). Soft shale at the site was likely sculpted by glacial processes, with fissures and crevices where bedrock is exposed or at shallow depths.

STA is located atop West Stockbridge Hill, a long ridge-like hill running northwest to southeast at approximately 1,270 feet elevation. The hilltop location is relatively flat, with minor changes in elevation across the site. Two areas onsite reach 1,280 feet elevation, one located in the southern center of the site, and the other in the northwestern part of the site. In the eastern woodlands, multiple small breaks in the bedrock are exposed at the surface. These fissures were likely caused by erosion and/or glaciation. Some are several feet deep and up to 100 feet long.

Newport Test Annexes

NTA1 and NTA2 are located within the Mohawk Valley sub-ecoregion, atop two adjacent hills. NTA1 represents the true summit of Tanner Hill and is at 1,560 feet elevation. Land slopes downward in all directions from the center of the site to approximately 1,525 feet elevation along the boundaries.

A valley to the northwest of NTA1 is at 1,240 feet elevation and bisects NTA1 and NTA2. The area between the annexes is primarily agricultural land, interspersed with upland and riparian forest dissected by tributaries of West Canada Creek. NTA2 is located atop Irish Hill, and ranges in elevation from 1,530 feet to 1,600 feet. The entrance to the installation represents the lowest elevation onsite, at 1,530 feet. Land slopes up going eastward to the center of the installation, which represents the highest elevation, 1,600 feet. Land slopes slightly downward, then plateaus to the east along a long peninsular arm of the hill. This arm is where the offices are located, at 1,560 feet elevation.

The newly acquired land parcel abutting the NTA2 to the north is mostly composed of forested moderately steep hillsides. The land slopes to the north and is incised with occasional ravines. Ravines have exposed bedrock, predominantly in the western portion of the parcel.

2.2.3 Geology and Soils

Bedrock such as shale, limestone, and siltstone underlie the AFRL/RI properties, with significant erosion over time resulting in the rolling landscape typical of the region. The higher elevation landscapes that surround the properties may be composed of erosion-resistant materials such as more cemented limestones but are also commonly formed by softer materials shaped by glaciation and subsequent fluvial action (NYSM 2022). Soils in this region are typically deep and productive due to their limestone origins (EPA 2021). Additional information on soils at the RRS and various GSUs, described below, was sourced from the National Resource Conservation Service Web Soil Survey (NRCS 2022) and maps produced by the State University of New York (SUNY) for the New York State Museum (NYSM) Geology Collection.

Rome Research Site

The RRS is primarily underlain by Utica Shale. Soils are composed of the Urban Land soil group, with minor soil components such as Udorthens, Alton, Honeoye, Lima, Castile, Windsor, and Canandaigua (Figure 2-6) (NRCS 2022). Urban soils typically have a man-made disturbed surface layer of native soils and imported materials or contaminants (Pouyat et al. 2020). They can have a wide range of compaction and porosity. Native soils in this area are lacustrine sands, typically deposited in proglacial lakes or in ancient near-shore environments (SUNY 1987, NYSM 2022). These sand deposits are typically composed of quartz sand and are well-sorted and stratified (SUNY 1987, NYSM 2022).

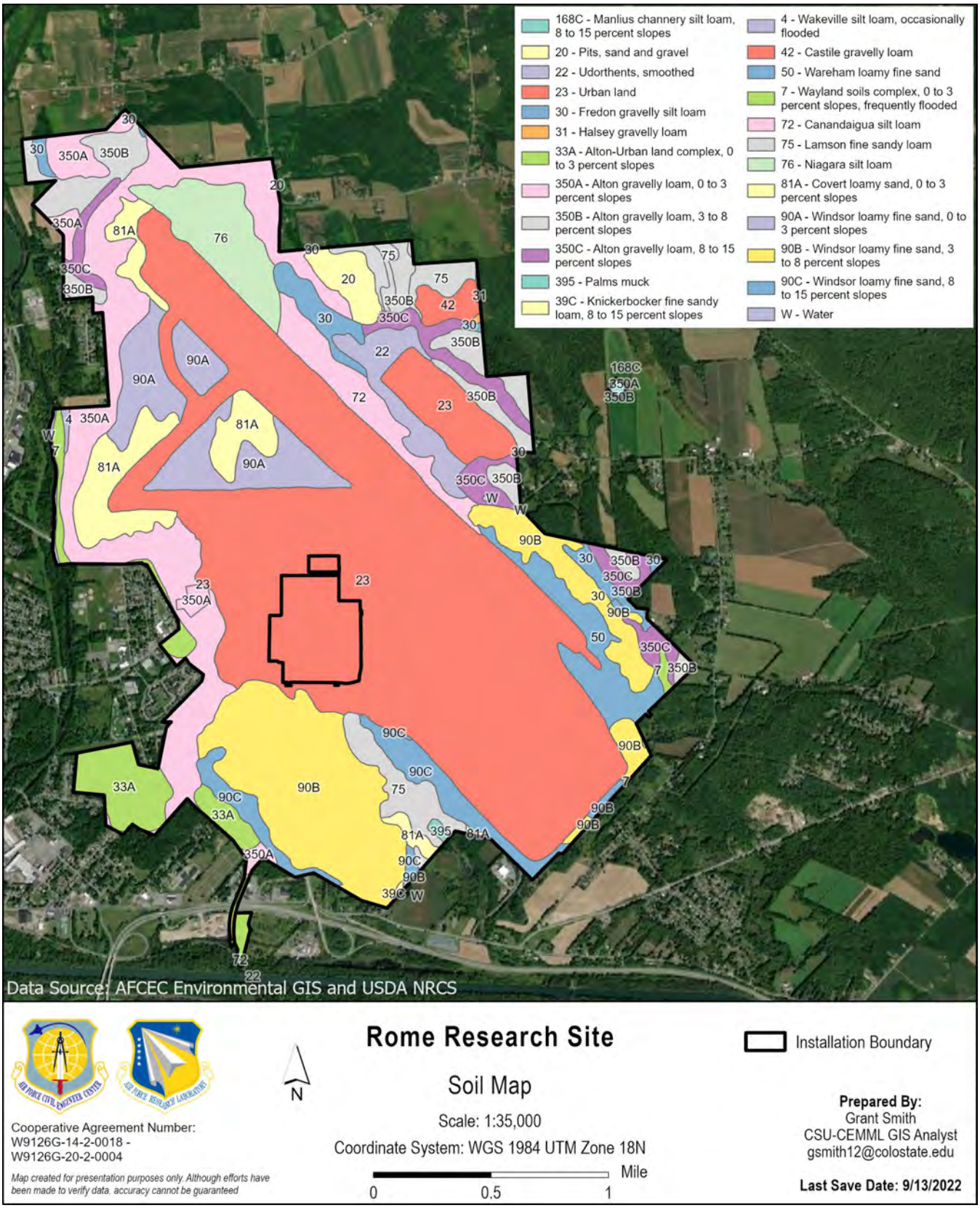

Figure 2-6. Rome Research Site Soil Map

Verona Test Annex

The bedrock geology of the VTA is primarily composed of the Lower Silurian Clinton Group, including major constituents of shale and minor constituents of sandstone, conglomerate, and hematite (Figure 2-7). Soils at the VTA are primarily composed of Niagara and Canandaigua silt loams, which were deposited in and around proglacial lakes, likely formed by retreating glacial meltwater (SUNY 1986, NYSM 2022). Niagara silt loam is composed of sandy and silty loam throughout all profiles, has a high-water content, and is poorly drained. Depth to the water table in this soil is typically only 6-18 inches, while depth to bedrock or another restrictive feature is usually more than 80 inches. Niagara silt loam is considered prime farmland, but only if it is drained; its runoff potential is high (NRCS 2022).

Canandaigua silt loam is comprised of silt, sand, and clay loam throughout all profiles, has a high-water content, and is poorly drained. It is considered a hydric soil, and the water table extends all the way to the soil surface. Depth to bedrock or other restrictive features is usually more than 80 inches. This soil is considered farmland of statewide importance; therefore, its runoff potential is high (NRCS 2022).

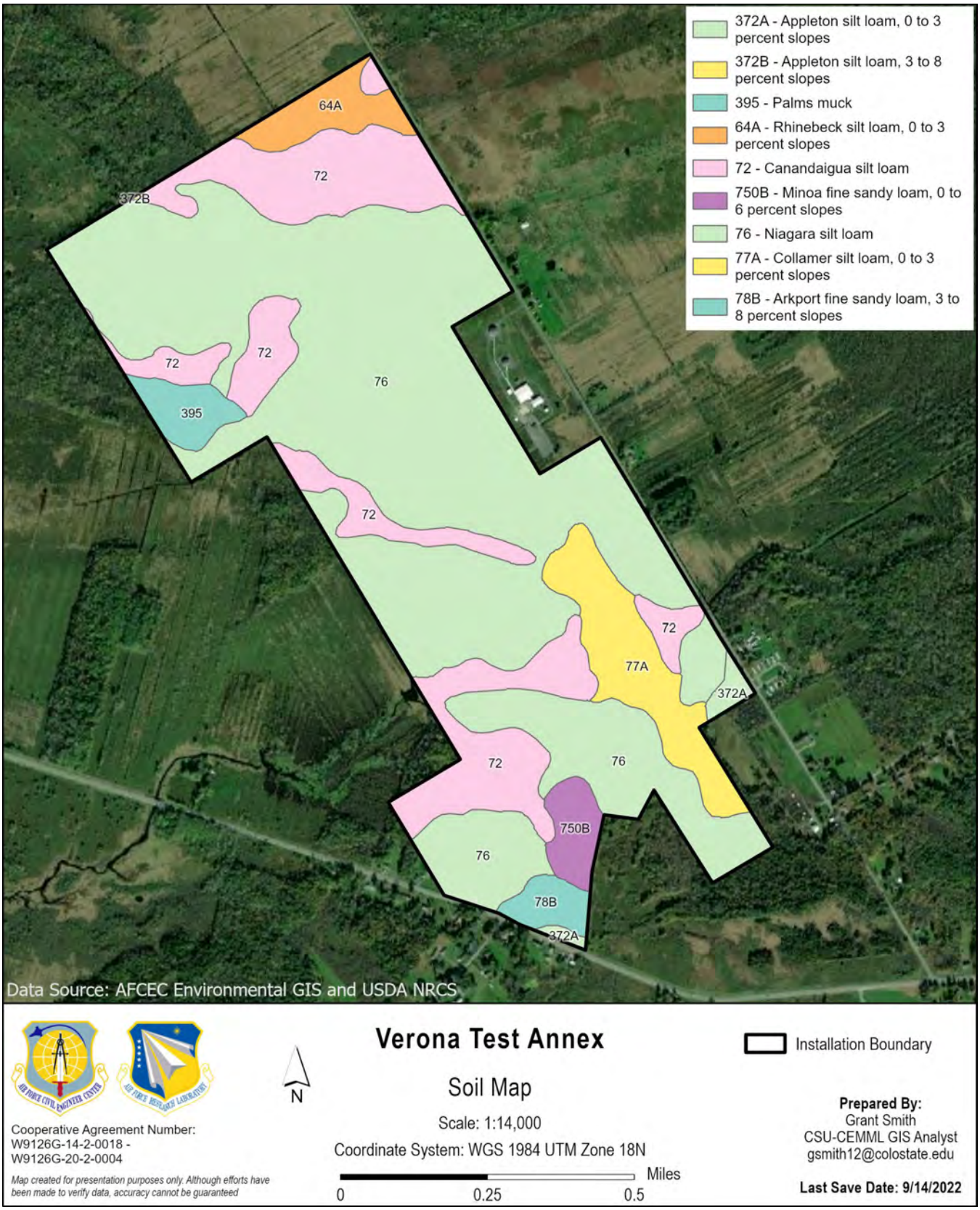

Figure 2-7. Verona Test Annex Soil Map

Stockbridge Test Annex

The bedrock geology of the STA is composed of two geologic groups, including the Helderberg group and the Onondaga Limestone group. The Helderberg group is primarily composed of limestone, with a minor constituent of dolostone (dolomite). The Onondaga Limestone group is primarily composed of limestone with smaller amounts of chert. The STA sits along the northern boundary of the limestone-dominant bedrock zone, transitioning to sandstone, siltstone, shale, and slate at the bottom of West Stockbridge Hill. Rocky outcrops are common (SUNY 1986, NYSM 2022). Soils of the area are mainly composed of Honeoye silt loam, with smaller components of Wassaic silt loam and Farmington-Wassaic-Rock outcrop complex, and are derived from glacial till, with variable components from boulders to silt and underlying bedrock (SUNY 1986, NYSM 2022). Honeoye is composed of silt and gravelly loam in all profiles, is well drained, and has a moderate water supply (Figure 2-8). Depth to the water table and bedrock in this formation is deep, usually more than 80 inches. This soil is considered prime farmland; however, it has medium potential for runoff (NRCS 2022).

Wassaic silt loam is comprised of silt, gravelly, and clay loam across all layers, has low water content, and is moderately well drained. Depth to the water table is approximately 19–39 inches, while depth to bedrock is usually 20–40 inches. This soil is considered prime farmland (NRCS 2022).

Farmington-Wassaic-Rock outcrop complex is composed of gravelly silt loam, drains somewhat excessively, and has a very low water supply. Depth to the water table is usually more than 80 inches, while depth to bedrock is only 10–20 inches. This soil is not considered prime farmland (NRCS 2022).

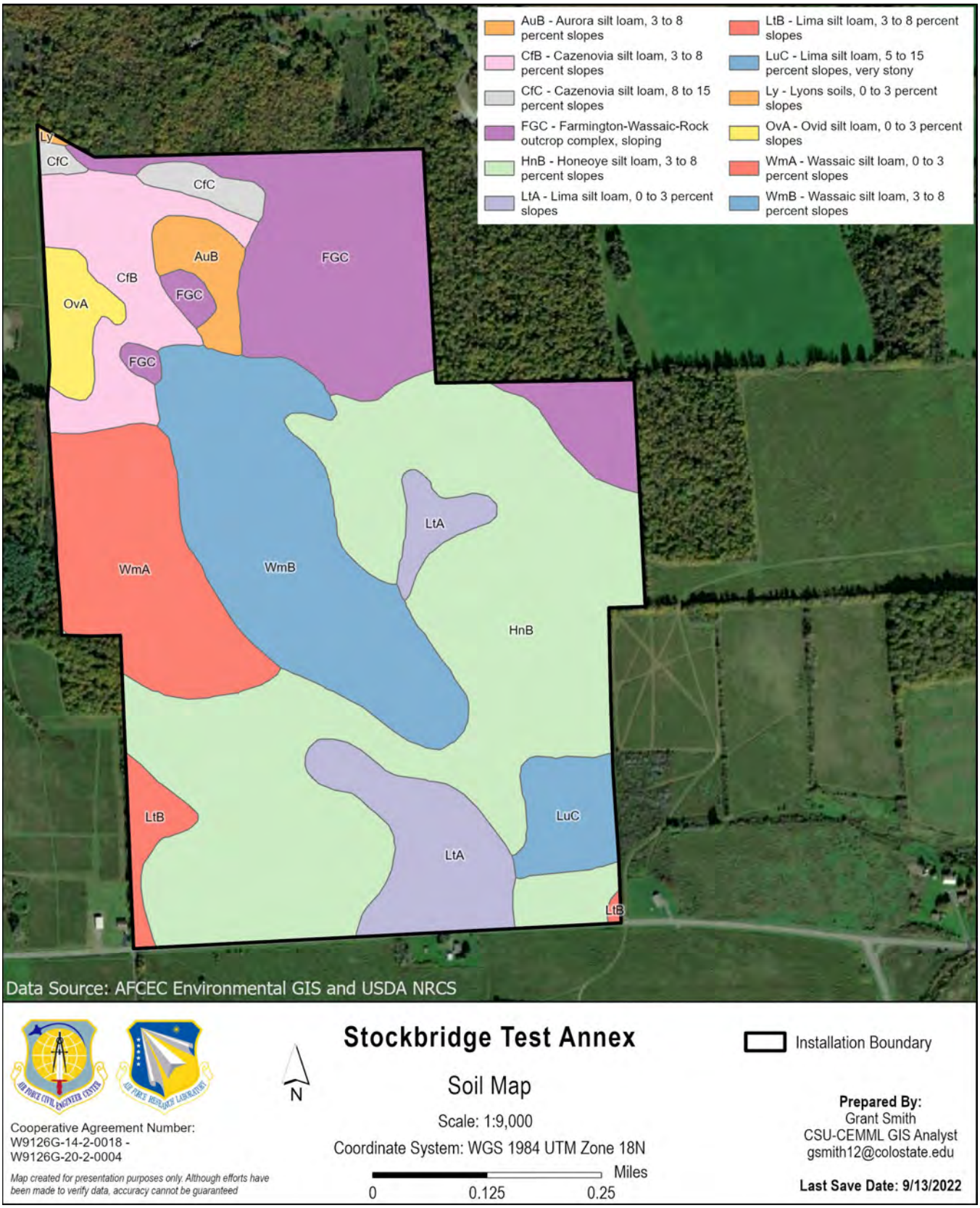

Figure 2-8. Stockbridge Test Annex Soil Map

Newport Test Annexes

NTA1 and NTA2 are composed of two geologic formations, Frankfort and Utica Shale (Figure 2-9). The Frankfort formation is composed primarily of shale and siltstone, with small amounts of sandstone, and the Utica Shale formation is composed solely of black-colored shale. Soils are composed of glacial till, with material ranging from silt to boulders and bedrock. Bedrock is within 10 feet of the surface, and rocky bedrock outcrops may occur (SUNY 1987, NYSM 2022).

Soils of NTA1 are composed of Hornell silt loam and Nassau silt loam. Nassau silt loam is made up of silt loam across all profiles, is somewhat excessively drained, and has a very low water supply. Depth to water table is usually more than 80 inches, while depth to bedrock is only 10–20 inches. This soil is not considered prime farmland (NRCS 2022).

Soil types at NTA2 are composed of two major soil types, and two others to a lesser extent. The two major soil types found on base are Manheim silt loam and Manlius shaly silt loam. Manheim silt loam is composed of silt and clay loam across all profiles, is somewhat poorly drained, and has a moderate water supply. Depth to the water table is 6–18 inches, while the depth to bedrock or a restrictive feature is 80 inches. This soil is considered prime farmland if drained. Manlius shaly silt loam is composed of silt loam across all profiles, is well drained, and has a low water supply. Depth to the water table is typically more than 80 inches, while depth to bedrock is only 20–40 inches. This soil is considered farmland of statewide importance. The minor soil types include Shaly rock land and Hornell silt loam. Shaly rock land is composed of silt loam across all profiles, is somewhat excessively drained, and has a very low water supply. Depth to the water table is usually greater than 80 inches, while depth to bedrock is only 10–20 inches. This soil type is not considered prime farmland. Hornell silt loam is comprised of silt and clay loam across all profiles, is poorly drained, and has a low water supply. The depth to the water table is only 6–18 inches, while the depth to bedrock is 20–40 inches. This soil is considered farmland of statewide importance (NRCS 2022). The recently acquired parcel abutting NTA2 is primarily composed of Burdett silt loam and Honeoye and Lansing silt loams. Shaly rock land, very steep also composes a large percentage of the land area. Burdett silt loam is composed of silt or fine sand across all profiles and is somewhat poorly drained. Depth to bedrock is over 60 inches. The soil is considered prime farmland if drained. Honeoye silt loam is described above.

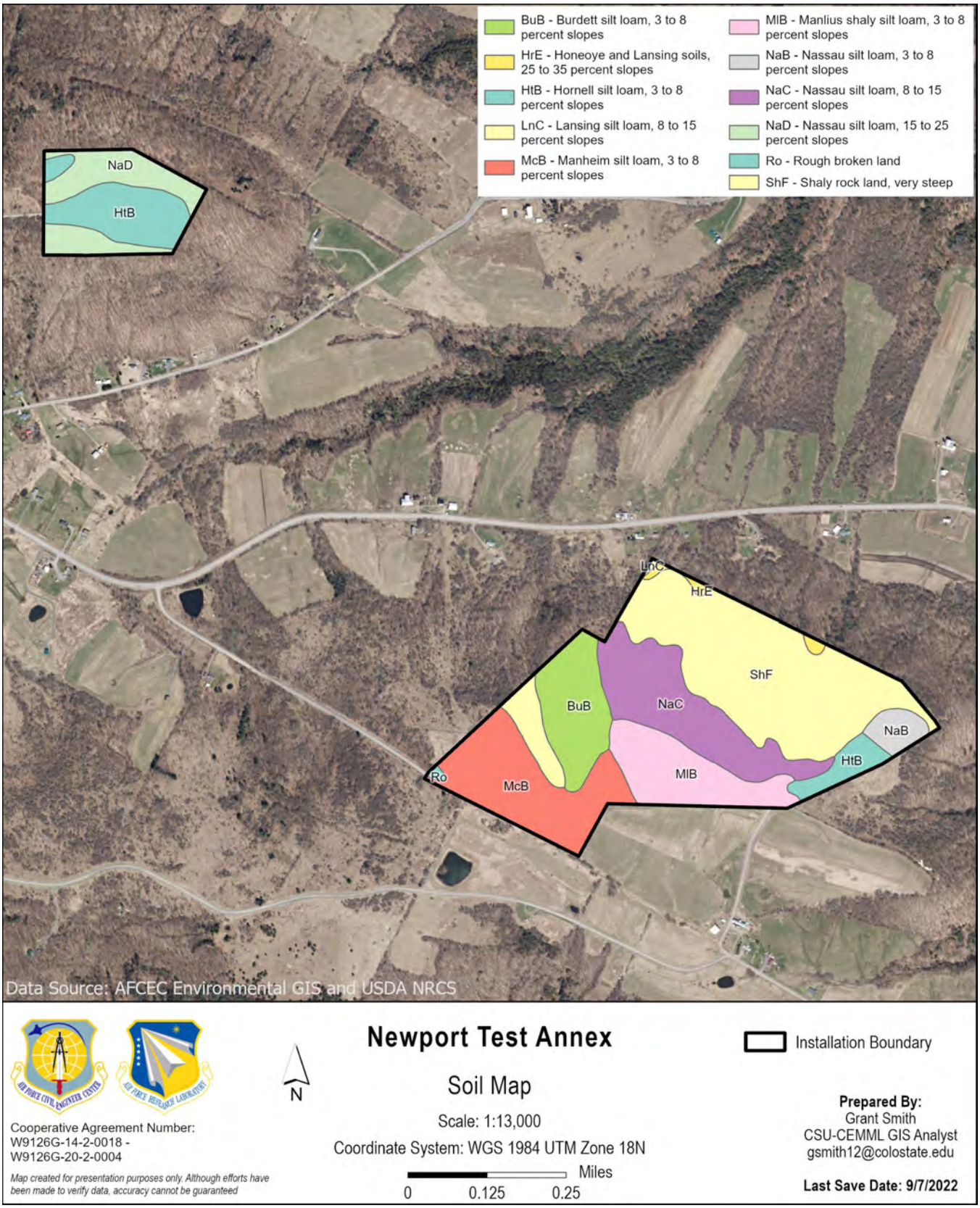

Figure 2-9. Newport Test Annexes Soil Map

2.2.4 Hydrology

The state of New York has abundant water resources and typically receives significant amounts of precipitation; however, the region also experiences occasional droughts.

Information regarding hydrology for the AFRL/RI was obtained from the U.S. Geologic Survey National Hydrography and Watershed Boundary Datasets via the National Map Viewer (USGS 2022) and from the USFWS National Wetlands Inventory (NWI) (USFWS 2022c), Federal Emergency Management Agency (FEMA) flood maps (FEMA 2021), EPA "How's My Watershed" (EPA 2022a), and installation documents.

Rome Research Site

The RRS sits within the Sixmile Creek-Mohawk River watershed. Water resources near RRS have been heavily developed and manipulated such that the site no longer contains any natural hydrologic features or surface waters aside from those associated with stormwater management. The RRS uses city-supplied water. However, it located near two aquifers: one to the northeast, and one to the southeast. The aquifer to the northeast is found in fractured shale and is only 1.5–4.5 feet below ground level, whereas the southeast aquifer is based in sand and gravel deposits and is typically 40–45 feet below the surface.

The RRS uses stormwater drainage lines to remove runoff from the site, which discharge to local waterways. Some precipitation infiltrates into soils, although pervious surfaces are limited due to development. Certain areas may be susceptible to ponding after significant precipitation events, especially in swales with low porosity soils or areas lacking stormwater drainage.

Verona Test Annex

The VTA is located at the intersection of three watersheds: Oneida Creek, Wood Creek, and Stony Creek. All but the northern third of the installation is within the Oneida Creek watershed. Water within this drainage flows south towards Brandy Brook, then west outside the VTA boundary. The northern third of the VTA is within the Wood Creek watershed and drains to the north. A small sliver on the eastern edge of the VTA is within the Stony Creek watershed and drains to the east (Figure 2-10).

Waters and wetlands are abundant on the VTA, including two streams and approximately 350 acres of wetlands. Brandy Brook flows across the southern portion of the installation from the southeast to the southwest (Figure 2-10). An unnamed tributary of Brandy Brook enters the VTA from the south and also flows to the southwest. These two streams merge just to the west of the installation boundary. Most of the lands west and north of the improved areas are wetlands, along with areas south of Brandy Brook. No manmade impoundments exist onsite and the VTA is within an area of minimal catastrophic flood hazard, although flooding does occur here. Significant historical ditching occurred across the site to drain lowland areas, likely for agriculture, and later to prevent flooding of Annex-built infrastructure (USACE 1995).

