

DRAFT ENVIRONMENTAL ASSESSMENT (EA)
FOR THE
INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
HANSCOM AIR FORCE BASE, MASSACHUSETTS



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Letters or other written comments provided may be published in the Final EA. As required by law, substantive comments will be addressed in the Final EA and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final EA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ABG	Air Base Group
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFMC	Air Force Materiel Command
AICUZ	Air Installations Compatible Use Zone
BVW	Bordering Vegetated Wetlands
CAA	Federal Clean Air Act
CE	Civil Engineer
CEIE	Hanscom AFB Environmental Element
CEMML	Center for Environmental Management of Military Lands
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DAF	Department of the Air Force
CZMA	Coastal Zone Management Act
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONSI	Finding of No Significant Impact
FT	Feet/Foot
GIS	Geographic Information System
GSU	Geographically Separate Units
HAFB	Hanscom Air Force Base
IDP	Installation Development Plan
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
LUW	Land Under Water
MCZM	Massachusetts Office of Coastal Zone Management
MESA	Massachusetts Endangered Species Act
MHC	Massachusetts Historical Commission

NEPA	National Environmental Policy Act
NHESP	Natural Heritage and Endangered Species Program
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
SAIA	Sikes Act Improvement Act of 1997
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SSC	Species of Special Concern
T&E	U.S. FWS's Threatened & Endangered Species
THPO	Tribal Historic Preservation Officer
TMDL	Total Maximum Daily Loads
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VA	United States Department of Veterans Affairs
WWII	World War II

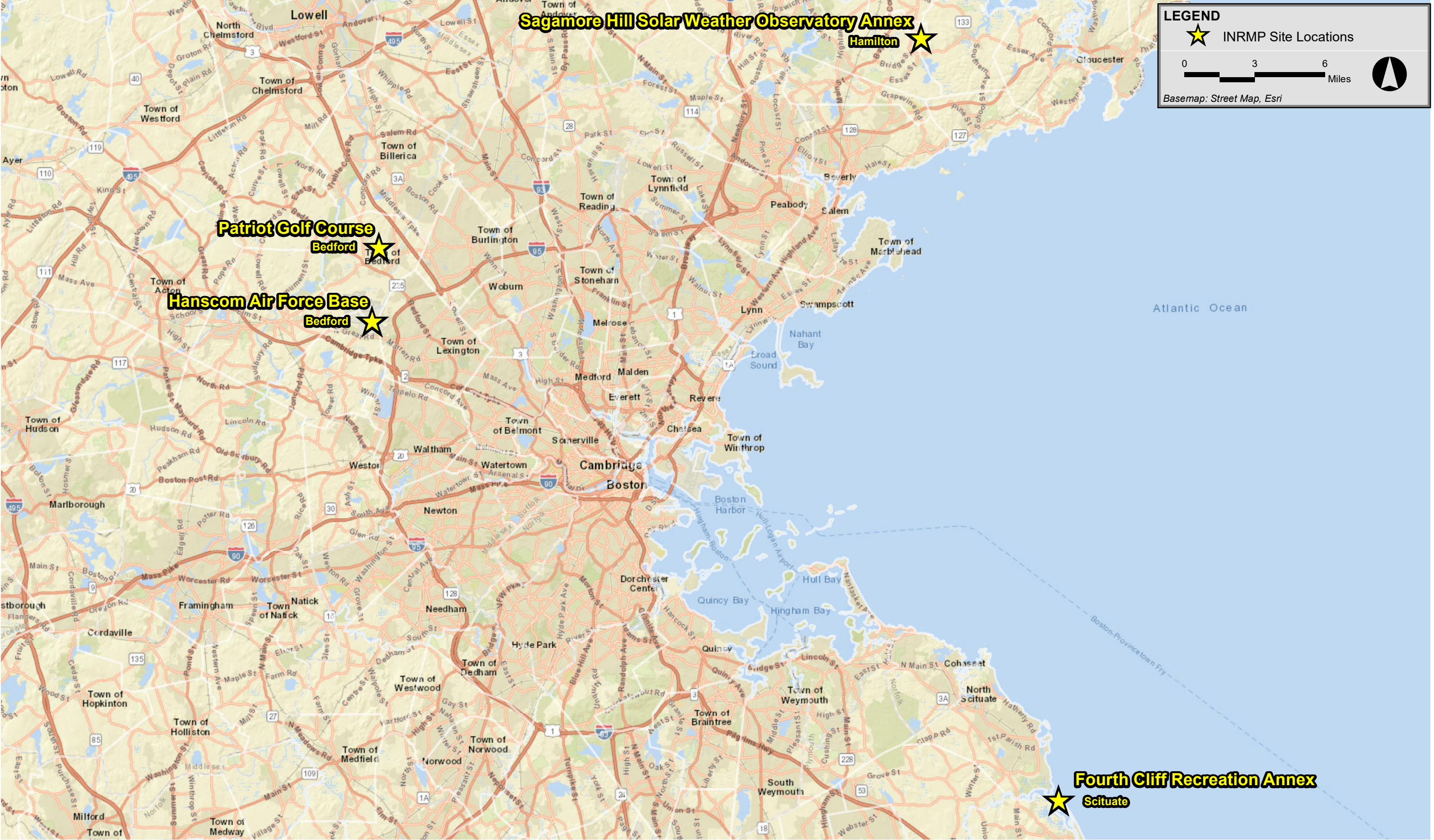
1 INTRODUCTION

The United States Air Force has developed the Integrated Natural Resources Management Plan (INRMP) for Hanscom Air Force Base (Hanscom AFB) and has prepared this Environmental Assessment (EA) to analyze the potential environmental impacts from implementing the INRMP. Hanscom Air Force Base (AFB) is located in Bedford and has three geographically separated units (GSU) that have also been considered under the INRMP. In addition to Hanscom AFB located in Bedford, the INRMP also considers the Patriot Golf Course in Bedford, MA, the Fourth Cliff Recreational Annex (Fourth Cliff) in Scituate, MA, and the solar observatory on Sagamore Hill in Hamilton, MA, see **Figure 1**. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; the provisions of Code of Federal Regulations (CFR) Title 323, Part 989; and 40 CFR Parts 1500 through 1508, which are the Council on Environmental Quality's (CEQ) NEPA implementing regulations.

The Sikes Act Improvement Act of 1997 (SAIA), as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), governs the planning and implementation of conservation programs on military installations and requires the Secretaries of the military departments to prepare INRMPs in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the applicable state wildlife agency. The SAIA requires plans to reflect “mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources.”

The SAIA and Department of the Air Force Manual (DAFMAN) 32-7003, *Environmental Conservation*, dated 26 June 2024, requires INRMPs to be reviewed for operation and effect annually. Additional reviews and updates to INRMPs may also be initiated by the base Natural Resources Manager (NRM) and/or an Installation Support Section Natural Resources Media Manager as changes to natural resource management and conservation practices occur. Installations conduct reviews of the INRMP in coordination with internal stakeholders and local representatives to accomplish pertinent updates. 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.

Natural resources support Hanscom AFB and its GSUs in achieving its mission through various benefits provided. Wetland areas conserved around the Shawsheen River watershed support the DAF's mission by providing a buffer from flooding events that could negatively affect the soils and structures of Hanscom AFB (HAFB 2010a). Natural resources also play a critical role in supporting on-site recreation programs and activities that provide opportunities to improve and maintain the social and physical wellbeing of Hanscom AFB personnel and their families, which is essential for an efficiently run base (HAFB 2017a). Natural resources also support the conservation programs at Fourth Cliff, which contains sandy beaches, tidal flats, and marsh environments used by a variety of animals, including the federally threatened piping plover (*Charadrius melodus*), least tern (*Sterna antillarum*), and rufa red knot (*Calidris canutus rufa*). Sagamore Hill's mission requires open



Hanscom EA INRMP

Figure 1
General Overview

space around the solar weather-monitoring equipment and the surrounding region to ensure maximum solar-observation capabilities (HAFB 2017a).

HAFB properties are presently experiencing the impacts of known invasive plants and are anticipating the arrival of the invasive spotted lanternfly in the coming years. Under the INRMP, Hanscom will survey Hanscom AFB, the Patriot Golf Course, Fourth Cliff, and Sagamore Hill properties for the baseline requirements to ensure compliance across all natural resources. The surveys will locate, identify, log, and map flora/fauna species, reptile, invertebrate, vegetative communities and wildlife communities as well as nuisance species affecting the mission and/or natural resources on the premises. Additionally, the surveys will observe for rare, threatened and endangered (T&E) species and the habitat in which they are found. Following the surveys, additional habitat and species management actions will be further defined.

1.1 Purpose and Need for Proposed Action

The purpose for the Proposed Action is due to Hanscom AFB establishing its first Sikes Act-compliant INRMP (2023), which is a legally binding tri-party agreement between Hanscom AFB, the US Fish and Wildlife Service (USFWS), and the Massachusetts Division of Fisheries and Wildlife Program through their Natural Heritage and Endangered Species Program (NHESP).

The need of the Proposed Action is to implement the goals and objectives identified in the INRMP. The agreement between the parties will require implementation of specific goals and objectives that have been translated into a slate of projects intended to preserve and enhance the natural resources at Hanscom AFB, the Patriot Golf Course, Fourth Cliff, and Sagamore Hill. The implementation of the INRMP will also prohibit the USFWS from designating any Hanscom AFB properties as critical habitat for T&E species, limiting what is allowed within such habitats, and subsequently impeding the installation's ability to execute its mission.

1.2 Scope of Environmental Analysis

Hanscom AFB seeks to improve its understanding of all potential environmental consequences associated with implementing an INRMP. An environmental impact analysis must be performed for each federal action that has the potential to impact the environment. The DAF implements compliance with NEPA through its Environmental Impact Analysis Process (EIAP). This EA has been prepared to determine potential environmental impacts from implementation of the INRMP on Hanscom AFB and the GSUs listed above.

According to the regulations and guidelines for implementing NEPA, the EA is a written analysis which serves to (1) provide sufficient analysis to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI); and (2) aid federal agencies in complying with NEPA when no EIS is required. If this EA determines the proposed action would adversely impact the environment, threaten public health or safety, or generate significant public controversy, then an EIS would be required.

1.3 Documents Incorporated by Reference

In accordance with CEQ regulations for implementing NEPA, the following material is incorporated by reference. These documents are part of the administrative record and are available upon request from the 66th Air Base Group/ Civil Engineering Environmental Element (66 ABG/CEIE).

Environmental Assessment for Installation Development at Hanscom AFB, 2020 (EA IDP). The Environmental Assessment for Installation Development at Hanscom AFB addresses proposed actions necessary to implement installation development as envisioned in Hanscom AFB Installation Development Plan (IDP). The IDP provides a roadmap for future development over the next five- to ten-year period to ensure that Hanscom AFB's facilities, infrastructure, and resources are well managed in support of Hanscom AFB's mission and people, while balancing multiple resource constraints. In addition to evaluating the scope of development as envisioned in the IDP, the EA serves as a baseline environmental analysis for future mission planning.