The VTA has a very shallow water table that has risen due to high amounts of precipitation, especially during 2021. Based on soil types, the water table averages from 0–18 inches below the surface across the site (NRCS 2022). Beaver (*Castor canadensis*) activity in and near Brandy Brook and in ditches, plus adjacent land use/wetlands management activities contribute to additional ponding and raised water tables. In some areas, this has resulted in tree die-off as wetlands expand into existing woodlands. Without regular maintenance, several ditches have filled with vegetation and sediment and become ineffective, causing additional flooding issues, especially when combined with beaver activity. These areas may need to be re-evaluated for establishment of wetland conditions, depending on desired future improvements and use.

Significant soil remediation efforts have been made to address groundwater contamination concerns at the VTA. Monitoring the site for residual substances under USAF AFCEC guidance, the site is considered eligible for the unrestricted use classification. However, water for site use is and has always been imported as an added precaution.

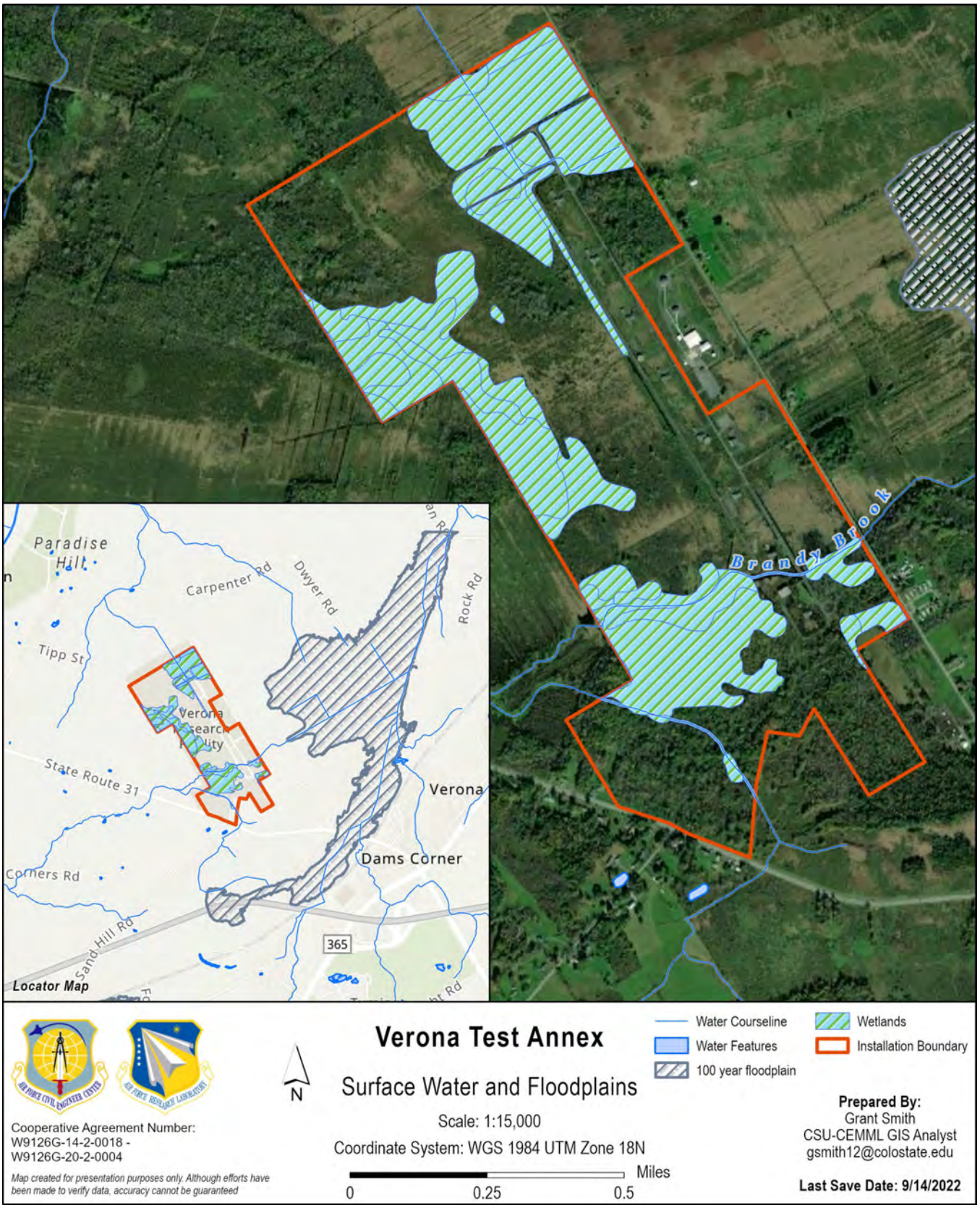

Figure 2-10. Verona Test Annex Surface Water and Floodplains

Stockbridge Test Annex

The STA is located at the boundary of two watersheds: the Taylor and Oneida Creek to the east and the Upper Cowaselon Creek to the west. Most rainfall infiltrates into the soil due to its well-drained characteristics and the generally flat topography. Cowaselon Creek runs to the west of the STA, and Mud Creek runs to the east. Both creeks drain northward, towards Oneida Lake. During intense precipitation events, water may run downslope to each drainage. According to the USFWS NWI, two adjacent wetlands are located in the southern part of the property just east of the entrance road. These wetlands are less than 0.1 acres in size and are considered the freshwater forested/shrub wetland type. The STA is located on a topographical high point that limits natural establishment of surface waters, such as ponds. No known agriculture tiles are onsite, despite previous use as farmland.

Groundwater at the STA is non-potable and potable water is delivered by truck. A sand and gravel aquifer lies under the far eastern border of the STA, continuing a short distance east and several miles south (USGS 2021). Depth to groundwater averages 4–11 feet.

Newport Test Annexes

The NTA is completely within the Shed Brook-West Canada Creek watershed and does not contain any wetlands, surface waters, or floodplains, due to its location on a topographical high point. Historically, the U.S. Army Corps of Engineers (USACE) reported that small seeps were present in the north-central portion of NTA2 and that soils at NTA1 may support a perched water table during the winter and spring (USACE 1995). This is consistent with seeps and wetlands detected within the newly acquired parcel north of NTA2. Multiple areas of hydric vegetation have been observed in ravines and large hillside seeps. The ability of precipitation to infiltrate into soils across the NTA varies depending on the soil type. When intense precipitation events and runoff occur, drainage is generally downslope to the north. Precipitation may also run off to the northwest, northeast, and southeast from the area surrounding the main offices. Given the steeper topography, minor surface erosion is a concern and has been noted in some areas. The water table is typically deep, and an aquifer exists along West Canada Creek to the east, although potable water is delivered by truck.

2.2.4.1 Climate Impacts to Hydrology

Design storm hyetographs are a modeled time distribution of rainfall amounts produced from extreme rainfall event data. The CEMML Climate Assessment (CEMML 2023) produced design storms as indicators of potentially changing hydrological conditions at the AFRL/RI. These design storms were modeled as indicators of potentially changing hydrological conditions under a changing climate (Allen and DeGaetano 2005, Perica et al. 2019, Kao et al. 2021). Given the relatively small spatial extent of the AFRL/RI properties, design storm precipitation amounts did not vary significantly enough across the RRS and GSUs to warrant design storm hyetographs for each site. Therefore, the hyetograph created for the RRS accurately represents projected changes in extreme rainfall events for the entire installation, including all GSUs.

Table 2-3 shows total 24-hour duration precipitation depths for the 10-year frequency and 2-year frequency design storms for all modeled scenarios. Modeled 10-year frequency design storms project both increases and decreases as compared to the baseline period. Generally, larger changes are projected for the 2050 periods as compared to the 2030 periods.

Table 2-3. Design storm precipitation amounts, 10-year and 2-year, 24-hour events

Event	Variable	Baseline	RCP 4.5		RCP 8.5	
		2000	2030	2050	2030	2050
10-year	Precipitation (inches)	3.57	3.72	2.68	3.34	4.10
	Change from baseline (%)		4	-28	-6	14
2-year	Precipitation (inches)	2.03	2.42	1.90	2.18	2.87
	Change from baseline (%)		18	-7	7	34

2.3 Ecosystems and the Biotic Environment

2.3.1 Ecosystem Classification

The National Hierarchical Framework of Ecological Units is a mapping and classification system that examines soils, physiography, and habitat types to stratify the landscape into smaller areas (Bailey 2014). These ecoregions are broad designations based on large-scale patterns of abiotic and biotic features that characterize landscapes. They are useful to understand regional patterns in geography, biota, and climate; aid in regional planning efforts; and serve as a common, interagency standard across the United States. The AFRL/RI is located within the Humid Temperate Domain, Warm Continental Division, Laurentian Mixed Forest Province and Northern Glaciated Allegheny Plateau Section. The Northern Glaciated Allegheny Plateau is characterized by irregular hilly topography in which water features, such as poorly drained swales, lakes, and ponds, and glacial features are common. Winters are severe, snowy, and long; summers are warm and wet (McNab and Avers 1994).

New York Ecoregions classifications are used to provide detail at a finer scale than Bailey's Ecoregions. In this classification system, RRS, VTA, and NTA are in the Mohawk Valley under the Eastern Great Lakes Lowland Forests Ecoregion and STA is in the Finger Lakes Uplands and Gorges, which is a transitional zone in the Northern Glaciated Alleghany Plateau Section. The Eastern Great Lakes Lowland Ecoregion is characterized by rolling, low-level landscapes and flat lake plains. It is a humid continental climate with warm summers, severe winters, and strong moderating effects from the Great Lakes. The closer to the Great Lakes, the more moderate the climate, but farther away, frost and extreme temperatures are more common (EPA 2021). The land types in this region are typically agricultural, old-growth hardwood forests, wetlands, and residential areas. The Finger Lakes Uplands and Gorges is a transitional zone characterized by a humid continental climate with a typically long frost-free growing season.

2.3.2 Vegetation

2.3.2.1 Historical Vegetation Cover

<u>Rome Research Site</u>

RRS was formerly Rome Army Air Depot (1941) before becoming Griffiss AFB (1948). Prior to the government acquiring the land from Oneida County, it was farm fields, primarily used for cropland (hay production), with some scattered houses (Krull 2019).

<u>Verona Test Annex</u>

Historically, VTA consisted of four, 19th to early 20th century dairy farms covering over 500 acres (Pierce 1998a). The area is flat and most of its soils are poorly drained. While wetlands historically covered approximately 300 acres, small areas throughout with well-drained soils were used for hay and as pasturelands (Pierce 1999). After the federal government acquired the land, ditches were dug to reroute water and prevent flooding and other areas were developed to support military personnel and testing

missions. Approximately 100 acres around research buildings, storage buildings, and roads were maintained by mowing before the site's closure in 1995. On the southern portion of VTA, Brandy Brook widens into a small floodplain woodland. The southwestern portion of VTA has a large wet meadow with reed canary grass (*Phalaris arundinacea*) as the dominant vegetation. The remainder of the site varies in successional stages, with mixed tree-shrub uplands and wetlands with scattered stands of sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), quaking aspen (*Populus tremuloides*), green ash (*Fraxinus pennsylvanica*), and meadowsweet (*Spirea* spp.) (Corey 1994).

Stockbridge Test Annex

STA, which covers approximately 295 acres, consisted of five separate parcels prior to government acquisition in 1957. The land was primarily used for livestock grazing and cultivation of wheat and hay. In 1970, conifer trees were planted, primarily Norway spruce (*Picea abies*), to mimic forests in Germany. In 1995, most of the site consisted of old field vegetation, such as grasses, forbs, shrubs, and apple orchards with a 54-acre uneven-aged hardwood stand, mostly sugar maple, in the northern portion of the property.

Newport Test Annexes

Historically, the NTA covered approximately 78 acres, before the 92-acre acquisition abutting NTA2 in 2017. The NTA1 was farmland prior to the government's purchase, with a 19th century dairy farm known as the Chapin-Olds-Dunn Farm and was primarily used for pastureland and hay (Bamberger 1998). In 1995, NTA1 consisted of central mowed areas, successional mixed shrubs and trees along the southern margin, and a nearly pure stand of sugar maples to the north (USACE 1995). NTA2 was approximately 41 acres. This annex was comprised of a mowed successional field community of grasses and forbs that is believed to have supported the dairy farm at NTA1 with peripheral stands of red maple and sugar maple (USACE 1995).

2.3.2.2 Current Vegetation Cover

Rome Research Site

RRS is in a highly developed technology park, consisting of pavement, concrete, sod, and some ornamental plants. Contractors maintain vegetation and landscaping.

Verona Test Annex

Since the closure of VTA in 1995, the site's vegetative communities have undergone ecological succession. Lack of grounds maintenance in semi-improved areas and increased precipitation has led to wetlands and shrublands encroaching on formerly developed areas. This wetland expansion is causing long-term saturation of the soil, resulting in trees dying in previously woodland/forested areas. On the southern portion of VTA, the Brandy Brook floodplain is still woodland as it was historically. The southwestern portion of VTA has a large wet meadow dominated by reed canary grass. Other vegetation along the wetlands includes red maple, cattails (*Typha* species), and common reed (*Phragmites australis*). The remainder of the site varies in successional stage with mixed tree-shrub uplands and wetlands throughout with scattered stands of red maple, quaking aspen, green ash, and meadowsweet. Morrow's honeysuckle (*Lonicera morrowii*), apple species (*Malus* spp.), cherry species (*Prunus* spp.), milkweed (*Asclepias* spp.), and birch species (*Betula* spp.) are also found throughout VTA.

Forests onsite likely represent the Silver Maple - Green Ash - Sycamore Floodplain Forest vegetation group. This forest group is dominated by broad-leaved deciduous trees including red maple, silver maple, sugar

maple, green ash, American sycamore (*Platanus occidentalis*), eastern cottonwood (*Populus deltoides*), and bur oak (*Quercus macrocarpa*).

Stockbridge Test Annex

Current vegetation at the STA resembles historical vegetative cover; however, in certain areas it has passed through ecological succession. STA has a mix of old field vegetation, including perennial grasses and forbs, woody vegetation such as arrowwood (*Viburnum dentatum*), and mixed-succession forest. Common species include goldenrod (*Solidago* spp.), field grasses, and small trees, such as wild apple (*Malus sieversii*) and gray-stem dogwood (*Cornus racemosa*). A mature hardwood forest still exists in the north and northeast of the STA. A forest management plan was developed in 2000 and a subsequent thinning operation reduced the northern forest stands from 54 acres to 30–40 acres. The plan noted that the stands were dominated by sugar maple, white ash (*Fraxinus americana*), American beech (*Fagus grandifolia*), and bitternut hickory (*Carya cordiformis*), with lesser amounts of ironwood (*Ostrya virginiana*), black cherry (*Prunus serontina*), and basswood (*Tilia americana*). The white ash and beech in these stands are suffering from the emerald ash borer (EAB) (*Agrilus planipennis*) and beech bark disease, respectively. The small four-acre Norway spruce stand is still present.

These forests represent the Laurentian - Acadian Hardwood Forest NVC vegetation group. The Hardwood Forest group is dominated by a combination of northern hardwoods, including sugar maple, red maple, yellow birch (*Betula alleghaniensis*), white ash, American beech, and black cherry, along with some conifers (<25% cover), including eastern hemlock (*Tsuga canadensis*), red spruce (*Picea rubens*), and eastern white pine (*Pinus strobus*).

Newport Test Annexes

Vegetation has not changed much compared to historical cover, and consists of regularly mowed perennial grasses across most of NTA1 and all of NTA2. Mowing allows missions that require line-of-sight between elements to continue without interference. NTA1 also has unimproved grasses and shrubs along the site's margins, but these do not interfere with missions. Forests along the peripheries and surrounding NTA1 represent the Laurentian - Acadian Hardwood Forest and Hemlock - White Pine - Hardwood NVC vegetation groups. Forests along the peripheries and surrounding NTA2 represent the Laurentian - Acadian Hardwood Forest NVC group. The Hemlock - White Pine - Hardwood Forest group is dominated by eastern hemlock, red spruce, and eastern white pine (at least 25% cover), with or without hardwoods, including sugar maple, American beech, yellow birch, and red oak (*Quercus rubra*) in varying percentages. Red maple is also quite common (Gawler et al. 2015).

Much of the newly acquired parcel north of NTA2 is forested. Forest composition is primarily of maple, hemlock, ash, and birch, and represent the two NVC groups listed above. Small wetland areas support species such as cattail, sedges, and rushes. Some areas in the southern portion of the parcel are recently abandoned agricultural fields supporting numerous pioneer species such as goldenrods, hawthorns (*Crataegus* genus), multiflora rose (*Rosa multiflora*), and raspberry (*Rubus* genus).

2.3.2.3 Future Vegetation Cover

The CEMML Climate Assessment used the Habitat Climate Change Vulnerability Index (HCCVI), developed in coordination with NatureServe (Comer et al. 2021), to assess how climate change may influence vegetation groups on the installation in the future. CEMML experts first determined vegetation classifications at the AFRL/RI using the National Vegetation Classification (NVC) standard, a hierarchical classification system. Using NVC allows state and federal agencies to standardize vegetation classification

and enables easier collaboration and information sharing. CEMML found that the ecosystems and associated vegetation at AFRL/RI have low to moderate vulnerability to the projected changes in climate. CEMML summarized anticipated effects on vegetative groups below. For further information, refer to the CEMML Climate Assessment for AFRL/RI (CEMML 2023).

The Laurentian - Acadian Hardwood Forest and the Laurentian - Acadian Hemlock - White Pine - Hardwood Forest vegetation groups, present at the VTA, STA, and NTA, may be vulnerable to changes in climate. Species in these groups are likely to show slowed growth rates (Norby et al. 2000, Chhin et al. 2018), be injured by extreme storms and winds (Chhin et al. 2018), be subject to increased insect or pest loads (Shuman et al. 2019), or decrease in abundance (Stephanson and Coe 2017) in response to rising temperatures and precipitation.

The Silver Maple - Green Ash - Sycamore Floodplain Forest vegetation group, also present at the VTA, may be impacted by changing flooding and fire regimes. Species in this group may experience delayed or interrupted reproduction and growth due to prolonged flooding or increased mortality from fire damage. Potential positive effects include increased quality of germination beds due to silt deposition from flooding.

Certain insects, such as bronze birch borer (*Agrilus anxius*), hemlock woolly adelgid (*Adelges tsugae*), and many invasive plant species (e.g., Morrow's honeysuckle) affect the species in these groups. These pests may benefit from warmer winter temperatures, which would allow them to expand their range northward into AFRL/RI lands, have higher winter survivorship, outcompete native species, and cause more damage within currently inhabited areas. Therefore, managers may need to closely monitor forest health and plan accordingly with adaptive management activities, including early detection and rapid response programs.

It is important to implement natural resource management programs and projects to mitigate and anticipate effects of climate stress beyond the historical patterns and to support healthy, sustainably managed forests (EO 14072). Prescribed fire and mechanical treatments may need to be used more commonly to maintain or enhance forest communities. These shifts may also necessitate increased monitoring for invasive plant expansion, effects of natural and human-caused disturbances], and outbreaks of insects or disease (Comer et al. 2021). Proactive management plans are further described in Section 8.0, Goal 3 of this plan.

The USACE has approved a roadside and structure maintenance mowing plan for improved lands affected by beaver-associated flooding. Removal of beaver dams in association with mowing will likely convert vegetation to grass and turf. Regular mowing will begin September 2022.

Additionally, the newly acquired parcel at NTA2 may be subject to thinning and cutting in the future if vegetation interferes with mission testing.

2.3.2.4 Turf and Landscaped Areas

Rome Research Site

RRS is situated in a highly developed technology park, which is landscaped with a combination of pavement, concrete, sod, and some ornamental plants. Contractors maintain vegetation and landscaping.

Verona Test Annex

During its active period, turf and landscaped areas were maintained at VTA, usually in areas adjacent to buildings and parking lots. Since the site's closure in 1995, these areas are no longer maintained and have reverted to upland grasslands and wet meadows. There are currently no turfed or landscaped areas on this property.

Stockbridge Test Annex

Mowing and landscaping occur on areas near the tower and buildings. The site must maintain a 100-foot buffer around the tower. The perimeter fence line is also mowed, and sightlines are maintained.

Newport Test Annexes

NTA1 and NTA2 are frequently mowed around the towers and buildings to keep vegetation in its current state to prevent interference with the missions.

2.3.3 Fish and Wildlife

There is currently a limited record of species occurrence on the AFRL/RI properties, as there have been no fish or wildlife surveys to date. As such, incidental observations are not often ascribed to a specific property or date. However, there are various common species that are expected to occur throughout the installation. Mammals likely to occur include white-tailed deer (*Odocoileus virginianus*), Virginia opossum (*Didelphis virginiana*), and coyote (*Canis latrans*). Rodents observed on the installation's properties include North American beaver, muskrat (*Ondatra zibethicus*), woodchuck (*Marmota monax*), and eastern chipmunk (*Tamias striatus*).

Common avian species on the properties include northern mockingbird (*Mimus polyglottos*), black-capped chickadee (*Poecile atricapillus*), red-winged blackbird (*Agelaius phoeniceus*), great blue heron (*Ardea herodias*), and grey catbird (*Dumetella carolinensis*). Waterfowl observed across the AFRL/RI include the mallard duck (*Anas platyrhynchos*) and Canada goose (*Branta canadensis*). Common avian species expected to occur include ruffed grouse (*Bonasa umbellus*), brown thrasher (*Toxostoma rufum*), and eastern meadowlark (*Sturnella magna*). Several raptor species are also expected to occur on the installation.

Possible reptile species include common snapping turtle (*Chelydra serpentina*), spotted turtle (*Clemmys guttata*), wood turtle (*Glyptemys insculpta*), rat snake (*Pantherophis obsoletus*), common garter snake (*Thamnophis sirtalis*), and northern water snake (*Nerodia sipedon*).

The eastern American toad (*Bufo americanus*) has been observed on the installation, and gray treefrog (*Hyla versicolor*), northern spring peeper (*Pseudacris crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans*), mink frog (*Rana septentrionalis*), northern leopard frog (*Rana pipiens*), wood frog (*Rana sylvatica*), and pickerel frog (*Rana palustris*) are all likely to occur. Salamanders such as the red-spotted newt (*Notophthalmus viridescens*), common mudpuppy (*Necturus maculosus*), northern and Allegheny dusky salamanders (*Desmognathus fuscus* and *ochrophaeus*), and possibly the northern spring salamander (*Gyrinophilus porphyriticus*) are likely to occur.

VTA is the only GSU that could potentially support fish populations. VTA wetlands extending into Brandy Brook may support species such as bluegill (*Lepomis macrochirus*), pumpkinseed sunfish (*Lepomis gibbosus*), black crappie (*Pomoxis nigromaculatus*), yellow perch (*Perca flavescens*), smallmouth bass (*Micropterus dolomieu*), and largemouth bass (*Micropterus salmoides*).

2.3.3.1 Climate Impacts to Fish and Wildlife

The impact of projected changes in climate (Section 2.2.1.1) on fish and wildlife at the installation will depend on the flora and fauna's ability to adapt to extreme temperature fluctuations, possible changes in seasonal timing, and periods of water deficiency. Although projected changes in temperature and precipitation are not likely to pose direct threats to common native wildlife species found across AFRL/RI, they could have indirect impacts. For example, migrating birds may be indirectly vulnerable to rising temperatures because they time their migration to coincide with the springtime emergence of insects. If

rising temperatures prompt insects to emerge earlier, birds migrating to or through the installation could miss a major feeding opportunity, potentially reducing their populations (Both et al. 2010). Additionally, earlier onset of spring may also disrupt the timing of pollinators, which could lead to decreases in both pollinator and plant populations. The changing climate could also impact fish and wildlife populations indirectly by altering vegetation, especially for specialist species that depend on native plant communities (Gonzalez et al. 2010, Hufnagel and Garamvölgyi 2014).

Climate change may open niches for non-native invasive species, as newly arriving invasive species often outcompete native species already experiencing reduced fitness due to shifting environmental conditions (Hellmann et al. 2008). Rising temperatures and changes in precipitation could increase the potential for outbreaks of infectious diseases such as chytrid fungus and West Nile virus, which have caused dramatic impacts to amphibian and avian communities respectively (Pounds et al. 2006, Petersen and Hayes 2008, Süss et al. 2008, Rohr and Raffel 2010, Baylis 2017).

2.3.4 Threatened and Endangered Species and Species of Concern

Species Present

There are four federally-listed, proposed, or under-review species that may occur on AFRL/RI property. During the 2018 USAF-wide acoustic survey, the northern long-eared, Indiana, little brown, and tricolored bats were acoustically detected at the STA, and the little brown bat was manually confirmed present. Further surveys are needed to confirm presence of these species.

Little information is present regarding the presence of other threatened and endangered species and species of concern at the AFRL/RI. To determine possible species occurrence related to the categories described below, a broad-based inventory of species was developed from the NYDEC database and the USFWS Information for Planning and Consultation (IPaC) tool. Species occurrence on the installation was determined by range maps and habitat requirements provided by NYDEC and USFWS. If the species was previously found within or bordering the same counties as the RRS and GSUs, it was marked as possibly occurring at the installation. If the habitat requirements for a species met the description of the installation and its GSUs and the species had previously occurred in or near the area, then it was marked as possibly occurring on the RRS or GSUs.

A comprehensive list of these species and their area occurrences can be found in Appendix B.

Species included on this list will be referred to as ‘special status species’, which encompasses the various categories of protection determined by the legislation listed below. Federal legislation regarding special status species dictates the responsibilities of federal land holders. AFMAN 32-7003 3.38.2 requires installations to provide the same level of protection to state-listed species, provided that doing so does not conflict with the military mission.

Species Protection Classifications

Endangered Species Act

The ESA protects species that are federally listed as threatened or endangered (T&E) by prohibiting the import, export, or take of T&E species and implementing recovery plans through interagency cooperation. According to AFMAN 32-7003, installations with known federally listed T&E species, or habitats supporting T&E species, must address T&E species conservation in the INRMP.