1.4 Relevant Laws and Regulations

Applicable Environmental Regulations and Requirements:

- ◆ National Environmental Policy Act of 1969 (42 United States Code [USC] 4321-4347)
- ◆ Council on Environmental Quality (CEQ, 1978) Regulations for Implementing the Procedural Provisions 195 of NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508) (revised 2022)
- ◆ 32 CFR 989 et seq., Environmental Impact Analysis Process
- ◆ Air Force Instruction (AFI) 32-7001, Environmental Management
- ◆ Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention
- ◆ Air Force Manual 32-7003, Environmental Conservation
- ◆ Air Force Instruction 32-1015, Integrated Installation Planning
- ◆ Coastal Zone Management Act
- ◆ Department of the Air Force Instruction 90-2002, Interactions with Federally- Recognized Tribes
- ◆ Department of the Air Force Instruction 91-203, Occupational Safety, Fire and Health Standards
- ◆ Department of the Air Force Instruction 32-7020, Environmental Restoration Program
- ◆ Archaeological Resources Protection Act

- ◆ Federal Clean Air Act (CAA) as amended in 1990 (81 U.S.C. 7401 Et. Seq.)
- ◆ Federal Clean Water Act (CWA)
- ◆ Comprehensive Environmental Response, Compensation, and Liability Act
- ◆ Endangered Species Act of 1973 (ESA)
- ◆ Executive Order (EO) 11988, Floodplain Management
- ◆ EO 11990, Protection of Wetlands
- ◆ EO 12372, Intergovernmental Review of Federal Programs, as amended by EO 12416
- ◆ EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- ◆ EO 13045, Protection of Children from Environmental Health Risks and Safety Risks
- ◆ EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis
- ◆ Massachusetts Endangered Species Act
- ◆ Massachusetts Wetland Protection Act
- ◆ National Historic Preservation Act (jointly administered with the MHC)
- ◆ Occupational Safety and Health Administration (OSHA) regulations
- ◆ Pollution Prevention Act of 1990
- ◆ Resource Conservation and Recovery Act

1.5 Intergovernmental Coordination

Federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action were notified and consulted during the development of this EA. **Appendix A** contains the list of agencies consulted during this analysis and copies of correspondence.

Federal/Tribal

Environmental Protection Agency (EPA) – Region 1

U.S. Fish and Wildlife Service (USFWS) – Region 5

Minute Man National Historical Park

Wampanoag Tribe of Aquinnah, Mashpee Wampanoag Tribe, and Narragansett Indian Tribe

Local

Town of Bedford (Conservation Commission)

Town of Scituate (Conservation Commission)

Town of Hamilton (Conservation Commission)

Town of Concord (Conservation Commission)

Hanscom Area Towns Committee (Bedford, Concord, Lincoln, and Lexington)

1.6 Government to Government Consultation

Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments* (6 November 2000), directs Federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. To comply with the National Historic Preservation Act (NHPA), 54 U.S.C. Section 306108, and its implementing regulations at 36 C.F.R. Part 800, federally recognized tribes that are affiliated historically with Hanscom AFB geographic region will be invited to consult on all proposed undertakings that have the potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal coordination process is distinct from NEPA consultation or the Interagency/Intergovernmental Coordination for Environmental Planning (IICEP) processes and requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of intergovernmental consultations.

- ◆ Hanscom AFB point-of-contact for Native American tribes is the Installation Commander or Hanscom AFB Installation Tribal Liaison Officer.
- ◆ Hanscom AFB point-of-contact for consultation with the Tribal Historic Preservation Officer (THPO) and the Advisory Council on Historic Preservation is the Cultural Resources Manager.

The Native American tribal governments consulted on the Proposed Action include the Wampanoag Tribe of Gay Head (Aquinnah), the Mashpee Wampanoag Tribe, and the Narragansett Indian Tribe. Initial consultation letters were sent on July 8th, 2024. Responses received prior to the close of the public comment period will be addressed and incorporated into the final EA.

1.7 Public and Agency Review of EA

A Notice of Availability (NOA) announcing the availability of the draft EA and FONSI for review on **DATE** was published in the following newspapers:

- ◆ The Bedford Citizen (Bedford, MA)
- ◆ Wicked Local (Scituate, MA)
- ◆ The Patch (Hamilton, MA)

In addition, the DAF issued a press release on **DATE** announcing the Notice of Availability (NOA) of the draft EA and FONSI. Copies of the press release and the NOA are provided in **Appendix B**. The NOA and press release invited the public to review and comment on the draft EA. The public and agency review period ended on **DATE**.

Copies of the draft EA and FONSI were posted to Hanscom AFB public website for download and review at the following location: <https://www.hanscom.af.mil/About-Us/Fact-Sheets/Display/Article/379486/civil-engineering/>

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Description of Proposed Action

The Proposed Action includes conducting baseline surveys to identify and quantify key natural resources on Hanscom AFB, Patriot Golf Course, Fourth Cliff Recreation Area, and Sagamore Hill and implementing appropriate management of habitats and species identified during the surveys, to aid in their healthy maintenance and recovery. Specific projects contained in the INRMP and timelines are provided in **Appendix C**.

The proponent (Hanscom AFB Natural Resources Program) has identified seven undertakings that comprise the overall Proposed Action. Six of these undertakings are based on a review of existing known conditions that need to be addressed and which are identified in the INRMP. One of these undertakings is grouped broadly into “Habitat and Species Management”, the details of which cannot be known until the surveys in step 1 are completed.

Known undertakings

- A - Golf course wetland rehabilitation
- B - Predation control at Fourth Cliff to protect ESA listed shorebird species
- C - Fourth Cliff Blue Mussel restoration demonstration project
- D - Annual invasive species control and eradication
- E - Establish initial pollinator habitats at Hanscom AFB properties
- F - Annual sediment monitoring at Fourth Cliff

Potential undertakings

Based on the step 1 survey results, additional undertakings may include, but are not limited to the following. These individual efforts are grouped under the single undertaking of “G - Habitat and Species Management” for analysis G - Habitat and Species Management:

- ◆ Monarch butterfly habitat enhancement;
- ◆ Turtle habitat protection and enhancement (Blanding’s, wood, and eastern box turtles);
- ◆ Blue spotted salamander habitat protection and enhancement;

- ◆ Intricate fairy shrimp and other invertebrate habitat protection and enhancement;
- ◆ Bridle shiner habitat protection and enhancement;
- ◆ Protected Avian species habitat protection and enhancement;
- ◆ Protected Bat species habitat protection and enhancement.

It should be noted, a major undertaking identified in the INRMP is the Erosion Control Project at Fourth Cliff. Due to the complexity and current urgency of the undertaking, this effort is being analyzed under a separate stand-alone EA which is currently in draft stage. However, the cumulative impacts of the Erosion Control Project are still discussed below.

2.2 Selection Standards

NEPA and CEQ regulations mandate the consideration of reasonable alternatives for the Proposed Action. “Reasonable alternatives” are those that could also effectively meet the purpose and need for the Proposed Action. Per the requirements of 32 CFR Part 989 and the DAF’s EIAP regulations, selection standards are used to identify alternatives for meeting the purpose and need for the Proposed Action.

Alternatives for the Proposed Action must meet the following selection standards to fulfill the purpose and need:

1. The action(s) must be conducted on Hanscom property;
2. The action(s) must be compliant with the Sikes Act;
3. The action(s) must address basic mission needs; and
4. The action(s) must address the natural resource management goals outlined in Hanscom INRMP.

All reasonable alternatives were considered during the development of the Proposed Action.

2.3 Alternatives

Four alternatives were selected for analysis based upon the selection standards identified above.

2.3.1 **No Action Alternative**

The No Action Alternative would not complete the Proposed Action, listed as undertakings A to G. The Natural Resources program would continue without compliance with the Sikes Act. Per the CEQ, the No Action Alternative will be used as a baseline to determine impacts the Proposed

Action, and/or any other alternative carried forward for further analysis, would have on the environment.

2.3.1.1 Hanscom AFB

Under the No Action Alternative, Hanscom AFB would not implement the INRMP, including the work plans, goals, and objectives set. Natural resources, including the Shawsheen River and other wetland resource areas, would not be sufficiently monitored and surveyed to ensure they are properly conserved to support DAF's mission of providing protection from flooding that could negatively affect the natural environmental and the built infrastructure on Hanscom AFB.

2.3.1.2 Fourth Cliff

Under the No Action Alternative, Fourth Cliff would not implement the INRMP, including the work plans, goals, and objectives set. The INRMP provides support to the natural resources that are integral to Fourth Cliff. The natural resources located at Fourth Cliff includes a sandy beach, tidal flats, and marsh environments, which are used by a variety of animals, including the federally threatened piping plover and least tern, and rufa red knot. Without an INRMP, these natural resources, and the federally threatened species that inhabit them, would be subject to increased risk of environmental, anthropogenic, and predatory stressors that would further impact Fourth Cliff.

2.3.1.3 Sagamore Hill

Under the No Action Alternative, Sagamore Hill would not implement the INRMP, including the work plans, goals, and objectives set. The Sagamore Hill Solar Observatory provides scientific observations of the sun as part of the Radio Solar Telescope Network. Observatory work is deemed integral to the DAF, and to operate properly requires open space around the solar weather-monitoring equipment and the surrounding region to ensure maximum solar-observation capabilities. Without an INRMP, the natural resources present have the potential of interfering with the solar weather-monitoring equipment, therefore impacting the objectives and mission of the Sagamore Hill Solar Observatory.

2.3.1.4 Patriot Golf Course

Under the No Action Alternative, the Patriot Golf Course would not implement the INRMP, including the work plans, goals, and objectives set. The Patriot Golf Course is a public golf course that was previously reserved for Hanscom AFB. However, the Patriot Golf Course recently offered openings for the public and members of the community to enhance and express appreciation for the local community. The Patriot Golf Course presently experiences periodic flooding events due to undersized culverts and a stream wetland system with impeded flow and drainage due to vegetation growth and bank alternations. Without an INRMP, and the associated management activities, flooding events would continue to occur and inhibit the golf course from functioning properly and keeping both military members as well as members of the public from enjoying Hanscom AFB property.

2.3.2 Preferred Alternative (Alternative 1)

The Preferred Alternative is proposed to include the implementation of all undertakings, identified as A through F “Known Undertakings” and also Potential Undertakings “G-Habitat and Species Management”, as noted above. Additional information regarding the Preferred Alternatives can be found in Section 2.1.

2.3.2.1 Hanscom AFB

Under the Preferred Alternative, Hanscom AFB would undertake Actions D, E, and G to allow for surveys to be conducted, as well as appropriately managing the habitats and species identified during the surveys, to aid in their healthy maintenance and recovery.

2.3.2.2 Fourth Cliff

Under the Preferred Alternative, Fourth Cliff would undertake Actions B, C, D, E, F, and G. These undertakings would result in habitat improvements as well as conservation of the integral environment Fourth Cliff provides to the natural resources that presently exist. The undertakings anticipated at Fourth Cliff would provide an all-encompassing approach to preservation of this historic area that is enjoyed by Hanscom AFB and the local veteran community.

2.3.2.3 Sagamore Hill

Under the Preferred Alternative, Sagamore Hill would undertake Actions D, E, and G. These Actions would result in management strategies and approaches to preserve the natural resources on-site and habitats for the flora and fauna that inhabit Sagamore Hill, while also clearing invasive species and managing vegetation to allow for unobstructed solar weather-monitoring measurements capabilities.