Federal Candidate Species

Candidate species have had a 12-month status review finding that listing is "warranted but precluded" by species with higher listing priority. Candidate species do not have legal protection under the ESA, but conservation and recovery efforts should be made by the installation when practical and not in conflict with the installation's mission.

USFWS Priority At-Risk Species

The list in Appendix B includes species considered to be regional priorities for management attention by the USFWS. This list does not afford any legal protection, but proactive action for these species may afford future benefits to the installation. This list was developed in cooperation between the USFWS and state wildlife agencies, including the NYDEC.

Migratory Bird Treaty Act

The MBTA prohibits killing, capturing, selling, trading, and transport of migratory bird species to ensure population sustainability. Species considered migratory are listed under Title 50 Part 10.13 in the Act. Prior authorization to take a migratory bird species may be obtained by the USFWS if a special need exists or certain criteria are met (16 U.S.C. §703712). EO 13186 provides guidelines and responsibilities for federal agencies to protect migratory bird species. A Memorandum of Understanding must be developed and implemented with the USFWS if the installation conducts missions that may harm migratory bird species.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits capturing, trapping, molesting, disturbing, obtaining, selling, hunting, or transporting bald eagles, golden eagles, their nests, feathers, or eggs (16 U.S.C. 668-668c). The installation's missions, training activity, and development cannot negatively impact or take these species, unless the installation has the proper permits in place.

New York State (NYS) T&E Species

Similar to the ESA, NYS T&E Species is a list of species requiring protection. 6 NYCRR Part 182 prohibits the direct killing of listed species, but also actions expected to result in harm to individuals, including adverse impacts to habitats occupied by listed species. AFMAN 32-7003, Section 3.38 states that installations will provide restoration and conservation efforts for state listed species when not in conflict with the installation's missions.

NYS Species of Greatest Conservation Need (SGCN)

SGCN is a list of species maintained by the New York Natural Heritage Program that lack legal protection, but that should be protected or conserved when not in conflict with the installation's mission. NYNHP also maintains a protection category of Significant Natural Communities—rare or high-quality wetlands, forests, grasslands, ponds, streams, and other types of habitats, ecosystems, and ecological areas. The NYNHP documents locations of natural communities only when the community type is rare in New York State; or, for more common community types, where the community at that location is a high-quality example and meets specific, documented criteria for state significance in terms of size, undisturbed and intact condition, and the quality of the surrounding landscape. A few significant natural communities are associated with sensitive rare animals and plants, as well. Although significant natural communities are not protected by NY state law, they should be considered during the EIAP or National Environmental Policy Act (NEPA) process as they are critical to maintaining ecosystem function and regional biodiversity. Additionally, they must be considered when conducting a review under the New York State Environmental Quality Review Act.

Regional Species of Greatest Conservation Need

The list in Appendix B includes species mostly endemic to the northeast U.S. with high conservation concern. This list offers no legal protections to species, but proactive action for listed species may afford future benefits to the installation. This list was developed cooperatively between 13 northeast states.

Pollinators

Because of the integral role of pollinators in maintaining native habitats, compliance with existing laws, regulations, and policies related to pollinators is essential for sustaining the USAF mission. The pollinators with the highest level of protection are those listed under the ESA, the MBTA, and/or state laws; however, all pollinators are afforded consideration under the Presidential memorandum "Creating a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators" (The White House 2014). In response to the memorandum, AFCEC and USFWS issued the "U.S. Air Force Pollinator Conservation Strategy," which aims to sustain the mission and ecological integrity on USAF installations by implementing management practices that support pollinators, especially those with regulatory protections, and enhance their habitat. The natural resource program at AFRL/RI employs the U.S. Air Force Pollinator Conservation Strategy and Reference Guide (USFWS 2017) to identify ways to support this ecologically important group.

Although no surveys have been conducted to identify pollinators on the installation, the Monarch butterfly and several other protected species may occur on the installation.

2.3.4.1 Climate Impacts to Threatened and Endangered Species and Species of Concern

This section presents population-level climate change vulnerability assessments for 11 special status species with potential to occur on AFRL/RI. CEMML summarized the species' vulnerabilities (i.e., vulnerability risk), and an overall level of confidence associated with that risk, based on literature review and other available information.

In addition to the species-specific threats described in the sections below, habitat change and disruption to food availability are two major climate-related threats to all species at AFRL/RI. These major threats will therefore be important considerations for all species of concern on the installation. Habitat requirements for some species, such as the need for refugia, may change as they employ behavioral adaptations. Changes in temperature and precipitation may also affect prey populations or forage abundance for many species. For example, seasonal timing and cues for prey or forage emergence may change, driving a mismatch between food availability and needs.

Bats

Bats are an important guild of animal that provide ecosystem services such as insect predation, plant pollination, and seed dispersal (Bat Conservation International 2022). They may also be among the most sensitive species to climate change and serve as bioindicators of large-scale ecological effects resulting from further regional warming and drying trends (Jones et al. 2009, Adams 2010, Sherwin et al. 2013, Center for Biological Diversity and Defenders of Wildlife 2016, Hayes and Adams 2017). Research has found that increases in temperature and decreases in precipitation resulted in decreased reproductive output of multiple bat species in the western U.S. (Adams 2010, Hayes and Adams 2017).

In 2006, *Pseudogymnoascus destructans* (Pd), the fungus that causes white-nose syndrome (WNS) was detected in a New York cave and it has since decimated populations of multiple hibernating bat species (Frick et al. 2010, Langwig et al. 2015, Bat Conservation International 2022). Higher temperatures in hibernacula can promote greater fungal loads for infected bats, and small changes in temperature may render

hibernacula unattractive (Langwig et al. 2016, USFWS 2016). Higher temperatures may also prompt bats to break hibernation more frequently, putting individuals at greater risk of mortality through rapid energy use. Phenological decoupling between insect emergence and bat emergence associated with a changing climate may reduce foraging success in the spring (Sherwin et al. 2013, USFWS 2016). Although warming temperatures and increasing precipitation could benefit bats if they promote greater food availability and faster juvenile development, the disruption of hibernation, increase in extreme weather events, and the spread of diseases may cause significant mortality (Sherwin et al. 2013). Models project that the distribution of some bats will change over the next century due to climate change (University of Massachusetts 2017).

Northern long-eared bat (*Perimyotis subflavus*) Photo credit: USFWS Environmental Conservation Online System

Northern Long-Eared Bat (*Myotis septentrionalis*)

Northern long-eared bats (NLEB) are a federally endangered species with the potential to occur on AFRL/RI. Since the mid-2000s, their populations have declined rapidly throughout their range, primarily as a result of WNS (NatureServe 2022a). Although NLEB's ability to move across landscapes or disperse relatively long distances may help it to cope with climate change, there is uncertainty about how temperature increases and changes in precipitation may affect hibernation, reproductive success, and survival. Due to their steeply declining populations and susceptibility to WNS and climate change related impacts, the NLEB was categorized with very high climate change vulnerability (CEMML 2023).

Tricolored Bat (*Perimyotis subflavus*)

Tricolored bat (*Myotis septentrionalis)*. Photo credit: James Kiser

The tricolored bat has the potential to occur on AFRL/RI and they have been proposed to be listed as endangered under the ESA. Similar to NLEB and little brown bats, over the last 15 years WNS has dramatically impacted populations of tricolored bats (Langwig et al. 2015, 2016; NatureServe 2022b). Prior to the impacts of WNS, populations of tricolored bats were increasing, and their range was expanding northward and westward (Kurta et al. 2007; Langwig et al. 2015, 2016). Although the tricolored bat's ability to move across landscapes and shift its range may help it to cope with climate change, there is uncertainty about how increasing temperatures may affect reproductive success and hibernation. Due to their declining populations and susceptibility to WNS and climate change related impacts, tricolored bat was categorized with very high climate change vulnerability (CEMML 2023).

Indiana Bat (*Myotis sodalis*)

Indiana bat (*Myotis sodalis*). Photo credit: Adam Mann, Environmental Solutions and Innovations, courtesy of USFWS

Indiana bats are a federally endangered species that have potential to occur on AFRL/RI. Indiana bat populations declined in the mid-to-late 20th century, primarily from cave disturbance, use of insecticides, and deforestation, but after implementation of the 1983 Indiana Bat Recovery Plan, populations began to stabilize (USFWS 1983, 2009). WNS has been confirmed in Indiana bat populations and is identified as a significant threat to the species' continued recovery (USFWS 2009). Indiana bats are predicted to be significantly affected by climate change, with a conservative estimate of 30–50% decline in the next decade as a result of increased temperatures, habitat loss, and WNS (Thogmartin et al. 2013, Langwig et al. 2016). Temperature increases are predicted to alter insect distribution and abundance, causing misalignment with bat ranges, which may cause geographic shifts in ranges. Additionally, increased temperatures are predicted to raise bats' metabolic rates during breeding and hibernation, rapidly decreasing fat stores needed for survival (Sherwin et al. 2012). Due to their susceptibility to climate-related changes, expected increases in WNS infection, and decreased abundance, the Indiana bat assessment resulted in a high vulnerability categorization (CEMML 2023).

Little Brown Bat (*Myotis lucifugus*)

Little brown bat (*Myotis lucifugus*). Photo credit: USDA Forest Service

The little brown bat is currently under review by USFWS for listing under the ESA. This species was acoustically detected at STA in 2018. Populations of little brown bats have declined dramatically over the past 25-30 years, primarily because of WNS (Frick et al. 2010, Kunz and Reichard 2010). They are distributed across North America and their ability to move across landscapes and disperse relatively long distances may help them to cope with climate change, yet there is uncertainty about how temperature increases and changes in precipitation may affect hibernation, reproductive success, and survival. Although they still retain a wide range across North America, little brown bat populations have undergone dramatic declines and they are highly susceptible to WNS, which may be exacerbated by projected increases in temperature, resulting in a very high climate change vulnerability categorization (CEMML 2023).

Short-eared Owl (*Asio flammeus*)

Short-eared owls have been documented just west of the VTA. The North American Breeding Bird Survey indicated a greater than 4% annual decline in short-eared owls (Booms et al. 2014, Sauer et al. 2014).

Habitat loss and degradation of grassland habit are the major sources of population decline for this species, both on its breeding grounds throughout North America and its wintering grounds in the southern US and Mexico (Ehrlich et al. 1992). Although climate change has not been a direct threat to their populations, it does pose indirect threats to their persistence by potentially increasing habitat fragmentation (Wiggins 2004), impacting grassland habitats, and reducing prey availability (Wiggins 2004, Wilsey et al. 2019). As such, short-eared owls were given a moderate climate change vulnerability categorization (CEMML 2023).

Short-eared owl (*Asio flammeus*). Photo credit: Tim Lenz, Macaulay Library.

Northern Harrier (*Circus hudsonius*, formerly *Circus cyaneus*)

Northern harriers are medium-sized raptors that have been observed at the VTA. Their abundance and distribution have declined in recent decades, due primarily to habitat loss and degradation of the grassland and wetland habitats they rely upon (Slater and Rock 2005, Smith et al. 2011). Although not a direct factor in recent northern harrier declines, climate change is likely to affect their habitats, therefore elevating their vulnerability and susceptibility. Northern harrier abundance is positively correlated with the previous year's precipitation (Hamerstrom et al. 1985, Dechant et al. 2002, Forcey et al. 2007) and their probability of extinction was shown to increase with increasing temperatures (Jarzyna et al. 2016). As a result, the assessment indicated that northern harriers are moderately vulnerable to the projected changes in climate (CEMML 2023).

Northern harrier (*Circus hudsonius*). Photo credit: Tom Reed, Macaulay Library.

American Kestrel (*Falco sparverius*)

American kestrel (*Falco sparverius*). Photo credit: JD Michael, Macaulay Library.

The American kestrel is a widespread small falcon with potential to occur on AFRL/RI. American kestrels are secondary cavity nesters, using cavities created by woodpeckers, natural crevices in trees or rocks, or artificial nest-boxes. The lack of existing cavities may limit kestrel populations in many areas of its breeding range (Smallwood and Bird 2020). Although North American Breeding Bird Survey data have shown declining kestrel populations in New England, their populations have increased in the Midwest and Central U.S., resulting in no significant continent-wide change in abundance (Smallwood and Bird 2020). Little is known about how climate change may affect American kestrel populations, but since they are abundant and widely distributed with a stable population, the assessment resulted in a low vulnerability categorization (CEMML 2023).

Ruffed Grouse (*Bonasa umbellus*)

Ruffed grouse (*Bonasa umbellus*). Photo credit: Alix d'Entremont, Macaulay Library.

Ruffed grouse are a medium-sized non-migratory landfowl with potential to occur on AFRL/RI. Ruffed grouse depend on early-successional forests, in which they feed on the leaves, buds and catkins of early successional deciduous trees such as aspen (*Populus* spp.), willow (*Salix* spp.), and birch (Dessecker and McAuley 2001, Rusch et al. 2020). Due to forest maturation, ruffed grouse populations are currently declining in the eastern portion of its range, with a 54% decrease in New York since the 1950s (Skrip et al. 2011, Rusch et al. 2020). Despite this decrease, they have an abundant and secure population with a wide range and are expected to increase their distribution in the future, resulting in a low vulnerability categorization (CEMML 2023).

Upland Sandpiper (*Bartramia longicauda*)

Upland Sandpiper (*Bartramia longicauda*). Photo credit: Bradley Hacker, Macaulay Library.

The upland sandpiper has been documented west of the VTA and has the potential to occur on base. From 1980-2000, the North American Breeding Bird Survey indicated a 20% decline in the upland sandpiper population (Houston 1999, Vickery et al. 2010, Houston et al. 2020). Although climate change has not been directly implicated in their past declines, the extent of the grassland habitat upland sandpipers depend on is expected to decrease in the future due to climate change (Bagne et al. 2012, Glaser 2014, Shafer et al. 2014). Recent analysis study suggests upland sandpipers are highly vulnerable to temperature and/or moisture changes, thus making their populations more vulnerable to projected changes in climate (Culp et al. 2017). Upland sandpipers feed almost exclusively on insects such as grasshoppers and crickets and are primarily restricted to extensive, open tracts of short grassland prairie, dry meadows, pastures, plowed fields, and airfields, preferring vegetation approximately 4–12 inches height for nesting (Terres 1980, White and Melvin 1985, Vickery et al. 2010, Houston et al. 2020). Although they are known to inhabit airfields, upland sandpipers tend to remain on the ground and their flight is usually low and direct, thus posing less of a BASH threat (White and Melvin 1985). Upland sandpiper populations in many areas are declining and they are susceptible to climate related impacts such as increases in temperature, flooding, and severe storms, yet they are highly mobile and retain a wide distribution across the US, resulting in a moderate climate change vulnerability categorization (CEMML 2023).

American Woodcock (*Scolopax minor*)

American woodcock (*Scolopax minor*). Photo credit: Louis Brodeur, Macaulay Library.

The American woodcock is a forest-dwelling shorebird with potential to occur on AFRL/RI. Similar to ruffed grouse, American woodcock requires early successional forests and shrublands for breeding (Dessecker and McAuley 2001, McAuley et al. 2020, NatureServe 2022c), and its populations have declined significantly throughout its range since 1968 (Kelley et al. 2008, Seamans and Rau 2021). The major factors leading to woodcock declines are loss of habitat through forest succession, development, and fragmentation, and habitat pollution and pesticide exposure (Kelley et al. 2008, NatureServe 2022c). Nonetheless, American woodcocks have maintained their wide distribution, have an estimated population size

of over three million (NatureServe 2022c), and major causes of their decline are not climate-related, resulting in a low vulnerability categorization (CEMML 2023).

Bobolink (*Dolichonyx oryzivorus*)

Bobolink (*Dolichonyx oryzivorus*). Photo credit: Ryan Sanderson, Macaulay Library

Bobolinks are a wide-ranging grassland species that has the potential to occur on AFRL/RI. Similar to many grassland birds, bobolink populations have declined more than 50% since the 1960s, mostly due to the conversion of grassland habitats to agriculture (Sauer et al. 2014, Renfrew et al. 2015). The open grassland habitats that bobolinks require are expected to undergo further significant changes due to climate change (Jarzyna et al. 2016). Bobolinks are long distance migrants with high site fidelity, making them susceptible to phenological mismatch caused by a changing climate (Culp et al. 2017, Renfrew et al. 2019). Additionally, bobolinks are highly vulnerable to temperature changes on both breeding and non-breeding grounds, and to moisture changes on breeding grounds (Culp et al. 2017, Renfrew et al. 2019). Although bobolinks have shown population declines and susceptibility to climate-related changes, they retain a large distribution and relatively large population size, resulting in a moderate vulnerability categorization (CEMML 2023).

Black-Throated Blue Warbler (*Setophaga caerulescens*)

Black-throated blue warbler (*Setophaga caerulescens*). Photo credit: Aaron Marshall, Macaulay Library

The black-throated blue warbler is a long-distance migratory songbird with potential to occur on AFRL/RI. This species requires interior secondary growth forests with a dense, well-developed shrub layer for nesting and foraging (NatureServe 2022d). Populations of black-throated blue warbler have most likely fluctuated over the past few centuries with the clearing and recovery of forests, but since the 1970s their population has remained stable, even increasing in many areas (Holmes et al. 2020, NatureServe 2022d). DeLuca and King (2017) presented evidence that black-throated blue warblers are shifting to higher elevations in the northern Appalachian Mountains; Sillett et al. (2000) demonstrated that adult survival and fecundity were lower in El Niño years and higher in La Niña years. In years with warmer springs, the species initiates breeding earlier, enabling them to produce double broods (Townsend et al. 2013), which indicates that warming temperatures may have a positive effect on their recruitment and population growth (Townsend et al. 2016). This species has a stable

population, with an estimated abundance of over two million birds (Holmes et al. 2020), and have shown positive responses to warming conditions, resulting in a low vulnerability categorization (CEMML 2023).

Bog Turtle (*Glyptemys muhlenbergii*)

Bog turtle (*Glyptemys muhlenbergii*). Photo credit: USFWS Environmental Conservation Online System

The bog turtle is a federally threatened species with potential to occur on AFRL/RI. Bog turtles are the smallest turtles in North America and primarily inhabit wet meadows and fens (Klemens 2001, Erb 2019). Since the 1980s, bog turtle range has been reduced by 40–50%, due primarily to habitat destruction and fragmentation from development, alteration of wetlands, ecological succession, and invasive plants (Klemens 2001, Myers and Gibbs 2013, Erb 2019, NatureServe 2022e). Climate projections for the northeastern U.S. suggest increased frequency and severity of rain and flooding events, particularly during spring and summer (Frumhoff et al. 2007, Hayhoe et al. 2008). Rising water levels resulting from increasing rains and floods could drown bog turtle eggs, create cloudier water conditions that could increase egg development time, and cause habitat disturbance (Erb 2019). Due to the isolation of bog turtle populations, their ongoing range and population declines, and susceptibility to climate-related storm and flooding events, the species was given a high vulnerability categorization (CEMML 2023).

Wood Turtle (*Glyptemys insculpta*)

Wood turtle (*Glyptemys insculpta*). Photo credit: Government of Canada

The wood turtle is currently under review for listing under the ESA and has the potential to occur on base. The species is declining across much of their range, and the rate of decline is predicted to be much higher in New England (van Dijk and Harding 2011, Willey et al. 2022). Wood turtles have low annual juvenile recruitment and mature late in life, making this species vulnerable to declines and limiting their recovery potential (NatureServe 2022f). A recent habitat suitability study by Mothes et al. (2020) projected that suitable habitat for wood turtles could decrease by 29-52% by 2070, with rising temperatures shifting the turtle's range northward and most climate refugia remaining in Maine, Vermont, New Hampshire, and New York (Mothes et al. 2020). Although main causes of wood turtle decline have not been related to climate, their populations have been decreasing rapidly, their life history traits make them vulnerable to decline and slow to recover, and their habitat suitability is projected to decline in the

future due to increasing temperatures, so they were given a moderate climate change vulnerability categorization (CEMML 2023).

Spotted Turtle (*Clemmys guttata*)

The spotted turtle is currently under review for listing under the ESA and has the potential to occur on base. The spotted turtle's reliance on wetlands makes them susceptible to adverse effects from altered hydrology due to climate change. Wetland losses and habitat fragmentation will likely lead to greater overland migrations, and in turn may lead to decreased prey abundance or increased roadway mortalities (NYDEC 2013, Dailey and Gosnell 2017). Invasive species are also likely to cause decreased prey abundance and perhaps increased competition for the spotted turtle (NYDEC 2013). Although spotted turtles have shown recent population declines in portions of their range, they are still widely distributed, considered stable in other portions of their range, and have not been directly impacted by climate change, resulting in a low climate change vulnerability categorization (CEMML 2023).

Spotted turtle (*Clemmys guttata*). Photo credit: Dr. Todd Pierson, State of Illinois

Monarch Butterfly (*Danaus plexippus plexippus*)

Monarch butterflies are federal candidate species for listing under the ESA and have potential to occur on AFRL/RI. Monarch butterfly populations have declined precipitously in recent decades as a result of habitat loss and severe weather events (Anderson and Brower 1996; Brower et al. 2002, 2012). Studies have indicated that climate is a major driver of their population dynamics (Zipkin and Oberhauser 2012). Therefore, projected climate change scenarios, such as altered timing and magnitude of weather events, could have substantial effects on monarch populations (Zipkin and Oberhauser 2012). Monarchs are predicted to experience long-term declines of more than 70% in future decades due to complex relationships between climate change and habitat loss (Schweitzer et al. 2015). Milkweed, the host plant for monarch butterflies, has been identified on the installation and surveys for monarchs should be conducted to determine their presence or absence. Due to their severely declining populations and susceptibility to climate-related impacts, such as increasing severe weather events, the assessment resulted in a very high vulnerability categorization (CEMML 2023).

Monarch butterfly (*Danaus plexippus*). Photo credit: USFWS Environmental Conservation Online System

2.3.5 Wetlands and Floodplains

Wetlands and floodplains are primarily identified using the USFWS NWI, FEMA Flood Map, and preexisting installation documents. The AFRL/RI is subject to numerous federal and state laws protecting water and water resources. Specifically, these regulations include the Clean Water Act, the Rivers and Harbors Act of 1899, EO 11990 Protection of Wetlands, and New York Environmental Conservation Law Article 15 and 24. Refer to AFMAN 32-7003 Section 3C for further guidance on compliance with federal regulations.

The Clean Water Act 'establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters' (EPA 2022b). The Clean Water Act uses the term 'Waters of the United States (WOTUS)' as a threshold term to establish applicability of protection standards to water resources. The complete definition of WOTUS can be found here: https://www.epa.gov/wotus/current-implementation-waters-united-states. Federal agencies, such as the EPA or USACE, use this definition to enforce the Act and only allow certain pollutant discharges through a permitting process. Section 404 of the Act regulates discharge of dredged and fill material into WOTUS. Section 401 recognizes state authority for setting water quality standards that cannot be violated by federal permit. The Clean Water Act directly applies to the AFRL/RI as a federal agency. The Rivers and Harbors Act of 1899 'prohibits the unauthorized obstruction or alteration of any navigable water of the United States'… and regulates such actions through approval and permitting by the USACE (Office of NEPA 2016). This directly applies to the AFRL/RI as a component of the USAF. EO 11990 requires that all federal agencies, such as the AFRL/RI, seek to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The USAF will fully disclose the location of wetlands, and any land-use restrictions imposed by regulatory authority, on lands that are transferred or sold to non-federal entities.

New York Environmental Conservation Law Article 15 broadly protects various water resources from disturbances in New York, including but not limited to certain streams, navigable waters, and aquifers. NYDEC created the Protection of Waters Regulatory program to implement the above listed state statute. The program established regulations that protect waters in accordance with the statute. The Protection of Waters Regulatory Program's website has numerous resources to help determine the protection status and regulatory process of managing and preventing impacts to water resources.

New York Article 24 protects wetlands from numerous regulated activities via a state permitting and hearing system. All permit applications must be reviewed by a local governmental body to ensure conformance with the Article. Most of the wetlands at the VTA are regulated by this Article. Please refer to the New York State Environmental Resource Mapper for further information: https://gisservices.dec.ny.gov/gis/erm/.

Rome Research Site

The RRS has no wetlands or floodplains.

Verona Test Annex

Wetlands represent a large portion of the undeveloped land at the VTA. The exact acreage of wetlands is unknown due to the lack of a recent wetlands delineation, however it is currently assumed 350 acres of wetlands are present onsite. Historically, the USACE concurred with a contractor's delineation of 255 acres of jurisdictional wetlands onsite in 1994. A subsequent delineation was performed in 1997 and found 394 acres of jurisdictional wetlands; however, it was not approved by the USACE. USACE approvals of

jurisdictional wetland delineations are only valid for three years, rendering previous surveys and acreage invalid. Most wetlands onsite are likely jurisdictional considering the historical surveys; however, a new delineation is necessary to confirm exact acreage and extent.

Information regarding the characteristics and biological assemblage of wetlands onsite are based on the wetland delineation conducted in 1997 by Lu Engineers (Figure 2-11). Wetlands may be considerably different now than in 1997 due to changes in species, presence of invasive species, or succession of wetlands. Wetlands onsite are varied and diverse, consisting primarily of emergent and scrub shrub wetlands, with some forested and invasive wetlands.

Emergent wetlands at the VTA consist of wet meadow communities, composed primarily of sedges (*Carex* spp.) and reed canary grass. These wetlands are found in the installation's center. Scrub-shrub wetlands are found in the eastern and center portions of the installation, and are composed of woody vegetation, including red-osier dogwood (*Cornus sericea*), northern arrowwood (*Viburnum recognitum*), red maple, quaking aspen, and green ash. Dominant woody vegetation within scrub-shrub communities is less than 20 feet tall, and may be true shrubs, or young or stunted trees. These communities may represent a successional stage before forested wetlands or a stable community (Cowardin et al. 1979). Forested wetlands are common in the southern portion of the installation, south of Brandy Brook. These wetlands are dominated by woody vegetation 20 feet tall or higher, and consist of red maple, green ash, American elm (*Ulmus americana*), and willow species.

Beavers have had a significant impact on wetlands since the site's deactivation in 1995. They have caused substantial flooding from repeated damming of Brandy Brook and ditches across the site. Beaver dams and impoundments are temporary, but numerous dams have become semi-permanent and created beaver-induced wetlands. Beaver dams downstream of the VTA have increased wetlands and flooding onsite in addition to affecting adjacent properties. These beaver-induced wetlands have expanded since the last delineation in 1997 and have encroached upon mission-related infrastructure. It is unknown whether these expanded wetlands are considered jurisdictional.

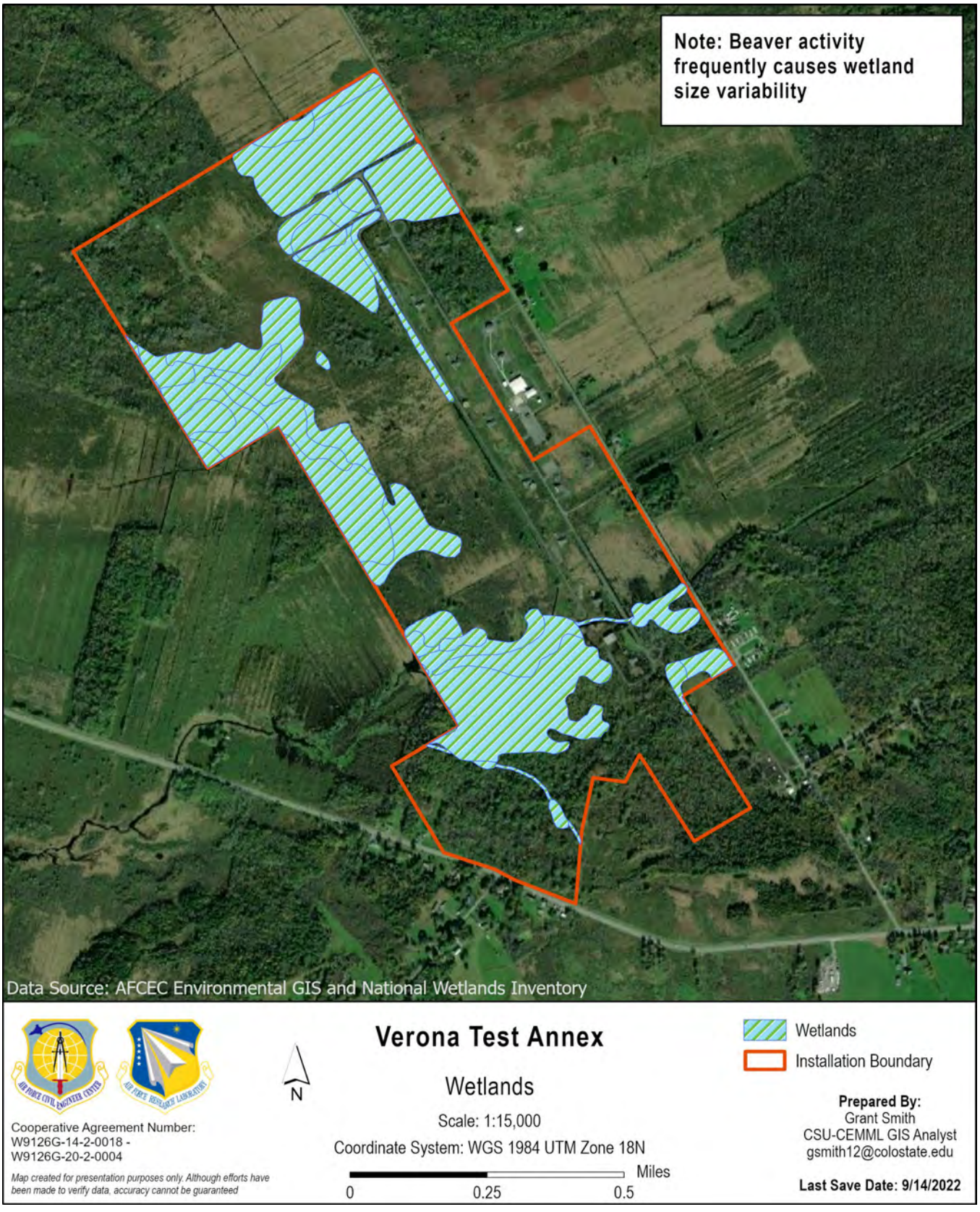

Figure 2-11. Verona Test Annex Wetlands

Stockbridge Test Annex

Wetlands resources at STA are limited.

Newport Test Annexes

Wetlands resources at NT1 and NTA2 are extremely limited. However, multiple seeps occur in the newly acquired parcel abutting NTA2. One such area is approximately 2.5 acres in size at a hillside bench northeast of the Transmit site. Wetland vegetation is present in ravines draining the hillside, and are scattered throughout the fields in the southern portion of the parcel.

2.4 Mission and Natural Resources

2.4.1 Natural Resource Constraints to Mission and Mission Planning

Constraints to future planning and missions at AFRL/RI are anything that causes restrictions to the mission. Constraints can arise from the presence of special status species, sensitive habitats, or water resources. These resources may limit the types of activities in an area, but with proper planning, the mission is unlikely to be completely restricted. Identification of potential restrictions is important for evaluating effects of these constraints on the mission and for future planning. For example, since the VTA site has been deactivated, wetlands have developed, mainly due to beaver activity in the nearby Brandy Brook. If the site is reactivated, these wetlands may pose regulatory constraints, depending on the mission activities being considering.

Early consideration of these issues in planning typically results in solutions where the activity can proceed without affecting the mission. Timing restrictions for special status species may be necessary to avoid impacts to those species during mission activities or habitat management activities. Currently, no critical habitat designated by the USFWS intersects AFRL/RI. Managers will want to monitor for any changes to USFWS critical habitat designations and for any new designations, to evaluate how they might affect management activities at the installation. For some quick response tasks, early planning may not always be possible, although efforts are made to accommodate these emergency tasks while minimizing environmental impacts.

2.4.1.1 Potential Future Constraints due to Climate Change

The CEMML Climate Assessment (CEMML 2023) identified several ways that climate change could directly or indirectly affect the mission, mission-critical infrastructure, and natural resources. The mission relies heavily on the natural environment and may be impacted indirectly by stressed or shifting ecosystems, loss of ecosystem services, and regulatory burden. See Section 7.16 for a more detailed discussion of vulnerabilities to the mission and operations at AFRL/RI.

2.4.2 Land Use

Contrasting the RRS, which is situated in an urban landscape, the GSUs of AFRL/RI are situated in a primarily rural agricultural landscape. The land use surrounding VTA, STA, and NTA is mostly agricultural mixed with woodland. The VTA, STA, and NTA are mostly composed of forested habitat with some shrubland, grassland, and wetland areas interspersed. Infrastructure at the GSUs is composed of roads, buildings, fences, concrete pads, and antennas and towers. Future grounds maintenance activities will likely involve infrastructure maintenance such as buildings, managed landscaped areas, roads, and fences. Any habitat management activities will occur only at VTA, STA, and NTA.

AFMAN 32-7003 defines three categories of land use, as described below.

Improved Grounds: Includes land occupied by buildings and other permanent structures as well as lawns and landscape plantings on which grounds maintenance personnel annually plan and perform intensive maintenance activities. Grass in these areas is normally maintained by regular mowing during the growing season.

Semi-improved Grounds: Land where periodic maintenance is performed primarily for operational reasons (such as erosion and dust control, bird control, and visual clear zones). Semi-improved grounds areas are mowed less often than the maintained turf grass on improved grounds.

Unimproved Grounds: Land that is not classified as Improved or Semi-improved Grounds. Unimproved Grounds include forest lands, croplands and grazing lands, lakes, ponds, and wetlands, and any areas where natural vegetation growth is not impeded by maintenance activities.

Land use is depicted at the VTA and STA in Figure 2-12 and Figure 2-14. Grounds maintenances categories is depicted for the VTA, STA, and NTA in Figure 2-13, Figure 2-15, and Figure 2-16. Grounds maintenance categories is also given below in Table 2-4.

Table 2-4. Grounds Maintenance Category Acreage

Grounds Maintenance Category	VTA	STA	NTA1	NTA2
Improved	8.90	19.55	1.30	4.90
Semi-Improved	120.05	120.78	12.19	41.99
Unimproved	351.17	153.37	9.67	76.68

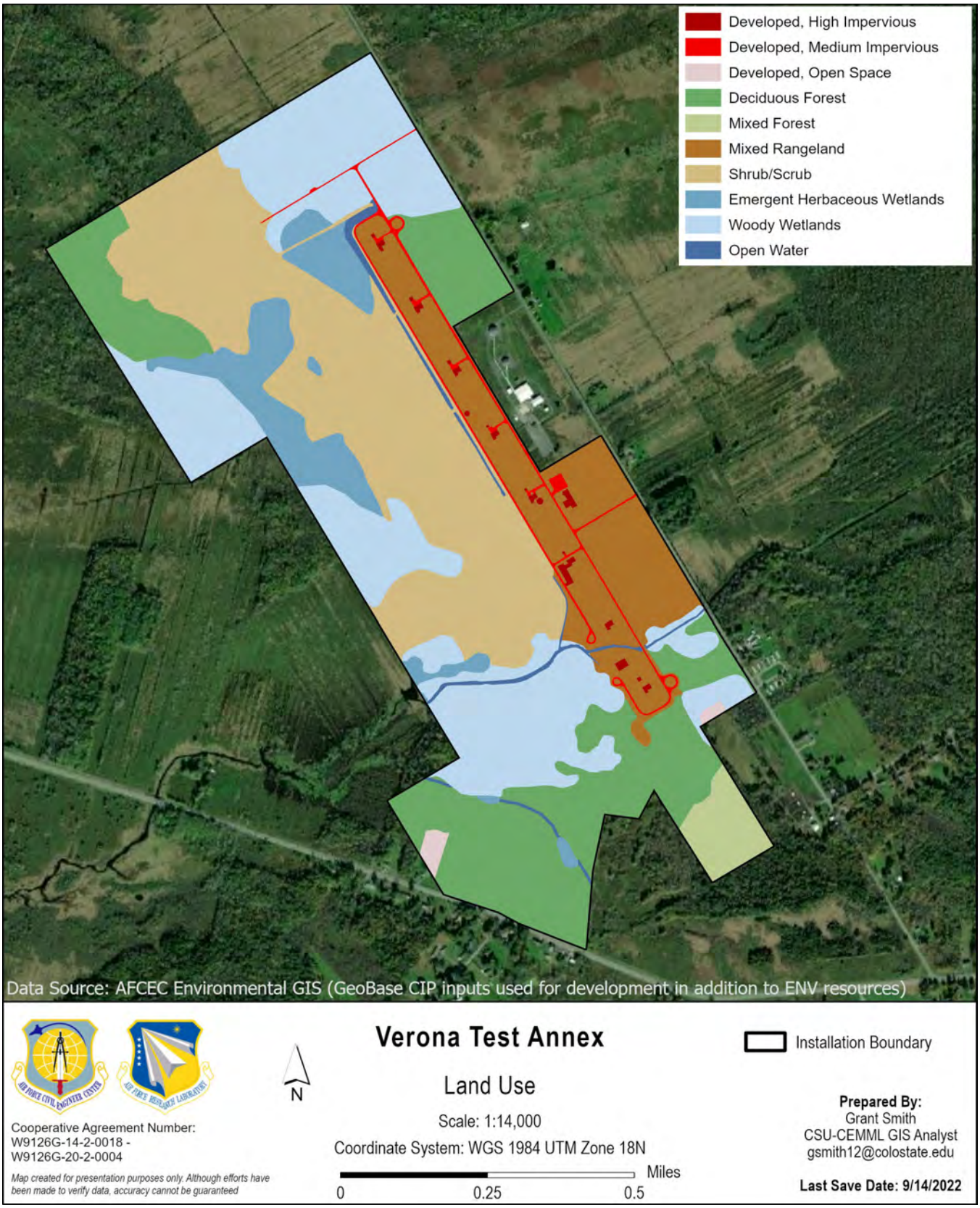

Figure 2-12. Land Use at Verona Test Annex

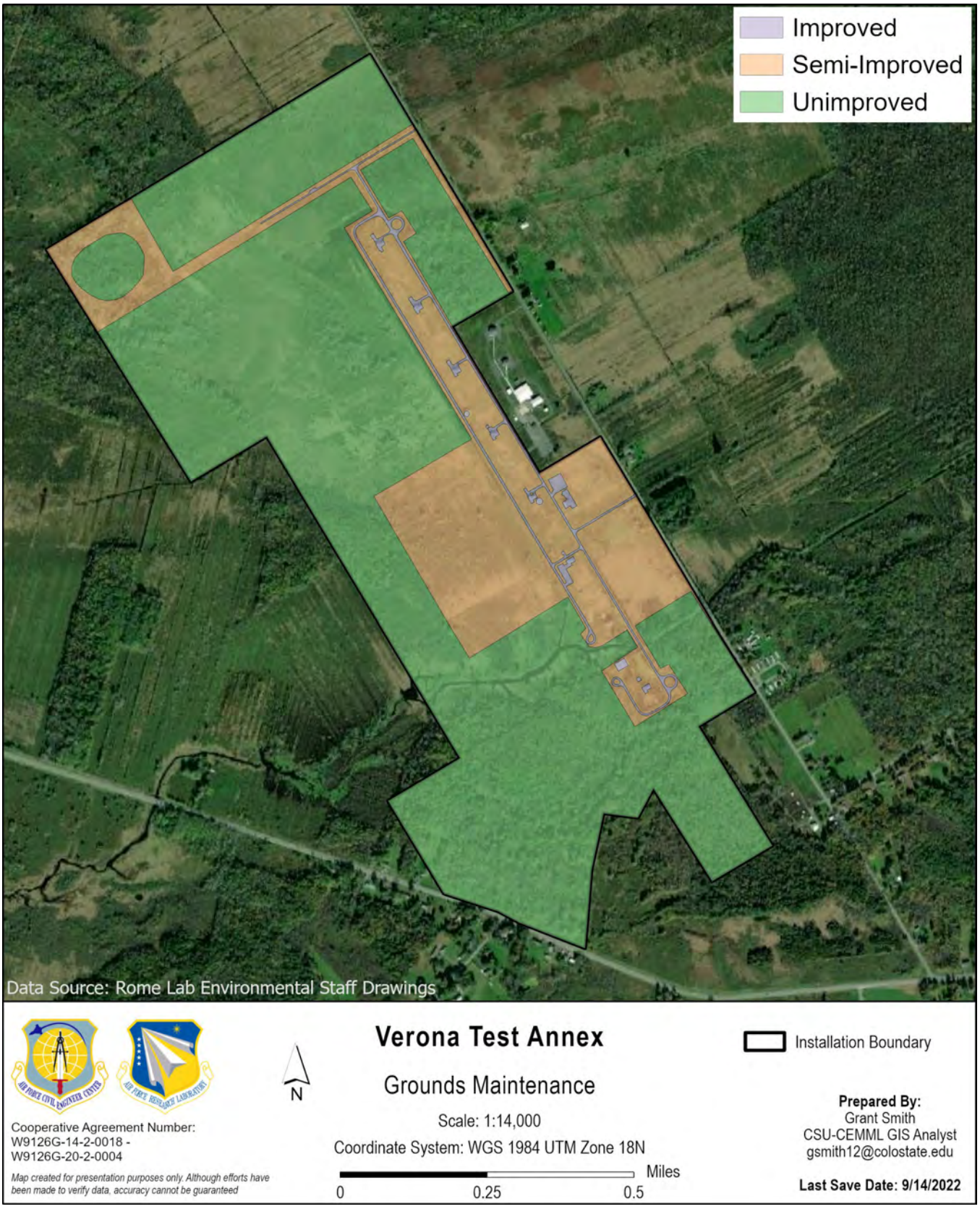

Figure 2-13. Grounds Maintenance Categories at Verona Test Annex

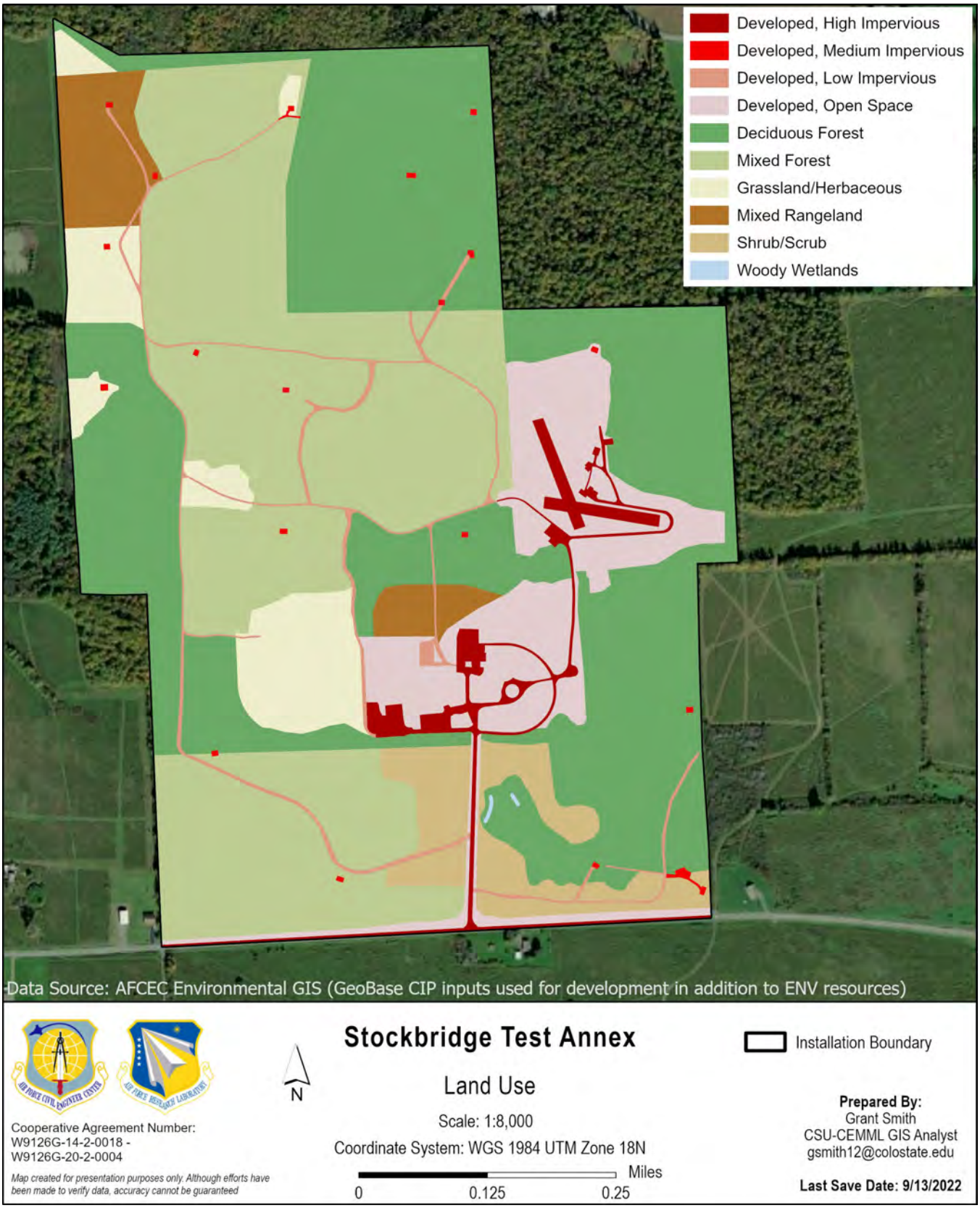

Figure 2-14. Land Use at Stockbridge Test Annex

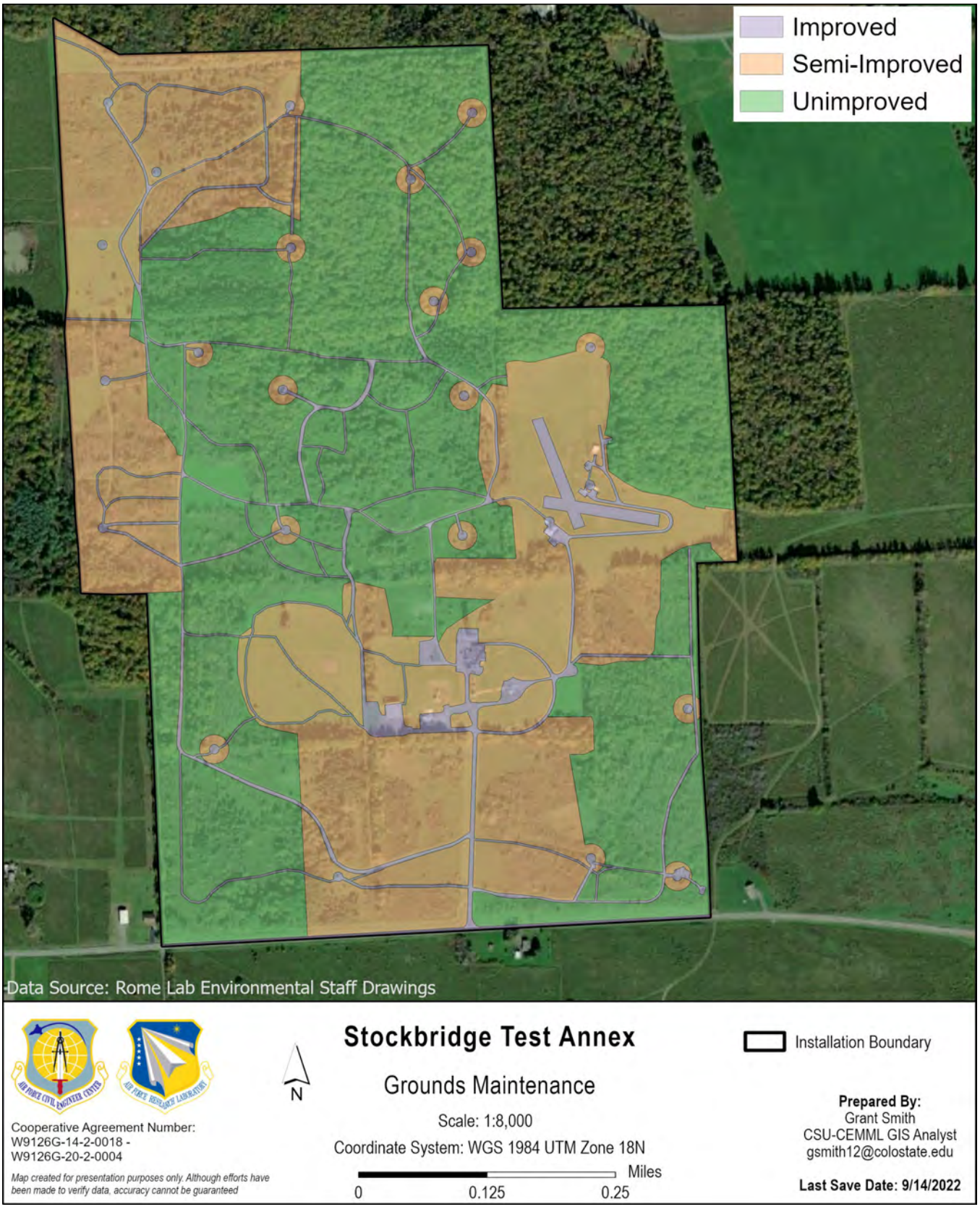

Figure 2-15. Grounds Maintenance Categories at Stockbridge Test Annex

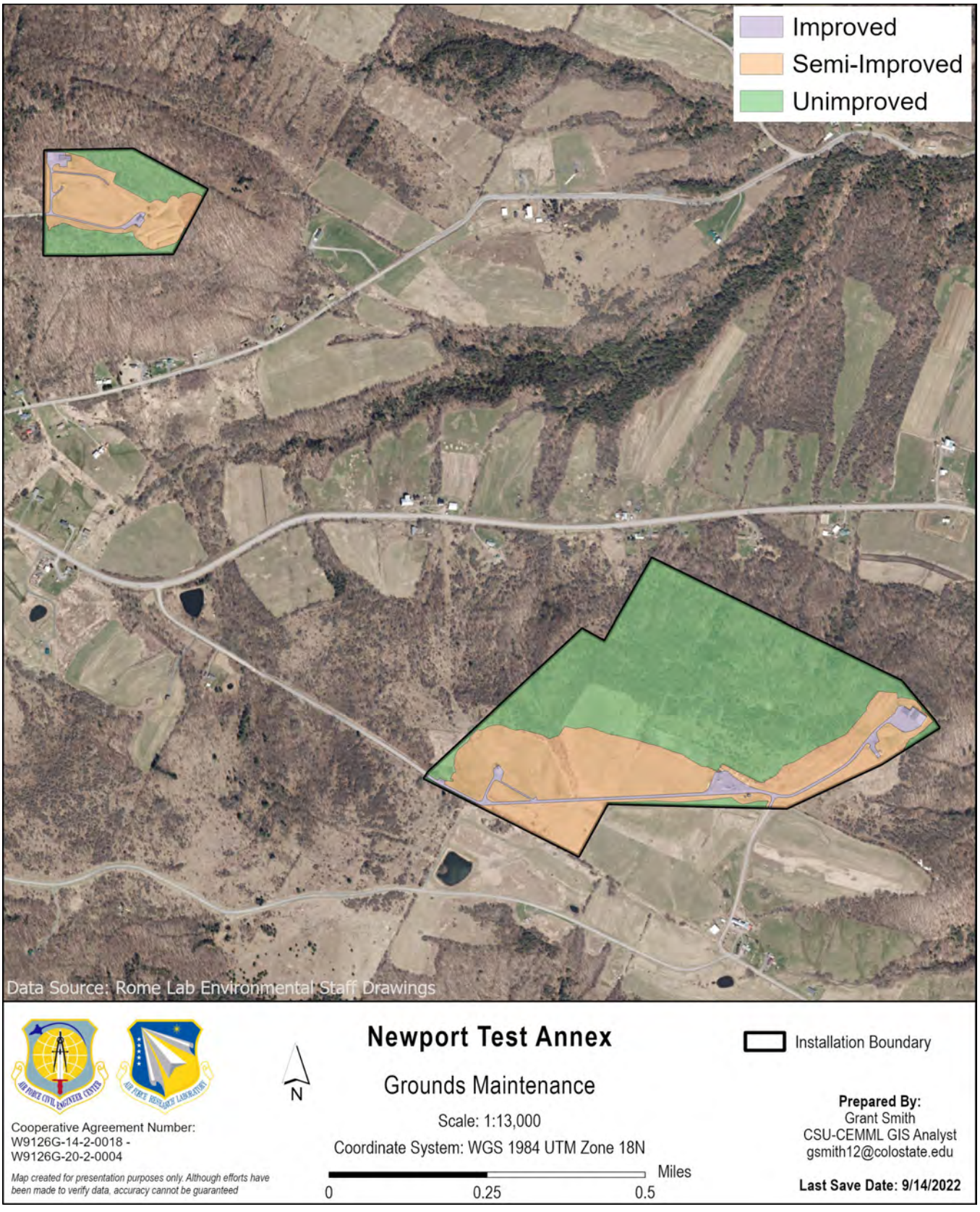

Figure 2-16. Grounds Maintenance Categories at Newport Test Annexes

2.4.3 Current Major Mission Impacts on Natural Resources

Impacts from the mission on natural resources at AFRL/RI are minor. The laboratory research work conducted at RRS and the lack of mission activities at VTA do not result in impacts to natural resources at those GSUs. During activities at the former Griffiss AFB, hazardous and toxic substances were used, and hazardous wastes were generated, stored, or disposed of at various sites on the installation. The DoD has located and assessed the previous sites of toxic and hazardous waste storage, disposal, and spills through the Installation Restoration Program. This DoD program identifies, characterizes, and remediates environmental contaminants on installations that have resulted from DoD activities. Per- and Polyfluoroalkyl substances (PFAS), such as perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) from firefighting foam may be present in soils. This is consistent with other private or public entities supporting airport operations.