2.3.2.4 Patriot Golf Course

Under the Preferred Alternative, the Patriot Golf Course would undertake Actions A, D, E, and G. These Actions would result in wetland rehabilitation on the golf course aimed at minimizing the occurrence of flooding events while also allowing for the golf course to maintain and protect the natural resources that exist on-site. The undertaking would allow for the installation to run properly without flooding interference currently inhibiting Hanscom and members of the public from utilizing this installation.

2.3.3 Alternative 2

Alternative 2 includes the implementation of only the undertakings that have either a known mission-impact or are current obligations of the DAF under the Endangered Species Act. These measures include undertakings B, D, and F. This Alternative was not selected as it does not meet all of the selection standards that have been provided under Section 2.2, specifically Selection Standards 2 (Addresses mission impact needs) and 4 (Addresses INRMP).

2.3.3.1 Hanscom AFB

Under Alternative 2, Hanscom AFB would receive partial support in its mission to preserve and protect the natural resources that exist within the installation; however, the undertakings of B, D, and F would not provide the support needed to ensure the AFB is operating at the highest capacity. Hanscom AFB would not realize the benefits of habitat and species management as well as establishing initial pollinator habitats, which have been deemed crucial in the installation's mission due to the unique natural resources that exist.

2.3.3.2 Fourth Cliff

Under Alternative 2, Fourth Cliff would not realize the benefits of the Fourth Cliff Blue Mussel restoration demonstration project, the annual sediment monitoring, as well as the habitat and species management and establishing initial pollinator habitats. Without these undertakings, Fourth Cliff would be subject to increased vulnerability due to the changing coastal environment and steep terrain on-site.

2.3.3.3 Sagamore Hill

Under Alternative 2, Sagamore Hill would primarily conduct annual invasive species control and eradication. This alternative would not meet all of the selection standards identified in Section 2.2. As described in Section 2.3.1.3, the solar observatory facilities at Sagamore Hill require open space around the weather-monitoring equipment to ensure maximum solar-observation capabilities. Without the undertakings described in the Proposed Action, the open space surrounding the weather-monitoring equipment would limit the installation's ability to function.

2.3.3.4 Patriot Golf Course

Under Alternative 2, the Patriot Golf Course would not receive the necessary undertakings required to mitigate environmental issues currently experienced. During precipitation events, the Patriot Golf Course experiences flooding from wetland resources that run in the north-south direction within the southeastern portion of the site. Flooding prevents the course from functioning properly. Under Alternative 2, the Patriot Golf Course would not include Undertaking A, the golf course wetland rehabilitation project, and the golf course will continue to flood and impede upon the golf course from functioning as intended. Additionally, the course will not enhance habitat to respond to potential future climate-related flooding in terms of frequency and intensity caused by precipitation.

2.3.4 Alternative 3

Alternative 3 includes the implementation of undertakings that have either a known mission-impact, are DAF current obligations under the endangered species act, or provide habitat and species management for species identified in future surveys. These would include undertakings B, D, F, and G.

2.3.4.1 Hanscom AFB

Alternative 3 would allow for the installation to conserve and restore the natural resources, to ensure environmental resources are protected. However, under Alternative 3, Hanscom AFB would only achieve partial compliance with the Sikes Act.

2.3.4.2 Fourth Cliff

Fourth Cliff, and its unique natural resources, requires extensive observation and protection to ensure it is able to continue operations as intended for recreational purposes for military personnel and their families. Under Alternative 3, the Fourth Cliff Recreation Area would undertake habitat and species management actions, described in undertaking G deemed as necessary due to the abundant state and federally listed species that exist within the Fourth Cliff area. However, Alternative 3 does not include the Fourth Cliff Blue Mussel restoration demonstration Project (undertaking C) and would not meet all of the selection standards identified. The Blue Mussel has been identified as a crucial species due to its role as a food source by shorebirds, particularly rufa red knots (*Calidris canutus*), that nest at Fourth Cliff. Not undertaking Blue Mussel restoration would place further stress on the shorebirds that utilize Fourth Cliff as a habitat and food source.

2.3.4.3 Sagamore Hill

Under Alternative 3, Sagamore Hill would receive most of the actions necessary to function as intended with the exception of undertaking E- Establish initial pollinator habitats at Hanscom AFB properties. Undertaking E has been determined to be necessary under the INRMP due to the potential species located at Sagamore Hill, including the Monarch Butterfly. Without Undertaking E, Sagamore Hill would not be improved to provide important pollinator habitats, including milkweed (*Asclepias* spp.), which monarch larvae feed on exclusively. Milkweed is native to Massachusetts and therefore would be appropriate for planting at Sagamore Hill to support both Monarch Butterfly conservation and milkweed conservation.

2.3.4.4 Patriot Golf Course

Under Alternative 3, the flooding experienced under existing conditions would not be addressed, including the wetland restoration measures noted in undertaking A.

2.3.5 Summary of Alternatives Analysis

The four alternatives have been compared to the selection standards identified above to determine their ability to adequately serve the purpose of the INRMP. **Table 1** describes whether each alternative adequately fulfills the selection standards identified as necessary for the Proposed Action.

Table 1 **Evaluation of Reasonable Alternatives**

ALTERNATIVES	Selection Standards			
	Hanscom owned property	Sikes Act Compliant	Addresses mission impact needs	Addresses INRMP
	(1)	(2)	(3)	(4)
Alternative 1 (Preferred Alternative)	YES	YES	YES	YES
Alternative 2	YES	Partial	YES	Partial
Alternative 3	YES	Partial	YES	Partial
No Action Alternative	Not Applicable	NO	NO	NO

2.3.6 Alternatives Eliminated From Further Consideration

The evaluation of alternatives resulted in only two alternatives being carried forward for full analysis in the EA: the Alternative 1: Preferred Alternative and the No Action Alternative. The Preferred Alternative would include implementation of all undertakings, A through G, listed in section 2.1. Under the No Action Alternative, Hanscom AFB would not complete the proposed actions A to G. The Natural Resources Program would continue without compliance with the Sikes Act. Per the CEQ, the No Action Alternative will be used as a baseline to determine impacts the Preferred Alternative would have on the environment.