The field research and testing at STA and NTA may have impacts on natural resources if woodlands are cleared to achieve sightlines for testing. Vegetation management practices in woodlands, or in other vegetation communities, may have an adverse impact on avian species if conducted during the nesting season. The Migratory Bird Treaty Act provides protection for most birds by requiring avoidance of disturbance to adults, nests, and young during the nesting season. Air quality and noise are not current mission impacts at AFRL/RI due to the types of mission activities at the GSUs; however, depending on the mission reactivation at VTA, they many need to be reconsidered. Required screening and remediation of environmental hazards will occur prior to future demolition of buildings.

2.4.4 Potential Future Mission Impacts on Natural Resources

The mission at AFRL/RI involves laboratory research and field testing of communications equipment and technologies, which do not have major impacts on natural resources. If the mission changes, however, or the mission is reactivated at VTA, that will need to be reconsidered. At AFRL/RI, land management may be done to improve natural resources on the installation and to protect and enhance the ecosystem. This future management should be intended to benefit the natural resources that exist, so potential impacts should primarily be positive. Habitat management activities may have short-term, temporary impacts on the environment that can be addressed through proper planning and coordination of projects with the necessary parties. Additionally, some woodlands may need to be cleared permanently to maintain ranges and mission capability at sites like the STA and NTA.

Potential future development at the VTA includes a cUAS range, solar generation, and beyond line of site communications. These developments may utilize undisturbed land and will need proper ESA, NEPA, and NHPA consultation and documentation to ensure compliance. Consultation with New York state may need to be completed to ensure compliance with Title 6, and Articles 15 and 24, which respectively regulate state-listed species and wetlands. Biological survey projects included in Sections 8.0 and 10.0 will expedite this process by guiding proper placement of development to reduce natural resource impacts.

3.0 ENVIRONMENTAL MANAGEMENT SYSTEM

The USAF environmental program adheres to the Environmental Management System (EMS) framework and its Plan, Do, Check, Act cycle for ensuring mission success. Executive Order (EO) 13834, *Efficient Federal Operations*; DoDI 4715.17, *Environmental Management Systems*; AFI 32-7001, *Environmental Management*; and International Organization for Standardization (ISO) 14001 standard, *Environmental Management Systems—Requirements with guidance for use*, provide guidance on how environmental programs should be established, implemented, and maintained to operate under the EMS framework.

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

Installation Specific Content

The AFRL/RI is not required to use the EMS framework.

4.0 GENERAL ROLES AND RESPONSIBILITIES

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

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
Installation Commander	Fred E. Garcia II, Colonel USAF Director, Information Directorate and Commander, AFRL/Detachment 4
AFCEC Natural Resources Media Manager/SME/Subject Matter Specialist (SMS)	Jamie Evans, GS-12, DAF Natural Resources Management JBMDL Installation Support Section Air Force Civil Engineer Center DSN 650-6164 Comm 609-754-6164 Mobile 732-927-0390 jamie.evans.6@us.af.mil
Installation Natural Resources Manager/POC	Jeffrey M. Sann Biological Scientist Air Force Research Laboratory Information Directorate 150 Electronic Parkway Rome, NY 13316 315.330.2146 Jeffrey.Sann@us.af.mil
Installation Security Forces	VINCENT J. GUZA Chief, Security Forces/Information Protection Branch AFRL/RIOF Bldg. 3 West Wing 525 Brooks Road Rome, NY 13441-4503 Commercial: 315-330-4048 DSN: 587-4048
Installation Unit Environmental Coordinators (UECs); see AFI 32-7001 for role description	N/A
Installation Wildland Fire Program Manager	TBD (Jeff)
Pest Manager	Tracey Collom RIOCO 315-330-2132 Tracey.Collom@us.af.mil
Range Operating Agency	N/A
Conservation Law Enforcement Officer (CLEO)	N/A
National Environmental Policy Act (NEPA)/Environmental Impact Analysis Process (EIAP) Manager	RIOCV Environmental Office Air Force Research Laboratory Information Directorate 150 Electronic Parkway

Office/Organization/Job Title (Listing is not in order of hierarchical responsibility)	**Installation Role/Responsibility Description**
	Rome, NY 13316 315.330.2098
NOAA)/ National Marine Fisheries Service (NMFS)	N/A
US Forest Service	N/A
USFWS	USFWS New York Ecological Field Office 3817 Luker Rd Cortland NY, 13045 607-753-9334 fw5es_nyfo@fws.gov

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5.0 TRAINING

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

Installation Supplement—Training

- NRMs at Category I installations must take the course "DoD Natural Resources Compliance," endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval Civil Engineer Corps Officers School (CECOS). See http://www.netc.navy.mil/centers/csfe/cecos/ for CECOS course schedules and registration information. Other applicable environmental management courses are offered by the Air Force Institute of Technology (http://www.afit.edu), the National Conservation Training Center managed by the USFWS (http://www.training.fws.gov), and the Bureau of Land Management Training Center (http://training.fws.gov).
- Natural resource management personnel shall be encouraged to attain professional registration, certification, or licensing for their related fields, and may attend appropriate national, regional, and state conferences and training courses.
- All individuals who will be enforcing fish, wildlife, and natural resources laws on USAF lands must receive specialized, professional training on the enforcement of fish, wildlife, and natural resources laws in compliance with the Sikes Act. This training may be obtained by successfully completing the Land Management Police Training course at the Federal Law Enforcement Training Center (http://www.fletc.gov/).
- Individuals participating in the capture and handling of sick, injured, or nuisance wildlife should receive appropriate training, to include training that is mandatory to attain any required permits.
- The installation WFMP will specify the numbers and types of qualified staff required for the installation wildland fire management program based upon an installation-specific risk assessment. All military, civilian, cooperator, contractor and FES personnel involved in wildland fire activities must meet or exceed the training, certification and fitness standards appropriate for their expected level of involvement in wildland fire operations (AMFAN 32-7003 3.83).
- The DoD-supported publication "Conserving Biodiversity on Military Lands -- A Handbook for Natural Resources Managers" (http://dodbiodiversity.org) provides guidance, case studies, and other information regarding the management of natural resources on DoD installations.

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

6.0 RECORDKEEPING AND REPORTING

6.1 Recordkeeping

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

Installation Supplement—Recording

There are no installation-specific record keeping procedures that the AFRL/RI follows.

6.2 Reporting

The installation NRM is responsible for responding to natural resources-related data calls and reporting requirements. The NRM and supporting AFCEC Natural Resources Media Manager and subject matter specialist should refer to the Environmental Reporting Playbook for guidance on data gathering, quality control/quality assurance, and report development.

Installation Supplement—Reporting

There are no installation-specific reporting procedures that the AFRL/RI follows.

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

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

7.1 Fish and Wildlife Management

Applicability Statement

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

Program Overview/Current Management Practices

Currently, there are no active fish and wildlife management programs or policies across the installation and its properties, except for nuisance beaver trapping at VTA to protect the former semi-improved areas from wetland encroachment. No species monitoring or habitat management is being conducted due to lack of funding and manpower.

Fish and wildlife management is overseen by AFRL/RI's NRM and is guided by AFMAN 32-7003 3F. Proposed management of wildlife, fish, and habitat are described in Section 8.0 of this INRMP. Species data collected through surveys and monitoring from the proposed management, such as occurrence and abundance data, will be submitted to federal and other installation-approved databases (Project 1.2.5). Large-scale and comprehensive databases, such as the Avian Knowledge Network (AKN) and North American Bat Monitoring Program (NABat), are critical for managing species that have a broad spatial extent. Demographic processes for avian and bat species, including birth, death, immigration, and emigration, drive patterns in distribution and abundance. Additionally, these processes are driven by many interacting environmental influences. Identifying and understand these complex interacting processes and influences is vital in ensuring adequate and effective management (Saracco et al. 2008). These databases are a valuable resource for identifying, accessing, and combining data sets for developing analytical techniques that can better inform conservation. The goals of these databases are to use broad and diverse data resources to make accurate projections of species occurrences and factors affecting occurrence to inform management decisions (Iliff et al. 2009). The submission of these data by the AFRL/RI will play a valuable role in accomplishing these goals and for effective fish and wildlife management on the installation.

7.1.1 Climate Impacts to Fish and Wildlife Management

Fish and wildlife management on AFRL/RI is not likely to be severely impacted by the projected changes in climate. Wildlife communities on the installation may alter their movements and timing of migration or breeding due to projected increases in temperature and slight increases in precipitation. Changing climatic conditions may present opportunities for invasive species to flourish and push out native species, so invasive species monitoring will be important and management plans should be flexible enough to adapt to changing fish and wildlife concerns (Hellmann et al. 2008). Managers will need to conduct wildlife surveys on a regular basis to document changes in native species populations.

Prevention and control of wildlife disease spread will be critical to protect native species and habitats in a changing climate. Increasing temperatures can favor disease-vectoring organisms such as mosquitoes and

ticks (Süss et al. 2008). Managers can reduce mosquito populations by minimizing stagnant water in and around the cantonment area. Tick populations can be minimized in urban settings by keeping lawns mowed and by preventing overabundances of hosts such as deer and rodents (Levi et al. 2012, Telford 2017). Controlling small mammal and rodent populations could help curtail the potential for outbreaks.

7.2 Outdoor Recreation and Public Access to Natural Resources

Applicability Statement

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

Program Overview/Current Management Practices

Currently, the installation does not allow public access, nor recreational activities, on its properties. Hunting and trapping are executed by permitted agencies for control of nuisance or invasive species. Forests onsite that support sugar maple trees, particularly the STA, have the potential to support future maple sugaring operations. This could be developed into an AFRL/RI and public recreational event. However, future maple sugaring would need to be further assessed to ensure no impact on the mission or other INRMP activities, and terms of access and participation will need to be defined within the INRMP (AFMAN 32-7003 3.32.3, 3.56). Maple sugaring is discussed further in Section 7.8.

7.2.1 Climate Impacts to Outdoor Recreation and Public Access to Natural Resources

Due to the lack of outdoor recreation and public access at the AFRL/RI, climate will have no impact on outdoor recreation and public access to natural resources. Reassessment of potential maple sugaring operations considering climate change is useful in determining long-term sustainability of the activity.

7.3 Conservation Law Enforcement

Applicability Statement

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

Program Overview/Current Management Practices

Currently, the AFRL/RI does not have a Conservation Law Enforcement Program, due to lack of public recreational areas and limited accessible acreage. However, according to the Sikes Act (16 USC § 670a(b)(1)(H)) and AFMAN 32-7003 3.33, the AFRL/RI is required to address how natural resource laws will be enforced in the INRMP. This is described below.

Natural resource laws are enforced through reporting of violations to authorities. This responsibility will fall most often to Security forces and installation personnel who witness violations. Violations are reported to local law enforcement or the USFWS for further handling. The Oneida Nations' Conservation Law Officers patrol neighboring Oneida Nation tribal lands, and they alert the installation out of courtesy when they observe misconduct on installation property.

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

Applicability Statement

This section applies to USAF installations that have threatened and endangered species on USAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Currently, it is unknown if any special status species occur on AFRL/RI and its properties. Future surveys are needed to determine presence or absence of these species. Historic inventories were referenced to determine the potential presence of special status species, species of concern, and/or suitable habitats. A comprehensive list of potentially present species is in Appendix B. In 2013, suitable habitat for bog turtles was determined to possibly exist on VTA, although never confirmed. Bog turtles are a federally threatened species, and future surveys are necessary to determine if bog turtles are present. These surveys have not been completed due to lack of funding and personnel. In 2018, the STA was included within a large USAF bat acoustic survey. The Indiana and northern long-eared bats were detected through a software analysis program, but failed to be manually confirmed by a bat expert. The little brown bat (*Myotis lucifugus*) and tricolored bats (Proposed Federally Endangered, NYS SGCN) were also detected but only the little brown bat was manually confirmed.

Bat Management

Habitat management for sensitive bat species will be comprised of the following. In general, trees will not be removed during the bat active season, April 15 – October 15, for sensitive species including the northern long-eared bat. This time-of-year restriction will also benefit nesting birds. Upon further data acquisition, any identified critical habitat features such as maternity roosts or hibernacula (although unlikely) will be protected. However, trees posing a risk to personnel and property may be removed at any time of year.

Large tracts of deciduous hardwood forests are the preferred roosting habitat for the tricolored bat. Tricolored bats have been noted to roost, including maternity roosts, within dead and live deciduous and coniferous leaf bundles (USFWS 2022a). Tricolored bat maternity roost locations are especially sensitive due to high site fidelity and communal roosting by female bats. They forage primarily along forest edges and waterways, but also within forests on occasion.

The little brown bat uses a variety of habitats, but primarily uses features associated with water. They forage in an around water bodies, including nearby forests. Dead trees with exfoliating bark, woody detritus and downed wood, and rocky outcrops have been documented to host roosting individuals. Dead trees with large cavities have been noted to host maternity colonies (USFWS 2022b)

Features that support life history components of these bats should be managed sustainably, to include foraging and roosting locations and habitats. Known roosts of either bat, especially maternity roosts, will be left undisturbed and protected from harm and disturbances. Habitats should be managed to perpetuate the continued presence of critical features. Both bats have been shown to roost in buildings and other human-created structures. Surveys will be conducted before demolishing or repurposing buildings to ensure no impact on these bat species.

7.4.1 Climate Impacts to Management of Threatened and Endangered Species, Species of Concern, and Habitats

Climate adaptation (i.e., making changes to natural or human systems that minimize the impacts or promote the benefits of climate change) will be an important management tool for protecting special status species from the most severe impacts. Single-species approaches to climate adaptation run the risk of interrupting ecosystem function and further imperiling other species. DoDI 4715.03 advises installations to instead employ adaptive and ecosystem-based management. As such, many current management activities are appropriate for increasing resilience or facilitating adaptation to climate change. For example, an ecosystem approach that prioritizes habitat maintenance, habitat variability, and habitat connectivity can help support

genetic and functional diversity. In turn, genetic and functional diversity can facilitate adaptation and help species migrate to favorable habitats. As temperatures increase, it will be increasingly important to plant or retain more drought-tolerant plant species.

Given the uncertainty inherent in managing species under changing environmental conditions, additional analysis and planning is required. Research into actionable science used for biodiversity conservation in changing conditions has demonstrated that historic patterns used for management decisions are likely to be insufficient for future management challenges (Bierbaum et al. 2013). Instead, proactive approaches that anticipate change can help extend the period over which species can adapt to a changing climate and avoid catastrophic declines associated with stochastic events that act on an already stressed ecosystem.

Effective approaches to climate adaptation require site-specific climate projections as well as local knowledge of species and their habitats. Adaptation actions can focus on addressing changes as they occur (i.e., reactive strategies) or can seek to avoid impacts of changes (i.e., proactive strategies). In the context of special status species with limited habitats, it may be prudent to focus on proactive strategies to avoid losses that may hinder species recovery. If changes in the environment are already affecting priority species, a reactive approach could still improve long-term species survival. Managers can further refine actions, whether proactive or reactive, by considering how they intend to manage change in the system. Resistance strategies seek to maintain the status quo and prevent change from affecting the species. Resilience strategies support ecosystem function without fundamental change. Realignment strategies focus on understanding that some changes will occur, and support transitioning to a new ecosystem state (Holling 1973, Millar et al. 2007).

Most depictions of the adaptive management cycle include phases for planning, acting, and evaluating (Figure 1-1). Managers should explicitly address special status species and their specific vulnerabilities to a changing climate at several stages of the adaptive management cycle (Stein et al. 2019) and can be used to identify and address climate-related threats to species of concern and their habitats. Scenario planning and scenario-based assessment models have also emerged to help decision makers take proactive management actions despite uncertainty (Banuls and Salmeron 2007).

7.5 Water Resource Protection

Applicability Statement

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

Program Overview/Current Management Practices

Local water resources issues include protection and remediation of water quality from agricultural and industrial development, polychlorinated biphenyl (PCB) contamination, sedimentation of local waterways, septic and sewage pollution, and streambank erosion. Numerous brownfield and Superfund sites throughout the Mohawk Valley potentially contribute to contamination of the water supply. Runoff from agricultural and developed areas contributes automotive pollutants, fertilizers, and pesticides to water resources (MRWC 2015).

Currently, water resource protection at the AFRL/RI includes containment and remediation of existing soil and water pollution and the avoidance of future contamination.

Rome Research Site

There are no current contaminants of concern at the RRS. Due to the closure, demolition, and remediation of Building 104, contaminants such as radium, cadmium, mercury, lead, PCBs, and asbestos are no longer a concern (AFRL/RIOCV 2013). Continued use of the soil management plan for the Building 104 drywell location, and the precautions in the stormwater pollution protection plan for radium and other contamination, should adequately protect water resources at the RRS (AFRL/RIOCV 2012, 2013).

Verona Test Annex

The VTA has significant water resource protection responsibility due to the abundant water resources on site. Past water resource concerns at the VTA were related to spilled chlorinated solvents detected from 1996-2000 around Buildings 1231 and 1253. (David Frostclapp, Stearns & Wheler, LLC, letter regarding semiannual monitoring analytical summary report, unpublished).

Stockbridge Test Annex

No water resource protection issues occur at the STA, other than remediation of small spills that may occur from construction or forestry equipment. Resulting pollutants may include hydrocarbon fuels or hydraulic fluids. Basic use of fertilizer and pesticides, consistent with nearby state and private properties, may contaminate runoff to local streams and/or shallow groundwater supplies.

Newport Test Annexes

No water resource protection issues occur at the NTA, other than erosion concerns from channelization of runoff. This erosion may cause sediment pollution of local water resources, especially during extreme precipitation events. Maintenance activities may contribute to regional non-point fertilizer and pesticide runoff problems.

7.6 Wetland Protection

Applicability Statement

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

Program Overview/Current Management Practices

Past surveying of wetlands across AFRL/RI has revealed that nearly all installation wetlands occur at the VTA. However, the newly acquired parcel abutting NTA2 likely contains numerous but small wetlands. Surveying the new parcel for wetlands would help identify extent and protection status. Wetlands on other sites cover smaller areas and are unlikely to be developed. With monitoring of contaminant spills and development potential at VTA, new wetland surveying and delineation is needed to determine possible jurisdictional status and to facilitate any future permitting needs, in addition to directing ongoing management actions.

Wetland inventories at VTA have not been completed since 1997 therefore, the current extent, classification, and jurisdictional status are not known. Based on existing surveys and observations by management staff, wetlands at VTA appear to be healthy. The bog turtle has the potential to inhabit the area, making knowledge of wetlands status in and near VTA of increased importance. Invasive species are present, primarily in disturbed areas, which will need to be addressed. Common reed has established several stands across the site, especially along roadsides and ditches.

Currently there are no plans for wetland restoration or enhancement at the VTA. Wetlands close to Brandy Brook and/or along existing ditching are being altered by beaver dams and resultant flooding, by changing size and distribution. Beaver dams have historically been manually removed to reclaim mission-critical lands. New surveying is important to document changes in wetlands size, legal status, determine management needs and requirements.

Downstream of the VTA, the Oneida Nation is involved in a wetland mitigation banking project. The AFRL/RI is not directly involved in this project, but wetland management actions at the VTA may affect the wetlands banking project downstream and vice versa.

To protect wetlands from disturbance or future development, the AFRL/RI will maintain 100-foot buffers where possible and not in conflict with the mission. This buffer will help reduce nutrient and sediment loading in wetlands. Where a 100-foot buffer is not possible due to mission conflicts, small transitional areas between developed landscapes and wetlands will be provided. These areas will provide the previously listed benefits, but also may provide habitat for riparian species or pollinators.

7.6.1 Climate Impacts to Wetland Protection

Wetland systems are vulnerable to changes in the quantity and quality of their water supply, and climate change is expected to drive pronounced alterations in hydrological regimes (Erwin 2009). The increase in projected minimum, maximum, and average temperatures, along with the number of days over 90°F, will likely increase evapotranspiration. This will potentially reduce wetland water levels, especially in the summer. The extent of potential wetland loss at VTA will depend on the balance of changes in precipitation versus evapotranspiration, activity of water resource altering species such as beaver, as well as the timing and magnitude of snowmelt.

The expansion of invasive plant species' ranges could also have negative impacts on the health of wetlands at the installation (Junk et al. 2013). Invasive plant species tend to have broader environmental tolerance limits, such as being more resilient to higher temperatures and altered hydrological regimes. These invasive species (e.g., reed canary grass; common reed) may outcompete native wetland plants. Invasive species could alter plant community structure and diversity, plant productivity, nutrient cycling, and soil biota in wetlands (Zedler and Kercher 2004). Future wetland management efforts could reduce impacts to wetlands by preventing climate-related encroachment of these species.

7.7 Grounds Maintenance

Applicability Statement

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

Program Overview/Current Management Practices

Currently, ground maintenance operations are contracted out for AFRL/RI. No major grounds maintenance occurs other than occasional improved and semi-improved grounds maintenance activities, including lawn mowing, hazard tree removal and pesticide application. Mowing at the VTA and STA typically occur around infrastructure, such as pavement and test pads. Intense mowing will begin at the VTA in fall 2022 to reclaim semi-improved areas. These areas have changed vegetation profile due to prolonged beaver-induced flooding. Numerous mowing cycles may have to be completed to shift the vegetation profile back to normal lawn grass. The AFRL/RI will provide a wetland buffer of up to 100 feet where possible and practical. Where 100-foot buffer is not possible, a small transitional area between develop landscapes and

wetlands will be considered. Mowing occurs at the NTA in July and September, although certain areas are mowed as often as possible to support the mission. Mowing in certain areas of the newly acquired parcel at NTA2 may be required in the future.

No planning documents have been developed or are in use for the ARFL/RI. A Grounds Maintenance Plan may be warranted with the implementation of this INRMP, to comply with various AFMAN 32-7003 instructions. Specifically, AFMAN 32-7003 3.58.1 directs installations to ensure landscape design and maintenance activities are not in conflict with the INRMP, and to use regionally native plants in landscape designs and conversions. It also directs installations to convert improved and semi-improved areas to unimproved areas when practicable. Similarly, inclusion of long-term goals and objectives of desired future condition of installation landscape trees in the INRMP is required by AFMAN 32-7003 3.58.3. An Urban Forest Management Plan would satisfy this requirement and provide future planning for grounds maintenance. Future opportunities for replacing ornamentals with native vegetation, pollinator-friendly plants, and/or pollinator gardens around RRS will be considered.

7.8 Forest Management

Applicability Statement

This section applies to USAF installations that maintain forested land on USAF property. This section **IS** applicable to this installation.

Program Overview/Current Management Practices

Management of native ecosystem types, hence management of forests, will be essential to implement the principles of ecosystem management required by AFMAN 32-7003 3.10. These principles must be implemented only where practical and consistent with the military mission. Forest management operations are required to follow New York State forestry best management practices per AFMAN 32-7003 3.44. The AFRL/RI's Range Operating Agency will determine if existing forests can support commercial timber harvesting operations, without impeding the INRMP or mission activities.

Forest management at the AFRL/RI applies to the VTA and STA and is not generally applicable to the RRS and NTA. One of the projects described in Section 8.0 of this plan is to develop forest management plan by 2024 for the VTA and STA, to include forest resource inventory, description of forest stands, and recommended harvest schedule based on economic value, existing pests and disease, and hazard trees.

Trees will not be removed during the bat active season, April 15 – October 15, except when posing risk to personnel or property. Trees posing a risk to personnel and property may be removed at any time of year. This time-of-year restriction will also benefit other sensitive bat species and nesting birds.

<u>Verona Test Annex</u>

No current forest management practices or forest management plan exists for the VTA; however, the VTA supports significant forest resources.

Forests cover approximately 235 acres of the VTA, in the western portion of the installation and southeast of Brandy Brook. Little is known regarding the exact biological assemblage of the forests, but they are likely part of the Laurentian-Acadian Hemlock - White Pine - Hardwood Forest vegetation group and the Silver Maple - Green Ash - Sycamore Floodplain Forest vegetation group. These groups represent a transition between boreal and broadleaf deciduous forest types. Part of the forested land has mixed stands of a few coniferous species (mainly pine) and a few deciduous species (mainly yellow birch, sugar maple,

and American beech); the rest is a mosaic of pure deciduous forest in favorable habitats with good soils, and pure coniferous forest in less favorable habitats with poor soils.

Mixed stands have several species of conifer with a component of eastern hemlock. Eastern red cedar is found in the southeast of the site. Pine trees are often the pioneer woody species that flourish in burned-over areas or on abandoned arable land, such as the VTA. Because they grow more rapidly than deciduous species where soils are poor, they quickly form a forest canopy. Where deciduous undergrowth is dense, they have difficulty regenerating and remain successful only where fire recurs.

Forests onsite may be capable of producing timber for commercial harvest. The draft 1993 VTA forest management plan indicated that forests onsite were classified as commercial forest land/regulated, capable of producing crops of industrial wood on a planned rotation basis with minimum restrictions. Significant time has passed since the completion of the draft plan, though, and forest conditions are likely to have changed.

Forests onsite present numerous concerns for future mission operations and forestry activities. Significant beaver flooding and conversion to wetlands has occurred during the 2000–2022 timeframe, which may have weakened tree root systems or caused rot (Mulvey n.d.). Stands of ash afflicted with signs of EAB have been observed onsite and most are in poor health or dying. Numerous tree diseases have emerged in the Northeast over the last few decades, including hemlock woolly adelgid, hemlock elongate scale (*Fiorinia externa*), beech bark disease, white pine needle disease, eastern white pine bast scale (*Caliciopsis pinea*), red pine scale (*Matsucoccus matsumarae*) and others, which may affect the health of VTA forests. No fire management has been conducted onsite, allowing fuel loads to build. Lastly, no management has been conducted to remove snag trees. All these issues create serious safety hazards for future mission activities and forestry operations.

Stockbridge Test Annex

The STA supports significant forest resources that will need management in the future. Infrequently, forests management activities occur to maintain range functionality, but no forest management plan exists for the site.

Forests onsite are diverse and vary in structure and succession. Detailed knowledge about the current biological assemblage of forests onsite is not available because an inventory has not been done since 2000. Information given here is a combination of incidental observations and information collected during the last survey (Marsh and Cronn 2000). A new forest inventory would provide exact acreages and species compositions of forests onsite. Lack of knowledge of existing forests, including their health and the quality of timber, inhibits proper management. Conducting a forest inventory and developing a forest management plan will better inform proper management.

Two significant stands of mature northern hardwood forest occur on the STA, a 38-acre stand in the north, and a 16-acre stand in the east. They are primarily dominated by sugar maple, white ash, and scattered bitternut hickory and American beech. Stands have lesser components of ironwood, basswood, and black cherry. Forest stands may have good quality merchantable timber, and those dominated by sugar maple appear healthy. Ash trees, serving as a minor canopy constituent, show evidence of EAB infestation. Hickory trees, a minor understory constituent, are scattered throughout the understory but seem healthy. Both stands have northern hardwood regeneration and dead standing timber, which serves as high-value wildlife habitat. Shrublands occur generally in the center, western, and southern portions of the site. Shrublands support species common to the area such as cherry, aspen, birch, juniper (*Juniperus* spp.), maple (*Acer* spp.) and others. These areas will probably be succeeded by northern hardwood forest over time.

The north-central portion of the property, near Test Pad 14, holds a small stand of Norway spruce. This stand was planted 40-80 years ago and has an even-aged canopy. Although the tree is an exotic, Norway spruce stands provide significant wildlife value (Marsh and Cronn 2000). Dense stands of conifers, such as Norway spruce, provide valuable winter cover for numerous species, and forage for snowshoe hare, grouse, small birds, and mammals (Sullivan 1994). Additionally, Norway spruce has been found to support similar or increased abundance of birds native to the Northeastern U.S. when compared to native species such as eastern hemlock and white pine, and deciduous forest (Ritter 2020). Maintaining and supporting this stand will provide important wildlife habitat, but it should be monitored for spread.

Forests onsite present numerous concerns for future mission operations and forestry activities. Most importantly, lack of management has allowed forest encroachment into mission ranges, which potentially impacts mission readiness and capability. These stands will need complete clearing to ensure full mission capability. Stands of ash afflicted with signs of EAB have been observed onsite and most are in poor health or dying. Standing dead timber, or hanging dead limbs, occur occasionally across the installation as well. These trees and limbs pose a hazard to mission-related infrastructure and personnel and should be cut down at any time. Numerous diseases have emerged affecting Northeastern tree species in the last few decades including hemlock woolly adelgid, hemlock elongate scale, beech bark disease, white pine needle disease, eastern white pine bast scale, red pine scale, and others. No fire management has been conducted onsite, allowing fuel loads to build, which may lead to an increased chance of severe fires.

Maple stands onsite have potential to support sap harvesting operations, which could result in an enhanced use lease or other arrangement. Sugar maple trees are not significantly affected by sap harvesting, showing growth rates only slightly slower than those of non-tapped trees (Van den Berg et al. 2015, Perkins 2018).

Newport Test Annexes

The NTA, particularly NTA2, supports significant forest resources that will need management in the future. The newly acquired 92-acre parcel at NTA2 contains significant forest resources. Forests at the NTA2 are composed of maple, hemlock, ash, and birch however further knowledge about the current biological assemblage of forests onsite is not available because an inventory has not been completed. A forest inventory would provide exact acreages and species compositions of forests onsite. Lack of knowledge of existing forests, including their health and the quality of timber, inhibits proper management. Conducting a forest inventory and developing a forest management plan will better inform proper management.

Forests onsite present some concerns for future mission operations and forestry activities, including testing interference and wildland fire. The forest may need to be thinned or partially cleared to ensure mission capability. Like the VTA and STA, fuel loads have accumulated from wildfire suppression and lack of fuels management therefore increasing the risk of severe fires. The forest onsite may have diseased or dead standing timber, as mentioned previously in this section.

7.9 Wildland Fire Management

Applicability Statement

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

Program Overview/Current Management Practices

Currently the AFRL/RI has no wildland fire management program. Wildland fire management may apply to the VTA, STA, and NTA based on the presence of burnable acreage. All USAF installations with burnable acreage are required to have a current WFMP that directly supports the mission and is consistent with the installation INRMP (AFMAN 32-7003 3.80.1). Development of a WFMP for AFRL/RI is necessary to remain in compliance. Similarly, the AFRL/RI is required to maintain or restore natural ecological disturbance processes such as fire where practical and consistent with the military mission, further reason to develop wildland fire management program and WFMP.

The AFRL/RI is in a low fire risk and fire severity area. No wildfires have occurred during the AF's tenure. Pre-settlement fire frequency in this region of New York is estimated to be approximately 13–100 years (Frost 1998), but current forest conditions likely differ from those of pre-settlement forests. Current estimates of fire return intervals for Great Lakes-region forests typically are longer, upwards of 100 years (Fryer and Luensmann 2012); however, the risk of wildfire should not be minimized. New York does have evidence of intense wildfires occurring on occasion due to fire-conducive weather. Some examples are the burns of 1903 and 1908, in which wildfires were widespread and extensive in upstate New York, or the nationwide increase, including in New York, in burned acreage in 2015 and 2016 (NYDEC 2018a, 2018b). One recent study also shows that wildfires are quite common in New York State, although they are contained quickly and therefore small in size (Smith 2020).

Wildfire poses a risk to the mission and natural resources onsite. It may damage mission-essential infrastructure and equipment or delay testing of equipment onsite due to smoke obstruction and personnel safety hazards. Wildfire may also remove profitable timber from forests onsite or significantly alter the range testing environment by removing tree cover. The AFRL/RI may be at higher risk of elevated fire intensity due to high fuel loads from lack of forest management and fuels reductions. Dead and dying timber caused by the EAB also has added to fuel loads. Higher fuel loads increase risk of successful ignition and quick spread. The AFRL/RI may be vulnerable to damages incurred on other properties from fires that originate from AF land. In general, the implementation of a wildland fire program and the creation of defensible space, along with the reduction and mastication of fuels, will minimize risk to existing structures and equipment.

In addition to reduced risk to the mission, prescribed burning has multiple land management benefits. Well-planned prescribed fire minimizes vigor and spread of invasive or undesirable species, pests and diseases; improves habitat for special status species; returns essential nutrients to soil and makes them available for uptake by other plants; promotes native plant growth and vigor; increases wildflower diversity and pollinator habitat; and provides habitat for grassland nesting birds (TNC 2018, NRCS 2020, USFS n.d.). Grasslands benefit from prescribed fire, as low-severity burning can increase plant nutrient availability and maintain grass and wildflower diversity (Neary et al. 1999, Santín and Doerr 2016, TNC 2018). Shrublands in New York are maintained by periodic disturbance such as wildland or prescribed fire (Wagner et al. 2003, CCE 2012) and often exhibit increased vigor from fire. Low-severity annual fires have been shown to have beneficial long-term impacts (Scharenbroch et al. 2012).

Specific discussion of ARFL/RI GSUs and the applicability of wildland fire management is below.

Verona Test Annex

Prescribed fire may serve a useful role at the VTA, by managing and minimizing understory fuel loads in forests, and therefore minimizing fire risk. Fire in combination with herbicide may eliminate common reed and other invasive species, such as Morrow's honeysuckle, from the installation (NRCS n.d.).

Stockbridge Test Annex

Prescribed fire may serve a particularly useful role at the STA. Existing cleared areas, or forested areas cleared for open range testing, may be maintained using prescribed fire every several years. Implementing fire on a semi-frequent basis would reduce the need for forestry operations, may cost less than mechanical treatment, and provides ecological benefits. Establishing and maintaining grasslands would support grassland-dependent and pollinator species such as bobolinks and monarch butterflies. Using prescribed fire to maintain shrublands would also provide habitat for shrubland birds and early successional forest species such as the ruffed grouse. Periodic, repeated use of prescribed fire will effectively control invasive species at the STA such as Morrow's honeysuckle (MDOC 2022).

Newport Test Annexes

Wildfire may present a risk for the NTA. Fuels onsite are composed of approximately equivalent amounts of grassland and forests. Grassland fires do not pose a significant risk to the mission and natural resources onsite. These fires are typically lower in intensity but can be complex. They spread quickly due to fine fuel texture and continuous fuel, respond quickly to weather changes, and may behave unpredictably. Fires might threaten mission-essential infrastructure and may delay testing due to smoke obstruction or personnel safety hazards. However, forests may pose a risk to mission infrastructure onsite. NTA forests are unmanaged and represent high accumulations of fuels. High fuel loads increase the risk for severe fires, and likely create more continuous fuels for fire to carry. Steep terrain, found in the newly acquired parcel, tends to increase wildfire speed and severity. The newly acquired forested parcel represents a significant risk due to accumulated fuel loads, steep terrain, and proximity to mission infrastructure.

Prescribed fire at the NTA would serve multiple benefits. Prescribed burning in grasslands helps reduce accumulating thatch, which often serves as dry tinder for ignition events, therefore reducing fuels and fire risk. Annual haying of fields extracts significant nutrients and may lead to chronically and severely nutrient-depleted soils, resulting in an unhealthy system (Rutgers 2018). Grasslands onsite may benefit from prescribed fire instead, as low-severity burning can increase plant nutrient availability more effectively than mowing, and also improve wildflower diversity (Neary et al. 1999, Santín and Doerr 2016, TNC 2018). Low-severity annual fires have been found to have beneficial long-term impacts (Scharenbroch et al. 2012). Increased plant and wildflower diversity, including *Asclepias* species, the genus required by monarch butterfly larvae, may lead to lower regulatory burden and increased health of systems onsite.

7.9.1 Climate Impacts on Wildland Fire Management

CEMML developed wildfire behavior projections based on climate change models to assess the impacts of climate on wildland fire management at AFRL/RI. The projections indicate a fire environment that is less fire-prone than current conditions, and not conducive to fires of any significance except under the most extreme fire weather conditions. The observed results were reasonably consistent across climate scenarios and timeframes, lending confidence to the results, which largely indicate decreases in wildfire potential. However, as noted in Section 7.9 extended periods of fire conducive weather may occur in New York and occasionally have caused intense fire activity in the state. It should be noted the relationship between weather and fire behavior is non-linear and marginal increases in fire-conducive weather may produce significant increases in fire behavior. Wildfire is always a possibility, though, and reduction of fuels and creation of defensible space are prudent measures to minimize potential risks.

Given the mission of AFRL/RI, which does not include fire-prone activities such as live-fire training, and the environment of New York State, which is not conducive to wildfire activity, there is currently little reason for concern regarding wildfire potential. Beyond the implementation of a wildland fire program, conducting ecological prescribed fires, and ensuring a wildland fire response availability, intensive

wildland fire management is not generally necessary at AFRL/RI due to the nature of the mission, fuels, and weather conditions.

If a WFMP is developed, the AFRL/RI is required to consider the effects of climate change on any wildland fire management it conducts per AFMAN 32-7003 3.80.3.25.

7.10 Agricultural Outleasing

Applicability Statement

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

The AFRL/RI may lease lands in the future. The VTA, STA, and NTA all have lands receptive to agricultural leasing. Outleasing will focus on low ground cover crops such and beans or hay that do not interfere with the mission. Outleasing will maintain these lands as well, removing them from grounds maintenance requirements. This section will be further developed if outleasing occurs.

7.11 Integrated Pest Management Program

Applicability Statement

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

Program Overview/Current Management Practices

Currently, the installation has no formal Integrated Pest Management Program. Development of an Integrated Pest Management Program is warranted per DoDI 4150.07 2.10.Q. This program may include management of nuisance wildlife species, noxious weeds, and invasive species, but must be mutually supportive and not in conflict with the INRMP (AFMAN 32-7003 3.58.4). Natural resource management will be supportive of the pest management program by seeking to maintain and enhance native landscapes free of pests or invasive species.

7.12 Bird/Wildlife Aircraft Strike Hazard (BASH)

Applicability Statement

This section applies to USAF installations that maintain a BASH program to prevent and reduce wildlife-related hazards to aircraft operations. This section **IS NOT** applicable to this installation.

Program Overview/Current Management Practices

If birds or wildlife interfere with or becomes more of a hazard to missions in the future, an investigation into the development of a BASH program may be warranted.

7.13 Coastal Zone and Marine Resources Management

Applicability Statement

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

7.14 Cultural Resources Protection

Applicability Statement

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

Program Overview/Current Management Practices

Natural resource management is required to be mutually supportive and not in conflict with cultural resources management at the AFRL/RI, per AFMAN 32-7003 3.12.3. No active management for cultural resources occurs at RRS, VTA, STA, NTA1, or NTA2, although the AFRL/RI conducts resource surveys to assess the impacts and limit conflicts with planned development projects, other installation plans, and mission activities. Following is a brief description of the cultural resources present and their determined sensitivities. More detailed cultural resources information can be found in the AFRL/RI ICRMP, anticipated to be signed 2023.

In addition to a variety of Cold War-era structures, other artifacts may be present on the RRS or GSUs, and assessments on each have been completed. While most or all of the RRS is found on Oneida Indian Nation ancestral lands, it was determined in 2011 that additional archeological resources are not likely to be found on the installation, due to the high level of development that has occurred since the establishment of Griffiss AFB (Cinquino et al. 1995). Condition assessments of the VTA have identified four 19th century farms within the GSU, with two more adjacent to the boundary. It was determined that there is a relatively high chance of discovering additional sites and artifacts in future surveys, and that remaining cultural resources have a low sensitivity to future development, because the surrounding environment consists mainly of wetlands (Pierce 1998a). Assessments of the STA found that it also has a high chance of containing undiscovered resources, due to the discovery of at least one 19th century farm on the property. Sensitivity assessments determined that various locations on the base have varying sensitivities, and further investigations will be needed (Pierce 1998b). Assessments of the NTA GSUs found that there is a relatively low potential for finding new artifacts and sites due to the high level of disturbance resulting from mission activities (Bamberger 1998). However, the newly acquired parcel abutting NTA2 may contain cultural resources that could be damaged by mission activities. Further cultural resource surveys may be warranted to identify and protect cultural resources. Currently, further guidance from the National Park Service is needed to assess if the identified cultural resources are eligible for protection under the National Historic Preservation Act.

7.15 Public Outreach

Applicability Statement

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

Program Overview/Current Management Practices

The AFRL/RI RRS and GSUs covered under this INRMP are not open to the public, so outreach efforts primarily consist of conferences and events that host public and private organizations in the research and development field to learn about the AFRL/RI mission and collaborate on future projects. These meetings and events are offered in both in-person and virtual formats, and often feature key speakers in the field. Information on these events and registration is provided on the AFRL website at

https://afresearchlab.com/events/. Any public outreach events are coordinated with the Public Affairs office per AFMAN 32-7003 3.72.

Questions from the public are directed to the AFRL/RI, Rome, NY office at (947) 257-3252.

7.16 Climate Change Vulnerabilities

Applicability Statement

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

Program Overview/Current Management Practices

Climate vulnerability in this case refers to the degree to which an installation and its natural resources are susceptible to the impacts of climate change. Under this definition, installations and their natural resources that are more vulnerable will experience greater harm, while those less vulnerable will be less affected or even benefit from changes. Mission-related vulnerabilities were assessed based on both literature review and spatial and temporal overlap between projected exposures, associated secondary effects, and mission requirements. This section will primarily cover natural resource-related impacts, with particular attention to impacts to operations and any potential future impacts from mission expansion. The AFRL/RI may be susceptible to the following climate-related issues:

- Significant increases in average annual, maximum, and minimum temperatures, as well as days over 90 °F.
- Decreased water quality.
- Changes to vegetation, including the expansion of invasive species and pests.
- Threats to native wildlife populations.
- Increased regulatory burden related to climate-driven impacts to sensitive, protected species.
- Potential loss of future training areas that may be needed in light of a changing geopolitical landscape and base realignment.
- Increased dust generation affecting equipment and visibility (DoD 2014).

Increased frequency of extreme temperatures could impact maintenance requirements for infrastructure (e.g., cooling buildings and electrical equipment, repairing heat and weather damage to roads), strain electrical supply, and increase drought potential. High temperatures may also disrupt global supply chains and increase acquisition costs for equipment and infrastructure (Pinson et al. 2020).

Indirect impacts of warmer temperatures could occur on AFRL/RI due to the degradation of natural resources. Warmer temperatures are likely to create additional stress on ecosystems and may reduce habitat quality in most of the installations' ecosystems through increased prevalence of invasive species. Most vegetation groups at the property are expected to be moderately vulnerable under all projected climate change scenarios. The anticipated reduction in habitat quality could result in a potentially increased regulatory environment, requiring more resources for management and monitoring. The vulnerability of these ecosystems on the installation will depend largely upon the balance between rising temperatures and projected summer precipitation changes. Furthermore, warmer temperatures may indirectly increase the prevalence of mosquito and tick-borne pathogens on the installation, potentially posing health risks for both wildlife and personnel.

Climate change is widely associated with increasing occurrence of extreme weather events. Events of larger magnitudes and intensities may occur more frequently under a changing climate (Trenberth 2011), damaging infrastructure and increasing the risk of severe erosion. In addition, anticipated high winds cause damage to infrastructure, and necessitate additional equipment maintenance (Sydeman et al. 2014). Specific to the AFRL/RI, damage or disruption to equipment and ranges may occur at the VTA, STA, and NTA. This was evidenced in 2021, when the AFRL/RI received extreme precipitation amounts which caused flooding and raised water tables.

Drought may increasingly impact the AFRL/RI, although projected changes in temperature and precipitation make it difficult to anticipate trends for drought in the region. Drought can negatively impact military installations in numerous ways. Effects include heightened physiological stress in plants and animals, leading to increased susceptibility to pests and pathogens and increased risk of vegetation mortality and die-off events (Stein et al. 2019). Specific to military readiness, droughts can damage military infrastructure, exacerbate heat-related illnesses, increase energy consumption to provide additional cooling for facilities, and lead to cracks in the soil that can rupture utility lines and road surfaces (U.S. DoD 2019, Pinson et al. 2020).

Climate change can also impact military operations by altering how the DoD and its installations maintain readiness and provide support. Extreme weather events and droughts in regions already prone to flooding and restricted water supplies can create instability, requiring additional military resources. Although AFRL/RI does not have mission training activities, if these types of operations were to be resumed, they could be impacted by flooding events or continued establishment and encroachment of wetlands, particularly at VTA, where this is already occurring. Fire may also impact mission activities at the AFRL/RI. Due to the historical absence of fire at the installation and lack of live-fire training on the properties, wildfires originating from within the installation are still unlikely given climate change projections. Slight projected increases in fire behavior at the AFRL/RI and nearby regions may increase the probability that fires will cross installation boundaries onto AFRL/RI property (Stein et al. 2019).

Regardless of the AFRL/RI's vulnerabilities to climate change, the use of resources and time will be required to successfully adapt to a changing climate. Adaptation will require that the installation assess current operations and procedures to identify gaps that may increase vulnerability to changes in climate and its secondary effects. Once these gaps are identified, considerations will need to be integrated across all organizational levels to manage associated risks. Mitigation and adaptation will also require collaboration with internal and external stakeholders to ensure the installation's mission is not compromised (U.S. DoD 2014a). Several resources are available to guide adaptation within the DoD (Naval Facilities Engineering Command 2017; Stein et al. 2019; Pinson et al. 2020, 2021).

7.17 Geographic Information Systems (GIS)

Applicability Statement

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

Program Overview/Current Management Practices

The AF Environmental GIS Program's mission is to collect, develop, and maintain spatial data included in the Functional Data Sets (FDS) supporting the environmental programs. FDS spatial data will be standardized to the Spatial Data Standards for Facilities, Infrastructure and Environment (SDSFIE) 3.1 Air

Force Adaptation as developed IAW AFCEC SMEs and as approved by Defense Installation Spatial Data Infrastructure as the standard for environmental spatial data.

By using GIS, a computer system that enables users to capture, develop, and maintain geographical features that can be associated with tabular data, GIS analysts can help standardize the 69 data layers for the bases supported by their respective Installation Support Section. GIS analysts can also assist with GIS support requested directly by environmental programs within their respective Installation Support Section. AFRL/RI is currently developing a program with the implementation of this INRMP and in accordance with guidance provided by AFI 32-1015, AFI 32-10112, and AFMAN 32-7003.

8.0 MANAGEMENT GOALS AND OBJECTIVES

The installation establishes long-term, expansive goals and supporting objectives to manage and protect natural resources while supporting the military mission. Goals express a vision for a desired condition for the installation's natural resources and are the primary focal points for INRMP implementation. Objectives indicate a management initiative or strategy for specific long or medium range outcomes and are supported by projects. Projects are specific actions that can be accomplished within a single year. Also, in cases where off-installation land uses may jeopardize USAF missions, this section may list specific goals and objectives aimed at eliminating, reducing, or mitigating the effects of encroachment on military missions. These natural resources management goals for the future have been formulated by INRMP preparers from an assessment of the natural resources, current condition of those resources, mission requirements, and management issues previously identified. Below are the integrated goals for the entire natural resources program.

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

Installation Supplement—Management Goals and Objectives

GOAL 1 MAINTAIN A DYNAMIC NATURAL RESOURCES PROGRAM THROUGH EFFECTIVE DATA MANAGEMENT, COORDINATION, AND TRAINING.

Objective 1.1 Ensure all spatial data related to natural resources on the installation are up-to-date and accessible to program staff.

Project 1.1.1 Create GIS databases for natural resources found on the installation and ensure their compliance with SDSFIE.

Project 1.1.2 Routinely update GIS maps and databases for all species observations, wetlands surveys, and other relevant natural resources information and management activities, and ensure all GIS data are available for management and planning purposes.

Objective 1.2 Coordinate with and develop relationships with other groups that may contribute data, expertise, or collaborative advantages to Natural Resources Management.

Project 1.2.1 Annually review federal and state lists of special status species maintained by USFWS, NYDEC, and New York Natural Heritage Program to determine if surveys are warranted for newly-listed species that could occur on the installation.

Project 1.2.2 Establish and maintain USFWS and NYDEC contacts and coordinate with these agencies annually to ensure strong working relationships and regulatory compliance, and to promote a stable regulatory environment.

Project 1.2.3 If federally endangered or threatened species are found on the installation, engage in ESA Section 7 consultations with the USFWS for recovery of threatened and endangered species on AFRL/RI.

Project 1.2.4 Ensure development plans on the installation consider special status species known to occur on the installation and their associated habitats by maintaining communication with project planning personnel.

Project 1.2.5 Contribute species survey and occurrence data to federal, and other installation-approved, scientific databases including the AKN and NABat

Objective 1.3 Develop and maintain a compliant INRMP and a well-trained, engaged, and equipped natural resource staff

Project 1.3.1 Annually review eDASH for training opportunities.