Alternative 2 and Alternative 3 were excluded from full analysis because they did not meet one (or more) of the selection standards. Alternative 2 would include only the implementation of undertakings that have either a known mission-impact or are current DAF obligations under the ESA. These would include undertakings B, D, and F. Alternative 3 would include the implementation of undertakings that have either a known mission-impact or are current DAF obligations under the ESA and future habitat and species management for any species identified in future surveys. These would include undertakings B, D, F, and G.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section addresses the environmental resources and conditions anticipated to be impacted by the Proposed Action and the No Action Alternative and provides sources of information to serve as a baseline from which to identify and evaluate environmental consequences that could result from implementation of these alternatives. In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. The affected environment within Hanscom AFB and its GSUs are described in greater detail in the INRMP. Alternatives 2 and 3 have not been analyzed under this section as they do not meet the selection standards identified in Section 2.2. Therefore, only the No Action Alternative and Proposed Action have been considered.

3.1 Hanscom AFB

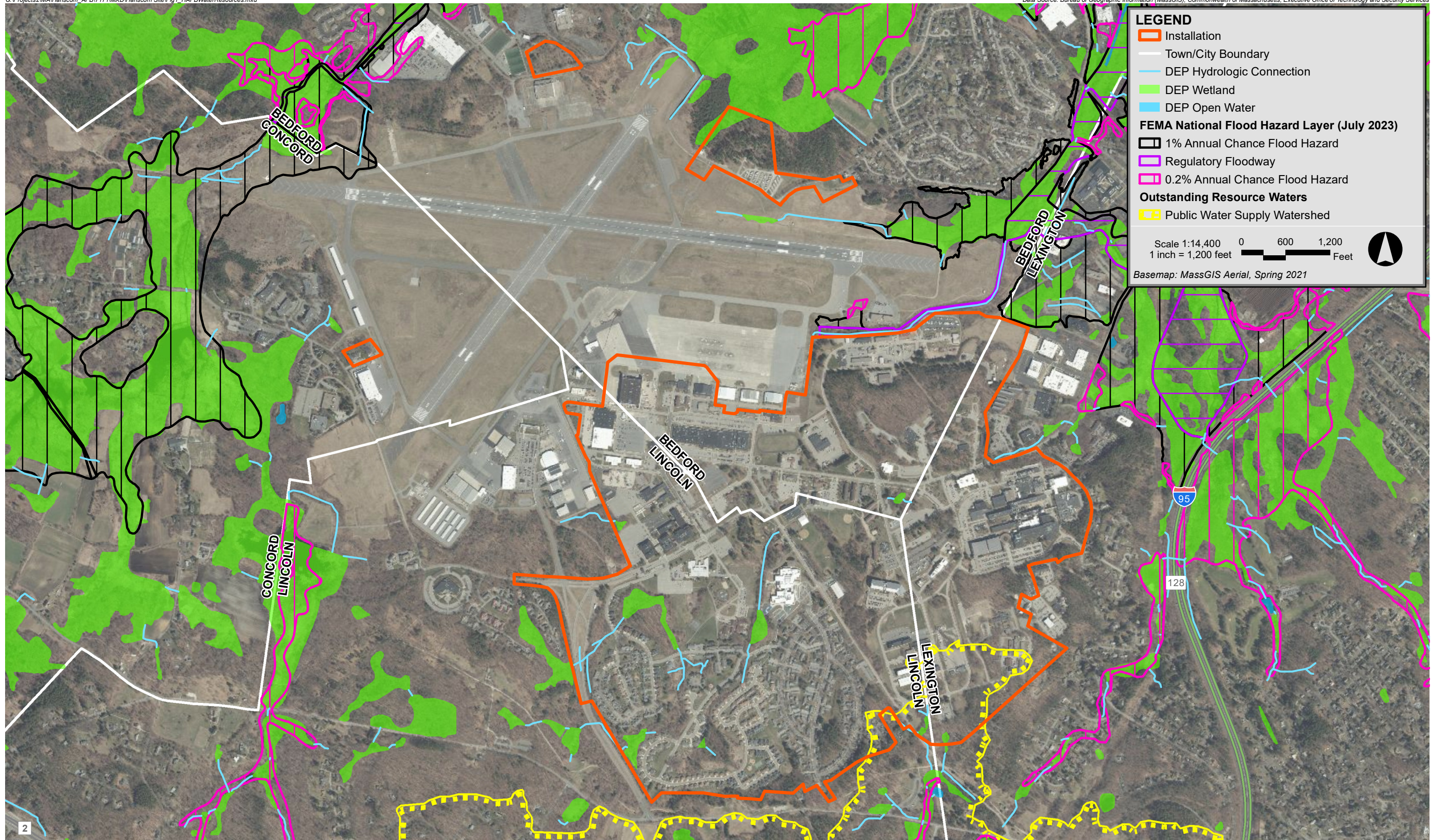
3.1.1 Water Resources- Affected Environment

At Hanscom AFB, freshwater wetlands are characterized by trees and shrubs that are classified as wooded swamp deciduous, wooded swamp mixed trees, and shallow marsh vegetation types. The principal river in this area is the Shawsheen River, which is a tributary to the Merrimack River (Executive Office of Environmental Affairs 2007). The Shawsheen River watershed is located in a predominantly suburbanized area with over 50 percent of the land developed. As a result, impervious surfaces cover a significant portion of the watershed, affecting runoff and water quality, especially given the watershed's proximity to Boston.