Project 1.3.2 Provide time for staff to engage in relevant training on an annual basis.

Project 1.3.3 Develop and coordinate initial Sikes Act-compliant INRMP.

Project 1.3.4 Develop an Environmental Assessment for the implementation of INRMP.

Project 1.3.5 Purchase, maintain, and update equipment as necessary for INRMP implementation, including drones, ATVs, GIS software and licensing, monitors, wildlife cameras, beaver deceiver equipment, wetland/swamp pads, waders, personal protective equipment, batteries, signage, and other miscellaneous equipment.

GOAL 2 CONDUCT INVENTORIES AND ASSESSMENTS OF NATIVE SPECIES AND USE THAT INFORMATION TO APPLY AN ECOSYSTEM MANAGEMENT APPROACH TO MANAGING HABITATS AS WELL AS SUPPORTING MISSION NEEDS ACROSS THE INSTALLATION.

Objective 2.1 Conduct surveys of RRS and GSUs for state and federally listed species every five years or as specified, and reassess survey needs based on new listing decisions.

Project 2.1.1 By 2024 and every five years thereafter, assess the current state of unimproved lands, and survey for rare plants and significant natural communities. If any such species or communities are detected, develop management and monitoring strategies in collaboration with the appropriate state or federal agency.

Project 2.1.2 After initial rare plant and habitat surveys have been conducted, update the INRMP tables for those species that could occur on the installation based on habitat, instead of including all species for the county.

Project 2.1.3 Based on the rare plant and habitat surveys, conduct targeted surveys for special status species most likely to occur on the installation based on habitat, life history, and range information.

Project 2.1.4 Survey for bat species on properties and around buildings to be demolished to reduce potential impacts.

Project 2.1.5 Deploy acoustic monitoring devices on the VTA and STA in areas identified as adequate bat roosting habitat. Target the northern long-eared bat, tri-colored bat, little brown bat, and Indiana bat in the surveys. Utilize northern long-eared bat acoustic monitoring guidelines published by USFWS.

Project 2.1.6 Using acoustic monitoring devices, conduct bat surveys around buildings designated to be demolished on the VTA and NTA. If bat species are detected, ensure the absence of individuals and/or maternity colonies before building demolishment. Utilize northern long-eared bat acoustic monitoring guidelines published by USFWS.

Objective 2.2 Reduce impacts to habitats and natural communities from nuisance animals.

Project 2.2.1 Develop a partnership with the Oneida Nation to address aquatic rodent problems.

Project 2.2.2 Cooperatively develop an aquatic rodent (beaver, muskrat) control plan to reduce adverse impacts to habitats and natural communities.

Objective 2.3 Monitor and manage for avian species found within forested tracts on the installation.

Project 2.3.1 Conduct annual avian point count monitoring during the breeding season on all contiguous forested tracts of 300 or more acres.

Project 2.3.2 Using the data from the avian point count monitoring, prepare a summary report of the data and incorporate results into recommendations for future management.

Objective 2.4 Conduct general biological surveys to provide data for use in developing appropriate natural resource management actions.

Project 2.4.1 By 2024, conduct general biological surveys on VTA, STA, and NTA.

Project 2.4.2 Update the INRMP as needed based on the results of the general biological surveys.

Project 2.4.3 By 2025, conduct a baseline invertebrate survey across all habitats at RRS and GSUs to determine presence of protected species, and map habitat of detected species.

Project 2.4.4 Develop invertebrate management projects based on the results of Project 2.4.3.

Objective 2.5 Improve understanding of pollinators and their habitats on the installation and coordinate with other groups on the installation to sustain their populations in the long-term.

Project 2.5.1 Design and conduct initial surveys for pollinators of conservation concern likely to occur on the installation.

Project 2.5.2 Review the IPMP to evaluate if the plan includes sufficient considerations in accordance with the USAF Pollinator Conservation Reference Guide (USFWS 2017).

Project 2.5.3 Develop a list of recommended native flowering plants that offer nectar, pollen, and/or nesting resources for native pollinators and provide as a landscaping reference for Grounds Maintenance.

GOAL 3 SUSTAIN HEALTHY VEGETATION COMMUNITIES BY USING APPROPRIATE MANAGEMENT TECHNIQUES AND ADDRESSING INVASIVE SPECIES ISSUES.

Objective 3.1 Develop and maintain an invasive plant and insect species monitoring and management program to balance the needs for healthy native vegetation and attractive grounds and manage for dynamic invasive species challenges.

Project 3.1.1 By 2023, conduct an invasive plant survey of RRS and GSUs and develop a management plan for any detected species that includes a prioritization of species, a variety of chemical and non-chemical control methods, monitoring protocols, and recommendations for resurvey intervals to ensure early detection of any new infestations.

Project 3.1.2 Plan and budget for annual in-house or contract invasive species removal efforts focusing on common reed in wetlands and other high-priority species as identified in Project 3.1.1.

Project 3.1.3 Evaluate current grounds maintenance practices such as mowing interval and timing, integrated pest management (IPM) protocols, and landscaping species lists for opportunities to reduce spread of invasive species or benefit native species.

Project 3.1.4 By 2024, conduct an invasive insect survey, particularly focusing on the spotted lanternfly (*Lycorma delicatula*), to include mapping of habitat and host species.

Project 3.1.5 By 2024, develop an invasive insect species management plan containing control strategies and early detection protocols.

Objective 3.2 Manage the forest to support woodland-dependent flora and fauna, and to produce economically viable forest products.

Project 3.2.1 Develop forest management plan by 2024 for the VTA and STA, to include forest resource inventory, description of forest stands, and recommended harvest schedule based on economic value, existing pests and disease, and hazard trees.

Project 3.2.2 Maintain Norway spruce stand at the STA to support valuable winter cover habitat and forage for numerous species.

Project 3.2.3 Investigate the possibility of developing and implementing a sugar maple harvesting program for the STA.

Project 3.2.4 Develop sugar maple management plan for the STA, including long-term sugar maple management objectives and production plan.

Objective 3.3 Manage the forest to maintain desired range testing environments, equipment buffer radii and safety of site personnel.

Project 3.3.1 Identify and remove problematic timber stands obstructing testing ranges at the STA.

Project 3.3.2 Remove hazard trees at any time at all sites.

Objective 3.4 Manage grassland and shrubland habitats to support species dependent on these community types.

Project 3.4.1 Maintain areas cleared at the STA under Project 3.3.1 as grasslands or shrublands using prescribed fire or mowing in coordination with the WFMP, if developed.

Objective 3.5 Use integrated wildland fire management to reduce risk to AF personnel and property and to maintain and improve fire-receptive natural communities onsite.

Project 3.5.1 Investigate development of wildland fire program utilizing active fire management on the installation in coordination with Joint Base McGuire-Dix-Lakehurst Wildfire Support Module.

Project 3.5.2 If the investigation determines there are GSUs with burnable acreage, develop a WFMP to ensure compliance with AFMAN32-7003 3.80.

Project 3.5.3 Minimize wildfire risk to natural resources, existing structures, and neighboring properties, by implementing mechanical management as needed to reduce fuel loads and create defensible space, by 2026.

Project 3.5.4 Burn pre-identified areas on the VTA and STA to maintain community assemblage and to reduce fuel loads.

Project 3.5.5 Evaluate the use of prescribed fire instead of haying as a management technique at NTA to improve the replenishment of nutrients to the soil.

GOAL 4 MANAGE AFRL/RI WETLANDS AND OTHER WATER RESOURCES TO PROTECT AREAS WITH SENSITIVE SPECIES, REDUCE LOSSES OF ERODIBLE SOILS, AND IMPROVE DOWNSTREAM WATER QUALITY WHILE MEETING MISSION DEVELOPMENT NEEDS.

Objective 4.1 Survey wetland resources to update existing data and identify areas in need of protection or further management.

Project 4.1.1 Conduct surveys of VTA to update past wetland survey results and determine if continued inundation and lapses in ditch maintenance have contributed to substantial changes in area of wetlands that would affect management and/or development needs.

Project 4.1.2 Conduct wetland surveys of NTA1, NTA2, and STA to update existing information for planning purposes.

Objective 4.2 Cultivate relationships with adjacent landowners and agencies to better manage adjoining wetland and riparian resources.

Project 4.2.1 Consult with USACE staff regarding changes to hydrological and potentially jurisdictional wetland resources at VTA over time and what additional resource protections may be needed to meet site management goals.

Project 4.2.2 Collaboratively determine and document how adjoining land use and natural and human-influenced change (e.g., wetlands management/modification/banking, beaver activity, climate change) to the VTA Brandy Brook drainage area affect desired current and future management activities through meetings with adjacent landowners, data sharing, and external research/funding opportunities.

Project 4.2.3 Use collaboration and consultation outcomes to inform management decisions to protect and enhance wetland and riparian resources on a scale beyond legal protections for individual development projects.

Objective 4.3 Protect soils from erosion to prevent damage to installation property and contribution of sediment and other pollutants to receiving waters.

Project 4.3.1 Survey erosion concerns across the AFRL/RI, focusing efforts on reported erosion issues at NTA.

Project 4.3.2 Assess and revegetate eroded areas using native seed mixes appropriate to the area.

Project 4.3.3 Monitor revegetated areas for invasive weed encroachment, treating as needed to help establish native species and prevent future erosion at the site.

9.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

9.1 Natural Resources Management Staffing and Implementation

Responsibility for implementation of an INRMP may involve several installation organizations. Each responsible organization and their associated planning, programming, budgeting, and execution programs implement the INRMP.

- AFRL/RIOCV is responsible for development, updates, signatures, and ensuring compliant status of the INRMP.
- AFRL/RIOCV has the primary responsibility for execution and management of the INRMP and is the Office of Primary Responsibility (OPR) for management, coordination, and negotiation of all USFWS- and NYDEC-related permitting, agreements, studies, surveys, and associated mitigation actions for base projects and management activities.
- Other offices also have direct responsibility for execution of many programs, including ground maintenance and others.
- Natural resources management is managed directly by a GS 401-11 NRM/CRM program manager holding a degree in the natural sciences per AFMAN 32-7003 Section 3.11 INRMP Implementation.
- Funding, execution, and implementation of INRMP projects where OPR is identified as CEIEC (Section 10, Annual Work Plans) occurs through contracts and cooperative agreements funded by the EQ Operations & Maintenance (O&M) annual AF budget managed by AFCEC/CZOW.
- In accordance with Section 10l(d)(2) of the Sikes Act, when acquiring services to implement and enforce an INRMP, priority shall be given to Federal and State agencies that are responsible for conserving or managing the fish and wildlife resources covered by the INRMP, provided those agencies are interested in and capable of providing the services. If no federal or state agency responsible for conserving or managing the fish and wildlife resources expresses an interest in providing the needed implementation or enforcement service or meets evaluation criteria, the work may be awarded using the competitive selection procedures outlined in Federal Acquisition Regulations or DoD Grants and Agreements Regulations, as appropriate

9.2 Monitoring INRMP Implementation

Monitoring, coordination with regulators, recordkeeping, INRMP updates and annual reviews, and implementation are the primary responsibility of the AFRL/RIOCV office. The NRM should evaluate progress for the various natural resource activities and consider future direction as needed throughout the year, but the implementation of the INRMP is mainly monitored through the annual review of objectives and projects and annual work plans. 32 CFR 989.3(e)(7) provides procedures for the INRMP to be in compliance with the NEPA and the EIAP. The development of the INRMP falls under NEPA categorical exclusion 2.3.5, which covers the preparation of plans/permits in which no action would be taken. The EIAP will be programmed and completed prior to the implementation of the actions proposed in this INRMP.

The AFRL/RIOCV Program Managers are SMEs that implement various portions of the INRMP individually and collaboratively. Programs include NEPA, Air Quality, Storm Water Monitoring, Cultural Resources Management, Hazardous Waste Management, Wastewater Management, and Tank Management. To establish proficiency, maintain currency, and support program elements, training is required. The trainings below would benefit natural resources staff.

- ArcGIS Training—Program managers would all be able to enter and manage spatial data and create maps for their respective programs. Due to staffing limitations, no dedicated GIS analyst is assigned to support AFRL/RIOCV. Maintaining a comprehensive, up-to-date natural resources GIS geodatabase is crucial to the planning and implementation of natural resource management projects. AFRL/RIOCV will coordinate with the GeoBase office to establish a point of contact (POC) or procedure for help with natural resource spatial data.
- AFIT WENV 450 Environmental Impact Analysis Process (EIAP) Course—The objective of this course is for each student to comprehend the AF Environmental Impact Analysis Process and its procedures for determining, documenting, and disclosing the environmental impacts for proposed AF actions.
- DoD Natural Resources Compliance—As required by AFMAN 32-7003, Section 3.76, *Natural Resources Training*, all individuals assisting with natural resources management will complete *DoD Natural Resources Compliance*, endorsed by the DoD Interservice Environmental Education Review Board and offered for all DoD Components by the Naval School, CECOS. See http://www.netc.navy.mil/centers/csfe/cecos/ for CECOS course schedules and registration information.

9.3 Annual INRMP Review and Update Requirements

A formal review of the INRMP for operation and effect should be conducted not less than every five years to ensure it is being implemented pursuant to the Sikes Act. The INRMP also requires annual review, IAW DoDI 4715.03 and AFMAN 32-7003, to ensure the achievement of mission goals, verify the implementation of projects, and establish any necessary new management requirements. This process involves installation natural resources personnel and external agencies working in coordination to review the INRMP. The USFWS, NYDEC, and the NRM/Section conduct an Annual INRMP Review Meeting. This meeting takes place in person with respective representatives for each agency. Individuals may telephone or video call if they cannot attend in person. During this meeting, the NRM/Section updates the external stakeholders/parties with the end of the year execution report and coordinates future work plans and any necessary changes to management methods, etc. All parties review the INRMP and begin preliminary collaborative work on updating the INRMP (new policies, procedures, impacts, mitigations, etc.) as applicable.

If the installation mission or any of its natural resources management issues changes significantly after the creation of the original INRMP, a major revision to the INRMP is required. The need for a major revision is normally determined during the annual review with USFWS and NYDEC. The NRM/POC documents the findings of the annual review in an Annual INRMP Review Summary and obtains signatures from the coordinating agencies on review findings. By signing the Annual INRMP Review Summary, the collaborating agency representatives assert concurrence with the findings. If any agency declines to participate in an on-site annual review, the NRM submits the INRMP for review along with the Annual INRMP Review Summary document to the agency via official correspondence and requests return correspondence with comments/concurrence.

AFMAN 32-7003 Section 3.8, INRMP Annual Review and Coordination, states that the Annual INRMP Review Summary must include the following:

- The INRMP Annual Review Summary shall include a summary of specific INRMP accomplishments since the last INRMP annual review.
- The INRMP Annual Review Summary shall include an update of the Annual Work Plan for implementing the INRMP that includes the current year and at least four future fiscal years. The

Annual Work Plan must include all projects and activities identified as essential for the successful implementation of INRMP goals and objectives, and an implementation schedule that is realistic and practicable. The Annual Work Plan may include a consensus by the collaborating agencies on relative project priority for projects in the Annual Work Plan (e.g., High, Medium, or Low) based upon the significance of the project for attaining the INRMP goals and objectives.

- The INRMP Annual Review Summary must include a statement indicating the projects in the Annual Work Plan for which the collaborating agencies have expressed an interest in participating in project execution. As indicated in the Sikes Act (16 USC § 670a(d)(2)), priority shall be given to Federal and state agencies having responsibility for conservation and management of fish and wildlife for execution of implementation and enforcement of INRMPs. If the collaborating agencies do not express an interest in executing projects in the Annual Work Plan, then include the following statement in the Annual INRMP Review Summary: "The execution strategy for the Annual Work Plan has been discussed with the participating agencies, and the agency representatives have not expressed an interest in participating in project execution and agree that implementation will be performed through other authorized acquisition methods."
- The INRMP Annual Review Summary shall include a statement asserting whether sufficient numbers of qualified natural resources management and enforcement personnel and resources are available to oversee implementation of projects and activities identified in the INRMP Work Plan.
- The INRMP Annual Review Summary shall include a summary of any required updates to the INRMP determined necessary to keep the INRMP current in operation and effect for the management of installation natural resources; or alternatively, a statement that significant changes to the installation mission or natural resources goals require an INRMP revision.
- An INRMP Annual Review Summary may substitute for the more formal 5-year review for Sikes Act compliance, provided that the INRMP Annual Review Summary lists all updates made to the INRMP since the last review and the installation documents signatures by the installation commander (or designee) and the authorized signatory representatives of the USFWS and the state fish and wildlife agency.

10.0 ANNUAL WORK PLANS

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

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

2674 Annual Work Plans (Work Plans should extend out to current year plus four additional years), AFRL/RI

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
Plan Update	1	1.3	One Time	2022	AFCEC/CZO	AFCEC	High	INRP	Plan Initial, INRMP	1.3.3	Develop and coordinate initial Sikes Act-compliant INRMP
T & E Species, Species Mgt	2	2.1	One time	2023	AFCEC/CZN	AFCEC	High	T&E	Management, Species	2.1.1, 2.1.3	Survey for potentially occurring, state-listed plant species, and identify areas that could support these species currently or in the future
Plan	1	1.3	One Time	2023	AFCEC/CZN	AFCEC	High	INRP	Plan, EA	1.3.4	Environmental Assessment for implementation of INRMP
T & E Species, Species Mgt, Habitat Mgt	1	1.3	Annual	2024	AFRL/RIOCV	AFCEC	High	INRP	Equipment Purchase / Maintain, CN	ULDFA53246111 1.3.5	Equipment purchase — Drone, ATV, GIS, monitors, wildlife cameras, beaver deceiver equipment, wetland/swamp pads
Species Mgt, Habitat Mgt Nuisance Species, Mgt	2	2.2	Annual	2024	AFRL/RIOCV	AFCEC	High	INRP	Management, Nuisance Wildlife	ULDFA53246122 2.2.1	Nuisance wildlife management of beavers and muskrats at Verona GSU. Interagency agreement with USDA.
Species Mgt, Habitat Mgt	2	2.2	One Time	2024	AFRL/RIOCV	AFCEC	High	INRP	Management, Wetlands and Floodplains	ULDFA5324915 2.2.2	Ditch/culvert cleaning and beaver dam removal at Verona GSU, Early Fall
T & E Species, Species Mgt, Habitat Mgt	1	1.3	Annual	2024	AFRL/RIOCV	AFCEC	High	INRP	Supplies, CN	ULDFA5324619 1.3.5	Supplies to support natural resources program-Waders, Gear, PPE, Batteries, Trail Cameras, Signage
Habitat Mgt	3	3.2	One Time	2024	AFRL/RIOCV	AFCEC	High	INRP	Management, habitat - Forestry	ULDFA53246119 3.2.1	Forest inventory at Stockbridge and Verona.
Wildland Fire Mgt	3	3.5	One Time	2024	AFCEC/CZOF				Management Forestry	3.5.1, 3.5.2	Fire Management Plan
T & E Species, Species Mgt,	2	2.6	One time	2024	AFRL/RIOCV	AFCEC	Medium	T&E	Management, Species	ULDFA53247119 2.6.2, 2.6.4	Conduct initial survey for proposed ESA listing of monarch butterfly. Include report on future management recommendations and habitat protection/enhancement.
T & E Species, Species Mgt, Habitat Mgt	2	2.3	One time	2024	AFRL/RIOCV	AFCEC	High	T&E	Management, Species	ULDFA53247119 2.3.1	Conduct acoustic bat surveys in forest habitats on the RRS and GSUs to determine presence and location of northern long-eared bats, little brown bats, tricolored bats, and eastern small-footed bats.
T & E Species, Species Mgt, Habitat Mgt	2	2.4	One time	2024	AFRL/RIOCV	AFCEC	Medium	T&E	Management, Species	ULDFA53247119 2.4.1 (this project is for general biological surveys, there is not a project specific to turtles)	Conduct surveys to determine the presence and location of wood, eastern box, Blanding’s (at Verona), spotted, and bog turtles. If present, develop future projects for management.

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
Invasive Species Mgt	3	3.1	One time	2024	AFRL/RIOCV	AFCEC	Medium	INRP	Management, Invasive Species	ULDFA53246121 3.1.1, 3.1.2, 3.1.3	Survey AFRL/RI RRS and all GSUs for invasive plant species and determine control strategies for any infestations detected. Include quantification to baseline presence in order to evaluate eradication and control efforts in the future. Include report on treatment plans and follow-up restoration protocol, and monitoring plan for future evaluation.
Invasive Species Mgt	3	3.1	One time	2024	AFRL/RIOCV	AFCEC	Medium	INRP	Management, Invasive Species	ULDFA53246121 3.1.4, 3.1.5	Fully survey AFRL/RI RRS and its GSUs for all invasive insect species, particularly the spotted lantern fly (*Lycorma delicatula*), and map potential habitat and locations of host species. Include a report on develop control strategies and/or early-detection protocols.
Species Mgt, Habitat Mgt	2	2.2	Annual	2025	AFRL/RIOCV	AFCEC	High	INRP	Management, Nuisance Wildlife	ULDFA53256122 2.2.1	Continued nuisance wildlife management (trapping). Assuming this is for continued beaver trapping since it's on an annual occurrence interval.
T & E Species, Species Mgt,	2	2.5	One time	2025	AFRL/RIOCV	AFCEC	Low	T&E	Management, Species	ULDFA53257119 2.5.3, 2.5.4	Conduct baseline invertebrate surveys across all major vegetation types on the installation to determine whether any T&E or state-protected invertebrate species are present. If present, develop future projects for management.
T & E Species, Species Mgt,	2	2.1, 2.4, 2.5	Annual	2025	AFRL/RIOCV	AFCEC	High	T&E	Management, Species	ULDFA53257119 2.1.1, 2.4.2, 2.5.2	Develop and manage species identified in the surveys conducted in preceding years
Invasive Species Mgt	3	3.1	Annual	2025	AFRL/RIOCV	AFCEC	High	INRP	Management, Invasive Species	ULDFA53256121 3.1.2	Annual invasive species control and eradication
Species Mgt, Habitat Mgt	2	2.6	One-time	2025	AFRL/RIOCV	AFCEC	Low	INRP	Management, Habitat	ULDFA53256119 2.6.4	Establish initial pollinator flyways at AFRL properties. To be maintained in the future through volunteer efforts
Outreach	3	3.2	Annual	2025	AFRL/RIOCV	AFCEC	Low	MNRA	Outreach	ULDFA53258114 3.2.3	Public outreach and other public natural resources engagement and outreach supporting materials
Species, Mgt Nuisance Species, Mgt	2	2.2	Annual	2026	AFRL/RIOCV	AFCEC	High	INRP	Management, Nuisance Wildlife	ULDFA53266122 2.2.1	Continued Beaver Trapping
T & E Species, Species Mgt,	2	2.1, 2.4, 2.5	Annual	2026	AFRL/RIOCV	AFCEC	High	T&E	Management, Species	ULDFA53267119 2.1.1, 2.4.2, 2.5.2	Develop and manage species identified in the surveys conducted in preceding years
T & E Species, Species Mgt,	2	2.4	One time	2026	AFRL/RIOCV	AFCEC	Medium	T&E	Management, Species	ULDFA53267119 2.4.1	Conduct avian point-count surveys to determine the presence and location of Bobolink…etc. At GSUs.
Invasive Species Mgt	3	3.1	Annual	2026	AFRL/RIOCV	AFCEC	High	INRP	Management, Invasive Species	ULDFA53266121 3.1.2	Annual invasive species control and eradication
Outreach	3	3.2	Annual	2026	AFRL/RIOCV	AFCEC	Low	MNRA	Outreach	ULDFA53268114 3.2.3	Public outreach and other public natural resources engagement and outreach supporting materials
T & E Species, Species Mgt,	2	2.1, 2.4, 2.5	Annual	2027	AFRL/RIOCV	AFCEC	High	T&E	Management, Species	ULDFA53277119 2.1.1, 2.4.2, 2.5.2	Develop and manage species identified in the surveys conducted in preceding years
Invasive Species Mgt	3	3.1	Annual	2027	AFRL/RIOCV	AFCEC	High	INRP	Management, Invasive Species	ULDFA53276121 3.1.2	Annual invasive species control and eradication
Outreach	3	3.2	Annual	2027	AFRL/RIOCV	AFCEC	Low	MNRA	Outreach	ULDFA53278114 3.2.3	Public outreach and other public natural resources engagement and outreach supporting materials

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Funding Source	Priority Level	PB28 Code*	Standard Title*	Project Number	Description
Nuisance Species Mgt	2	2.2	Annual	2027	AFRL/RIOCV	AFCEC	Medium	INRP	Management, Nuisance Wildlife	ULDFA532761222.2.1	Continued Beaver management

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***Natural Resources Standard Titles by PB28 Code (excluding CZT/CZC titles):**

INRP	MMA	T&E	MNRA	WTLD
P&F, CN	Mgt, Species	Mgt, Habitat	Compliance Public Notification	Mgt, Wetlands / Floodplains
Interagency/Intraagency, Government, Sikes Act	Interagency/Intraagency, Government, Sikes Act	Mgt, Species	Plan Update, Other	Monitor Wetlands
Interagency/Intraagency, Government, Sikes Act, CLEO	Outsourced Environmental Services, CN	Mgt, Invasive Species	Recordkeeping, Other	Interagency/Intraagency, Government, Sikes Act
Outsourced Environmental Services, CN	Supplies, CN	Mgt, Nuisance Wildlife	Outreach	Outsourced Environmental Services, CN
Supplies, CN	Supplies, CN, CLEO	Interagency/Intraagency, Government, Sikes Act		
Supplies, CN, CLEO	Vehicle Leasing, CN	Interagency/Intraagency, Government, Sikes Act, CLEO		
Equipment Purchase / Maintain, CN		Outsourced Environmental Services, CN		
Vehicle Leasing, CN		Supplies, CN		
Vehicle Fuel & Maintenance, CN		Supplies, CN, CLEO		
Mgt, Wildland Fire		Equipment Purchase / Maintain, CN		
Plan Update, INRMP		Vehicle Leasing, CN		
Plan Update, Other		Vehicle Fuel & Maintenance, CN		
Mgt, Habitat		Plan Update, Other		
Mgt, Species		Environmental Services, CN		
Mgt, Invasive Species				
Mgt, Nuisance Wildlife				
Recordkeeping, Other				

Environmental Services, CN				

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11.0 REFERENCES

11.1 Standard References (Applicable to all USAF installations)

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

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12.0 ACRONYMS

12.1 Standard Acronyms (Applicable to all USAF installations)

- eDASH Acronym Library
- Natural Resources Playbook—Acronym Section
- U.S. EPA Terms & Acronyms

12.2 Installation Acronyms

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AFRL	Air Force Research Laboratory
ARFL/RI	Air Force Research Laboratory Information Directorate
CCSM4	Community Climate System Model
CECOS	Naval Civil Engineer Corps Officers School
CEMML	Center for Environmental Management of Military Lands
CFR	Code of Federal Regulations
DoD	Department of Defense
DoDI	Department of Defense Instruction
EIAP	Environmental Impact Analysis Process
EMP	Environmental Management Program
EMS	Environmental Management System
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FDS	Functional Data Sets
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HCCVI	Habitat Climate Change Vulnerability Index
ICRMP	Integrated Cultural Resource Management Plan
INRMP	Integrated Natural Resource Management Plan
IPCC	International Panel on Climate Change
IPMP	Integrated Pest Management Plan
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NLEB	Northern Long-Eared Bat
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NRM	Natural Resource Manager
NTA	Newport Test Annexes

- NTA1 Newport Test Annex Number 1, Tanner Hill
- NTA2 Newport Test Annex Number 2, Irish Hill
- NVC National Vegetation Classification
- NWI National Wetlands Inventory
- NYDEC New York Department of Environmental Conservation
- NYS New York State
- NYSM New York State Museum
- PFAS Per- and Polyfluoroalkyl Substances
- PFOA Perfluorooctanoic Acid
- PFOS Perfluorooctanesulfonic Acid
- RCP Representative Concentration Pathway
- RI Information Directorate
- RIOCV Environmental and Occupational Health Office
- RRS Rome Research Site
- SAIA Sikes Act Improvement Amendment
- SDSFIE Spatial Data Standards for Facilities, Infrastructure, and Environment
- SGCN Species of Greatest Conservation Need
- SME Subject Matter Expert
- STA Stockbridge Test Annex
- SUNY State University of New York
- T&E Threatened and Endangered
- USAF United States Air Force
- USC United States Code
- USDA United Stated Department of Agriculture
- USFWS United States Fish and Wildlife Service
- VTA Verona Test Annex
- WFMP Wildland Fire Management Plan
- WNS White-nose Syndrome

13.0 DEFINITIONS

13.1 Standard Definitions (Applicable to all USAF installations)

- Natural Resources Playbook—Definitions Section

13.2 Installation Definitions

There are no installation unique definitions.