Hanscom AFB is located within four Flood Insurance Rate Maps (25017C0383F, effective 07/07/2014; 25017C0384F, effective 07/06/2016; 25017C0382F, effective 07/06/2016; and 25017C0381F, effective 07/07/2014), which includes a portion of the Shawsheen River. The Shawsheen River has a floodway area designated as Zone AE that slightly encroaches on HAFB. The designated floodway for the Shawsheen River on the AFB requires the stream channel and adjacent floodplains are maintained to accommodate a 100-yr flood without substantial increases in flood depths. There is also a special flood hazard area (SFHA) for North Lexington Brook that slightly encroaches on a small portion of the AFB during a 100-year flooding event.

Segment MA83-08 of the Shawsheen River, located on part of Hanscom AFB downstream of the AFB, is listed as impaired due to high levels of fecal coliform bacteria. For this segment of river, surface runoff from physical substrate habitat alterations and channeling are the main sources of fecal coliform, which may come from pets, livestock, and wildlife (Massachusetts Division of Watershed Management 2002; USEPA 2022).

Please refer to **Figure 2** below for the water resources located within and surrounding Hanscom AFB.



3.1.1.1 No Action Alternative

Under the No Action Alternative, the wetland resources would remain under their current conditions. All impairments and issues for the wetland resources on and off-site will continue uninhibited. It is anticipated these issues would likely be exacerbated under climate change projections due to increased frequency and intensity of severe weather, and inland and coastal flooding events.

3.1.1.2 Preferred Alternative (Alternative 1)

The Preferred Alternative does not provide undertakings that will directly impact the wetland resources within Hanscom AFB. However, the municipalities that Hanscom AFB fall within have adopted wetlands bylaws and regulations for alterations near wetland resource areas. The INRMP has the goal of complying with all federal and local laws that pertain to natural and cultural resources. As such, the management activities include communication between Hanscom and local towns regarding activities that will impact wetlands or regulatory areas. This management approach and communication will allow for a sustained approach to the wetland resource areas on-site without risk of further adverse impacts.

3.1.2 Land Use- Affected Environment

The 846-acre Hanscom AFB site includes 713 acres considered as developed land with 132 undeveloped acres comprised of fragmented wetlands and upland forest. The developed land is used for a multitude of uses, including administrative and research facilities, private housing units, and associated infrastructure including sidewalks and roads.

The primary mission of HAFB is achieved within the research and administration facilities throughout the northern half of the base, and the use of land and base facilities is not anticipated to change drastically in the foreseeable future; however, the continued use of present facilities and the planned modernization of several existing facilities presents some potential conflicts with the natural resources at HAFB and its geographically separated units.

The wetland areas account for 31 acres, the majority of which are less than one acre. The forested areas account for 101 acres, most of which are patches of less than five acres (HAFB 2017a). Another five percent of the developed acreage is composed of altered grasslands planted in small patches or strips adjacent to developed areas, including sidewalks and housing.

3.1.2.1 No Action Alternative

The No Action Alternative would not result in a change in land use or impacts on existing conditions. However, without the implementation of the INRMP, Hanscom AFB would not survey the existing undeveloped land and therefore would be potentially subject to future expansion of the base into these undisturbed areas and potentially create risk to the natural environment that

exists. The HAFB 2017 Installation Development Plan (IDP) identified 26 parcels of land that are open for development, many of them in or adjacent to forested or wetland sections of HAFB. The planned development in 21 of these areas has the potential to negatively impact the nearby environments through an increase in releases of harmful particulates during construction, or by encroaching on natural areas.

3.1.2.2 Preferred Alternative (Alternative 1)

The Preferred Alternative would generally be limited to the areas considered undeveloped on Hanscom AFB and would not result in a change of land use from undeveloped to developed. The implementation of the Proposed Action would result in minor changes to the land from environmental management activities. However, a significant benefit would be achieved as the undeveloped land would be surveyed and subsequently monitored for habitat and species management to ensure the ecosystems within Hanscom AFB are properly protected.

3.1.3 Biological/Natural Resources- Affected Environment

Efforts associated with fulfilling the HAFB mission have resulted in primarily developed areas composed of research and administrative facilities, residential and educational buildings, and roads and jogging trails connecting the facilities. Due to the large amount of development, the remaining 132 acres of undeveloped land are composed of highly fragmented sections of wetland and forest that are too small and fragmented to provide habitat for animal species that cannot adapt to human activity and development.

Habitat on Hanscom AFB consists of urban or developed areas, forest, wetlands, and grasslands. These habitats generally support a variety of small mammal species and urban-adapted wildlife. Forested areas provide roosting and foraging habitat for several bat species, including the little brown bat (*Myotis lucifugus*), which is state listed as endangered and under review for federal listing, and the tri-colored bat (*Perimyotis subflavus*), which has been proposed for listing as Federal endangered (Schwab 2018). Avian species include raptors, songbirds, and grassland nesting birds, such as the grasshopper sparrow (*Ammodramus savannarum*) and upland sandpiper (*Bartramia longicauda*; LEC Environmental Consultants, Inc. 1999, S&S Environmental Consultants, LLC 2019).

Wetlands support breeding amphibians, potentially including the blue-spotted salamander (*Ambystoma laterale*; CEMML 2022B). Wetlands may provide habitat for aquatic reptiles; however, they are unlikely to support breeding populations (Massachusetts Port Authority [Massport] 2019, Partners in Amphibian and Reptile Conservation 2019). Fish surveys at HAFB have not been extensive and currently there are no recreational fishing opportunities on base (LEC Environmental Consultants, Inc. 1999).