14.0 APPENDICES

14.1 Standard Appendices

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

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

EO 12088, Federal Compliance with Pollution Control Standards	This EO delegates responsibility to the head of each executive agency for ensuring all necessary actions are taken for the prevention, control, and abatement of environmental pollution. This order gives the U.S. Environmental Protection Agency (EPA) authority to conduct reviews and inspections to monitor federal facility compliance with pollution control standards.
EO 12898, Environmental Justice	This EO requires certain federal agencies, including the DoD, to the greatest extent practicable permitted by law, to make environmental justice part of their missions by identifying and addressing disproportionately high and adverse health or environmental effects on minority and low-income populations.
EO 13112, Invasive Species	To prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.
EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds	The USFWS has the responsibility to administer, oversee, and enforce the conservation provisions of the Migratory Bird Treaty Act, which includes responsibility for population management (e.g., monitoring), habitat protection (e.g., acquisition, enhancement, and modification), international coordination, and regulations development and enforcement.
EO 14072, Strengthening the Nation's Forests, Communities, and Local Economies	This EO establishes policy to maintain, restore, and conserve the Nation's forests, to include old growth and mature forests, to limit international deforestation, and to combat climate change and enhance resilience.
United States Code (U.S.C.)	
Animal Damage Control Act (7 U.S.C. § 426-426b, 47 Stat. 1468)	Provides authority to the Secretary of Agriculture for investigation and control of mammalian predators, rodents, and birds. DoD installations may enter into cooperative agreements to conduct animal control projects.
Bald and Golden Eagle Protection Act of 1940, as amended; 16 U.S.C. 668-668c	This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Clean Air Act, (42 U.S.C. § 7401–7671q, July 14, 1955, as amended)	This Act, as amended, is known as the Clean Air Act of 1970. The amendments made in 1970 established the core of the clean air program. The primary objective is to establish Federal standards for air pollutants. It is designed to improve air quality in areas of the country that do not meet federal standards and to prevent significant deterioration in areas where air quality exceeds those standards.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (Superfund) (26 U.S.C. § 4611–4682, P.L. 96-510, 94 Stat. 2797), as amended	Authorizes and administers a program to assess damage, respond to releases of hazardous substances, fund cleanup, establish clean-up standards, assign liability, and other efforts to address environmental contaminants. Installation Restoration Program guides cleanups at DoD installations.

Endangered Species Act (ESA) of 1973, as amended; P.L. 93-205, 16 U.S.C. § 1531 et seq.	Protects threatened, endangered, and candidate species of fish, wildlife, and plants and their designated critical habitats. Under this law, no federal action is allowed to jeopardize the continued existence of an endangered or threatened species. The ESA requires consultation with the USFWS and the NOAA Fisheries (National Marine Fisheries Service) and the preparation of a biological evaluation or a biological assessment may be required when such species are present in an area affected by government activities.
Federal Aid in Wildlife Restoration Act of 1937 (16 U.S.C. § 669–669i; 50 Stat. 917) (Pittman-Robertson Act)	Provides federal aid to states and territories for management and restoration of wildlife. Fund derives from sports tax on arms and ammunition. Projects include acquisition of wildlife habitat, wildlife research surveys, development of access facilities, and hunter education.
Federal Environmental Pesticide Act of 1972	Requires installations to ensure pesticides are used only in accordance with their label registrations and restricted-use pesticides are applied only by certified applicators.
Federal Land Use Policy and Management Act, 43 U.S.C. § 1701–1782	Requires management of Bureau of Land Management lands to protect the quality of scientific, scenic, historical, ecological, environmental, and archeological resources and values; as well as to preserve and protect certain lands in their natural condition for fish and wildlife habitat. This Act also requires consideration of commodity production such as timbering.
Federal Noxious Weed Act of 1974, 7 U.S.C. § 2801–2814	The Act provides for the control and management of non-indigenous weeds that injure or have the potential to injure the interests of agriculture and commerce, wildlife resources, or the public health.
Federal Water Pollution Control Act (Clean Water Act [CWA]), 33 U.S.C. §1251–1387	The CWA is a comprehensive statute aimed at restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Primary authority for the implementation and enforcement rests with the U.S. EPA.
Fish and Wildlife Conservation Act (16 U.S.C. § 2901–2911; 94 Stat. 1322, PL 96-366)	Installations encouraged to use their authority to conserve and promote conservation of nongame fish and wildlife in their habitats.
Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	Directs installations to consult with the USFWS, or state or territorial agencies to ascertain means to protect fish and wildlife resources related to actions resulting in the control or structural modification of any natural stream or body of water. Includes provisions for mitigation and reporting.
Lacey Act of 1900 (16 U.S.C. § 701, 702, 32 Stat. 187, 32 Stat. 285)	Prohibits the importation of wild animals or birds or parts thereof, taken, possessed, or exported in violation of the laws of the country or territory of origin. Provides enforcement and penalties for violation of wildlife related Acts or regulations.
Leases: Non-excess Property of Military Departments, 10 U.S.C. § 2667, as amended	Authorizes DoD to lease to commercial enterprises federal land not currently needed for public use. Covers agricultural outleasing program.
Migratory Bird Treaty Act 16 U.S.C. § 703–712	The Act implements various treaties for the protection of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful without a valid permit.

National Environmental Policy Act of 1969 (NEPA), as amended; P.L. 91-190, 42 U.S.C. § 4321 et seq.	Requires federal agencies to utilize a systematic approach when assessing environmental impacts of government activities. Establishes the use of environmental impact statements. NEPA proposes an interdisciplinary approach in a decision-making process designed to identify unacceptable or unnecessary impacts on the environment. The Council of Environmental Quality (CEQ) created Regulations for Implementing the National Environmental Policy Act [40 Code of Federal Regulations (CFR) Parts 1500–1508], which provide regulations applicable to and binding on all Federal agencies for implementing the procedural provisions of NEPA, as amended.
National Historic Preservation Act, 16 U.S.C. § 470 et seq.	Requires federal agencies to take account of the effect of any federally assisted undertaking or licensing on any district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). Provides for the nomination, identification (through listing on the NRHP), and protection of historical and cultural properties of significance.
National Trails Systems Act (16 U.S.C. § 1241–1249)	Provides for the establishment of recreation and scenic trails.
National Wildlife Refuge Acts	Provides for establishment of National Wildlife Refuges through purchase, land transfer, donation, cooperative agreements, and other means.
National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. § 668dd–668ee)	Provides guidelines and instructions for the administration of Wildlife Refuges and other conservation areas.
Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001–13; 104 Stat. 3042), as amended	Established requirements for the treatment of Native American human remains and sacred or cultural objects found on Federal lands. Includes requirements on inventory, and notification.
Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)	Makes it unlawful for the USAF to conduct any work or activity in navigable waters of the United States without a federal permit. Installations should coordinate with the United States Army Corps of Engineers (USACE) to obtain permits for the discharge of refuse affecting navigable waters under National Pollutant Discharge Elimination System (NPDES) and should coordinate with the USFWS to review effects on fish and wildlife of work and activities to be undertaken as permitted by the USACE.
Sale of certain interests in land, 10 U.S.C. § 2665	Authorizes sale of forest products and reimbursement of the costs of management of forest resources.
Soil and Water Conservation Act (16 U.S.C. § 2001, P.L. 95-193)	Installations shall coordinate with the Secretary of Agriculture to appraise, on a continual basis, soil/water-related resources. Installations will develop and update a program for furthering the conservation, protection, and enhancement of these resources consistent with other federal and local programs.

Sikes Act (16 U.S.C. § 670a–670l, 74 Stat. 1052), as amended	Provides for the cooperation of DoD, the Departments of the Interior, USFWS, and the State Fish and Game Department in planning, developing, and maintaining fish and wildlife resources on a military installation. Requires development of an INRMP and public access to natural resources and allows collection of nominal hunting and fishing fees. NOTE: AFMAN 32-7003 sec 3.11. INRMP Implementation. As defined in DoDI 4715.03, use professionally trained natural resources management personnel with a degree in the natural sciences to develop and implement the installation INRMP. (T-0). 3.9.1. Outsourcing Natural Resources Management. As stipulated in the Sikes Act, 16 U.S.C. § 670 et. seq., the Office of Management and Budget Circular No. A-76, Performance of Commercial Activities, August 4, 1983 (Revised May 29, 2003) does not apply to the development, implementation and enforcement of INRMPs. Activities that require the exercise of discretion in making decisions regarding the management and disposition of government owned natural resources are inherently governmental. When it is not practicable to utilize DoD personnel to perform inherently governmental natural resources management duties, obtain these services from federal agencies having responsibilities for the conservation and management of natural resources.
DoD Policy, Directives, and Instructions	
DoD Instruction 4150.07 *DoD Pest Management Program* dated 29 May 2008	Implements policy, assigns responsibilities, and prescribes procedures for the DoD Integrated Pest Management Program.
DoD Instruction 4715.1, *Environmental Security*	Establishes policy for protecting, preserving, and (when required) restoring and enhancing the quality of the environment. This instruction also ensures environmental factors are integrated into DoD decision-making processes that could impact the environment, and are given appropriate consideration along with other relevant factors.
DoD Instruction (DoDI) 4715.03, Natural Resources Conservation Program	Implements policy, assigns responsibility, and prescribes procedures under DoDI 4715.1 for the integrated management of natural and cultural resources on property under DoD control.
OSD Policy Memorandum, 17 May 2005—Implementation of Sikes Act Improvement Amendments: Supplemental Guidance Concerning Leased Lands	Provides supplemental guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD. The guidance covers lands occupied by tenants or lessees or being used by others pursuant to a permit, license, right of way, or any other form of permission. INRMPs must address the resource management on all lands for which the subject installation has real property accountability, including leased lands. Installation commanders may require tenants to accept responsibility for performing appropriate natural resource management actions as a condition of their occupancy or use, but this does not preclude the requirement to address the natural resource management needs of these lands in the installation INRMP.

OSD Policy Memorandum, 01 November 2004—Implementation of Sikes Act Improvement Act Amendments: Supplemental Guidance Concerning INRMP Reviews	Emphasizes implementing and improving the overall INRMP coordination process. Provides policy on scope of INRMP review, and public comment on INRMP review.
OSD Policy Memorandum, 10 October 2002—Implementation of Sikes Act Improvement Act: Updated Guidance	Provides guidance for implementing the requirements of the Sikes Act in a consistent manner throughout DoD and replaces the 21 September 1998 guidance Implementation of the Sikes Act Improvement Amendments. Emphasizes implementing and improving the overall INRMP coordination process and focuses on coordinating with stakeholders, reporting requirements and metrics, budgeting for INRMP projects, using the INRMP as a substitute for critical habitat designation, supporting military training and testing needs, and facilitating the INRMP review process.
State Laws and Regulations	
New York Codes, Rules, and Regulations Title 6, Chapter I Fish and Wildlife	This CRR provides guidance for all the current state laws regarding fish and wildlife, including threatened or endangered species
New York Codes, Rules, and Regulations Title 6, Chapter II Lands and Forests	This CRR provides guidance for all the current state laws regarding lands and forests, including protected species, forest fires, forest insect and disease control, forest practices, and others.
New York Environmental Conservation Law Article 15	This Article broadly protects various water resources from disturbances in New York, including but not limited to certain streams, navigable waters, and aquifers.
New York Environmental Conservation Law Article 24	This Article protects wetlands from numerous regulated activities via a state permitting and hearing system.
USAF Instructions and Directives	
32 CFR Part 989, as amended, and AFI 32-7061, Environmental Impact Analysis Process (EIAP)	Provides guidance and responsibilities in the EIAP for implementing INRMPs. Implementation of an INRMP constitutes a major federal action and therefore is subject to evaluation through an Environmental Assessment or an Environmental Impact Statement.
AFI 32-1015, Integrated Installation Planning	This publication establishes a comprehensive and integrated planning framework for development/redevelopment of Air Force installations.
AFMAN 32-7003, Environmental Conservation	Implements AFPD 32-70, Environmental Considerations in Air Force Programs and Activities; DoDI 4715.03, Natural Resources Conservation Program; and DoDI 7310.5, Accounting for Sale of Forest Products. It explains how to manage natural resources on USAF property in compliance with Federal, state, territorial, and local standards. This manual also implements AFPD 32-70 and DoDI 4710.1, Archaeological and Historic Resources Management. It explains how to manage cultural resources on USAF property in compliance with Federal, state, territorial, and local standards.

AFI 32-10112 Installation Geospatial Information and Services (IGI&S)	This instruction implements Department of Defense Instruction (DoDI) 8130.01, Installation Geospatial Information and Services (IGI&S) by identifying the requirements to implement and maintain an Air Force Installation Geospatial Information and Services program and Air Force Policy Directive (AFPD) 32-10 Installations and Facilities.
AFPD 32-70, Environmental Considerations in Air Force Programs and Activities	Outlines the USAF mission to achieve and maintain environmental quality on all USAF lands by cleaning up environmental damage resulting from past activities, meeting all environmental standards applicable to present operations, planning its future activities to minimize environmental impacts, managing responsibly the irreplaceable natural and cultural resources it holds in public trust and eliminating pollution from its activities wherever possible. AFPD 32-70 also establishes policies to carry out these objectives.
Policy Memo for Implementation of Sikes Act Improvement Amendments, HQ USAF Environmental Office (USAF/ILEV) on January 29, 1999	Outlines the USAF interpretation and explanation of the Sikes Act and Improvement Act of 1997.

14.2 Installation Appendices

14.2.1 Appendix B. Protected Species Lists

The following lists include species that occur or may occur on the AFRL/RI. Any species with state endangered, threatened, species of concern, or species of greatest conservation need status is included in the lists.

Species Type	Species Names		Protection Status		Status at AFRL/RI
	Common Name	Scientific Name	Federal	New York	
Amphibians	Blue-spotted salamander	*Ambystoma laterale*	—	SOC	Potentially at VTA, NTA I and II, STA
	Four-toed salamander	*Hemidactylium scutatum*	—	SGCN	Potentially at VTA, NTA I and II, STA
	Jefferson salamander	*Ambystoma jeffersonianum*	—	SOC	Potentially at VTA, NTA I and II, STA
Avian	American bittern	*Botaurus lentiginosus*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	American black duck	*Anas rubripes*	MBTA	SGCN	Potentially at NTA I and II, STA
	Bald eagle	*Haliaeetus leucocephalus*	BGEPA, MBTA	T	Potentially at VTA, NTA I and II, STA

Species Type	Species Names		Protection Status		Status at AFRL/RI
	Common Name	Scientific Name	Federal	New York	
	Barn owl	*Tyto alba*	MBTA	SGCN	Potentially at NTA I and II, STA
	Belted kingfisher	*Megaceryle alcyon*	MBTA, BCC		Potentially at VTA, STA
	Black-billed cuckoo	*Coccyzus erythropthalmus*	MBTA, BCC		Potentially at all sites
	Black tern	*Chlidonias niger*	MBTA, BCC	E	Potentially at VTA, NTA I and II, STA
	Blue-winged warbler	*Vermivora cyanoptera*	MBTA, BCC		Potentially at VTA, NTA I and II, STA,
	Bobolink	*Dolichonyx oryzivorus*	MBTA, BCC	SGCN	Potentially at NTA I and II, STA
	Brown thrasher	*Toxostoma rufum*	MBTA	SGCN	Potentially at NTA I and II, STA
	Canada warbler	*Cardellina canadensis*	MBTA, BCC	SGCN	Potentially at NTA I and II, STA
	Cerulean warbler	*Setophaga cerulea*	MBTA, BCC	SOC	Potentially at VTA, NTA I and II, STA
	Chimney swift	*Chaetura pelagica*	MBTA, BCC		Potentially found at all sites
	Common loon	*Gavia immer*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Common nighthawk	*Chordeiles minor*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Common tern	*Sterna hirundo*	MBTA	T	Potentially at VTA
	Cooper's hawk	*Accipiter cooperii*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Eastern meadowlark	*Sturnella magna*	MBTA, BCC	SGCN	Potentially at NTA I and II, STA
	Eskimo curlew	*Numenius borealis*	E	E	Most likely extinct
	Evening grosbeak	*Coccothraustes vespertinus*	MBTA, BCC		Potentially at VTA, NTA I and II, STA
	Golden eagle	*Aquila chrysaetos*	BGEPA, MTBA	E	Potentially at VTA, NTA I and II, STA
	Golden-winged warbler	*Vermivora chrysoptera*	MBTA, BCC	SOC	Potentially at VTA, NTA I and II, STA
	Grasshopper sparrow	*Ammodramus savannarum*	MBTA	SOC	Potentially at NTA I and II, STA
	Henslow's sparrow	*Ammodramus henslowii*	MBTA, BCC	T	Potentially at VTA, NTA I and II, STA
	Horned lark	*Eremophila alpestris*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Least bittern	*Ixobrychus exilis*	MBTA	T	Potentially at VTA
	Lesser yellowlegs	*Tringa flavipes*	MBTA, BCC		Potentially at VTA, STA

Species Type	Species Names		Protection Status		Status at AFRL/RI
	Common Name	Scientific Name	Federal	New York	
	Loggerhead shrike	*Lanius ludovicianus*	MBTA	E	Potentially at VTA, NTA I and II, STA
	Northern goshawk	*Accipiter gentilis*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Northern harrier	*Circus cyaneus*	MBTA	T	Potentially at VTA, NTA I and II, STA
	Olive-sided flycatcher	*Contopus cooper*	MBTA, BCC	SGCN	Potentially at NTA I and II, STA
	Osprey	*Pandion haliaetus*	MBTA	SOC	Potentially at VTA
	Peregrine falcon	*Falco peregrinus*	MTBA	E	Potentially at all sites during different times of the year
	Pied-billed grebe	*Podilymbus podiceps*	MBTA	T	Potentially at VTA
	Red-headed woodpecker	*Melanerpes erythrocephalus*	MBTA, BCC	SOC	Potentially at VTA, NTA I and II, STA
	Red-shouldered hawk	*Buteo lineatus*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Sedge wren	*Cistothorus platensis*	MBTA	T	Potentially at VTA
	Sharp-shinned hawk	*Accipiter striatus*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Short-eared owl	*Asio flammeus*	MBTA, BCC	E	Potentially at VTA, NTA I and II, STA
	Spruce grouse	*Falcipennis canadensis*	—	E	Potentially at VTA, NTA I and II, STA
	Upland sandpiper	*Bartramia longicauda*	MBTA, BCC	T	Potentially at VTA
	Vesper sparrow	*Pooecetes gramineus*	MBTA	SOC	Potentially at VTA, NTA I and II, STA
	Whip-poor-will	*Caprimulgus vociferus*	MBTA, BCC	SOC	Potentially at VTA, NTA I and II, STA
	Wood thrush	*Hylocichla mustelina*	MBTA, BCC		Potentially at all sites
Fishes	American eel	*Anguilla rostrata*	—	SGCN	Potentially at VTA
	Lake sturgeon	*Acipenser fulvescens*	UR	T	Potentially at VTA
	Mooneye	*Hiodon tergisus*	—	T	Potentially at VTA
	Northern sunfish (formerly longear sunfish)	*Lepomis peltastes*	—	T	Potentially at VTA
	Round whitefish	*Prosopium cylindraceum*	—	E	Potentially at VTA
	Summer sucker	*Catostomus utawana*	—	SGCN	Potentially at VTA

Species Type	Species Names		Protection Status		Status at AFRL/RI
	Common Name	Scientific Name	Federal	New York	
Insects	Frosted elfin	*Callophrys irus*	—	T	Potentially at VTA, NTA I and II, STA
	Gray petaltail	*Tachopteryx thoreyi*	—	SOC	Potentially at VTA, NTA I and II, STA
	Monarch butterfly	*Danaus plexippus*	C	E	Potentially found at all sites
	Mottled duskywing	*Erynnis martialis*	—	SOC	Potentially at VTA, NTA I and II, STA
	Rusty-patched bumble bee	*Bombus affinis*	E	SGCN	Potentially at VTA, NTA I and II, STA
	Tawny crescent	*Phyciodes batesii*	—	SOC	Potentially at VTA, NTA I and II, STA
	Unnamed dragonfly species	*Gomphus spec. nov.*	—	SOC	Potentially at VTA, NTA I and II, STA
Mammals	Indiana bat	*Myotis sodalis*	E	E	Potentially at all sites
	Canada lynx	*Lynx canadensis*	—	T	Most likely not found at AFRL/RI
	Little brown bat	*Myotis lucifugus*	UR	SGCN	Confirmed at STA, potentially at all sites
	Northern long-eared bat	*Myotis septentrionalis*	E	T	Potentially at all sites
	Small-footed myotis	*Myotis leibii*	—	SOC	Potentially at all sites
	Tricolored bat	*Perimyotis subflavus;*	E*	SGCN (UR)	Potentially at all sites
Mollusks	Alewife floater	*Anodonta implicata*	—	SGCN	Potentially at VTA
	Black sandshell	*Ligumia recta*	—	SGCN	Potentially at VTA
	Buffalo pebble snail	*Gillia altilis*	—	SOC	Potentially at VTA
	Eastern pearlshell	*Margaritifera margaritifera*	—	SGCN	Potentially at VTA
	Eastern pondmussel	*Ligumia nasuta*	—	SGCN	Potentially at VTA
	Fringed valvata	*Valvata lewisi*	—	SOC	Potentially at VTA
	Green floater	*Lasmigona subviridis*	UR	T	Potentially at VTA
	Mossy valvata	*Valvata sincera*	—	SOC	Potentially at VTA
	Yellow lampmussel	*Lampsilis cariosa*	—	SGCN	Potentially at VTA
Reptiles	Blanding's turtle	*Emydoidea blandingii*	UR	T	Potentially at VTA
	Bog turtle	*Glyptemys muhlenbergii*	T	E	Potentially at VTA

Species Type	Species Names		Protection Status		Status at AFRL/RI
	Common Name	Scientific Name	Federal	New York	
	Eastern massasauga	*Sistrurus catenatus*	T	E	Potentially at VTA, NTA I and II, STA
	Eastern musk turtle	*Sternotherus odoratus*	—	SGCN	Potentially at VTA, NTA I and II, STA
	Timber rattlesnake	*Crotalus horridus*	—	T	Potentially at VTA
Plants	Northeastern bulrush	*Scirpus ancistrochaetus*	E	—	Most likely not found at AFRL/RI

*Proposed listing

E–Endangered, T–Threatened, C–Candidate, UR–Under Review by USFWS, SOC–Species of Concern, SGCN–Species of Greatest Conservation Need, MBTA–Migratory Bird Treaty Act, BGEPA–Bald and Golden Eagle Protection Act, BCC–Birds of Conservation Concern