There are no known T&E plant species or plant species of special concern (SSC) at HAFB, but inventory surveys for all species have yet to be completed. There are 259 plant species listed by

the state of Massachusetts, three of which are federally endangered and one of which is federally threatened.

At this time, Hanscom AFB has not conducted invertebrate surveys to determine whether any existing T&E species are present. The Monarch Butterfly and the Intricate Fairy Shrimp are two invertebrate species that may be located within Hanscom AFB. However, until surveys are conducted, no invertebrate species has been confirmed to exist at Hanscom AFB to date.

Finally, there are a number of vertebrate species that were confirmed or potentially located at Hanscom AFB. **Table 2** presents the threatened and endangered vertebrate species and species of special concern at Hanscom AFB (HAFB INRMP 2023).

Table 2 **Threatened and Endangered Vertebrate Species at Hanscom AFB**

Species	Scientific Name	Listing Category	Status on Unit
Mammals			
Little brown bat	<i>Myotis lucifugus</i>	SE	Confirmed
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT & FE**	Potential
Tri-colored bar	<i>Perimyotis subflavus</i>	FE	Confirmed
Birds			
Eastern Meadowlark	<i>Sturnella magna</i>	SSC	Potential
Grasshopper sparrow	<i>Ammodramus savannarum</i>	ST	Confirmed
Sedge wren	<i>Cistothorus platensis</i>	SE	Potential
Upland sandpiper	<i>Bartramia longicauda</i>	SE	Potential
Reptiles			
Blanding's turtle	<i>Emydoidea blandingii</i>	ST	Potential
Eastern box turtle	<i>Terrapene carolina</i>	SSC	Potential
Wood turtle	<i>Glyptemys insculpta</i>	SSC	Potential
Amphibians			

Blue-spotted salamander	<i>Ambystoma laterale</i>	SSC	Potential
Marine Species			
Bridle shiners	<i>Notropis bifrenatus</i>	SSC	Potential

FE=Federally Endangered, FT=Federally Threatened, SE=State Endangered, ST=State Threatened, SSC=Massachusetts Species of Special Concern.

The Northern Long Eared Bat (NLEB) (*Myotis septentrionalis*) may be encountered within Hanscom AFB boundary; however, there have been no documented sightings of the NLEB at Hanscom AFB. The closest known hibernaculum and/or maternity roost tree (trees that provide habitat or hibernaculum for the species) for the NLEB is 9.3 miles away, east of Reading, MA, near Bear Meadow Brook. In 2018 and 2023, DAF conducted acoustical surveys that failed to indicate presence of the NLEB within the areas of Hanscom AFB main base.

Based on these surveys' findings and that no known maternity roost trees are located within the vicinity, DAF determined that proposed undertakings within the boundaries of Hanscom AFB main base would have "No Effect" on the NLEB. A "No Effect" determination valid for five years was put in effect for undertakings conducted in Hanscom AFB between October 2, 2018 and October 1, 2023, unless subsequently rescinded based on newly acquired science or information. Updated bat surveys were conducted at the main base in 2023 and findings concluded that the NLEB was not present. The existing "No Effect" determination has been extended through March 2029. The determinations and extensions are provided as **Appendix D**

3.1.3.1 No Action Alternative

The No Action Alternative will leave the biological and natural resources to exist as they presently do and will not result in surveys to confirm the presence of potential T&E species within Hanscom AFB. The T&E species will continue to face pressures from the urban and industrialized environment within and surrounding the base with no support provided under the INRMP.

3.1.3.2 Preferred Alternative (Alternative 1)

The Preferred Alternative presents the most robust approach to protection of the T&E species that have been or potentially may be identified at Hanscom AFB. Undertaking G directly addresses habitat and species management to provide support for the various species that inhabit Hanscom AFB, including those listed under Table 2, above. Specifically, undertaking G will provide species management in the form of:

- Monarch Butterfly habitat enhancement
- Blue Spotted Salamander habitat protection and enhancement
- Intricate Fairy Shrimp and other invertebrate habitat protection and enhancement

- Bridle Shiner habitat protection and enhancement
- Protected Avian species habitat protection and enhancement
- Bat species habitat protection and enhancement

In addition to the species management listed above, supplemental support for the species will be provided in the form of annual invasive species control and eradication and the establishment of initial pollinator flyways that will create an increasingly native and natural environment for the T&E species within Hanscom AFB.

3.1.4 Cultural Resources- Affected Environment

The DAF's mission includes protecting our nation's heritage, as well as its people and borders; therefore, the DAF places a high priority on integrating cultural resources management with other mission priorities (DAFMAN 32-7003). Activities that protect cultural resources also indirectly support the military mission by preventing or minimizing conflicts between military operations and resource-protection goals.

Federal law protects cultural resources that satisfy government criteria for listing on the National Register of Historic Places. The area around Hanscom AFB contains areas of major prehistoric and historic importance from early Paleoindian sites to Revolutionary War battle sites and Cold War laboratories. Due to the prehistoric and historic archaeological sites in the vicinity of and on the installation, inventories have been completed on the main base and its GSUs. In 1992, the inventory identified areas of high, moderate, and low archaeological sensitivity on the main base, with one possible prehistoric site and the potential presence of historical sites.

Federal regulations and DAF policy require that any potential negative effects on cultural resources caused by mission activities be minimized or mitigated. This could include land-use activities related to natural resource management, such as forest management, T&E species management, wildland fire suppression, erosion control, and prescribed burning. The Cultural Resources Manager and project managers work together to identify and manage potential conflicts. Adverse effects to cultural resources resulting from standard or routine natural resource management activities will be avoided or mitigated (HAFB 2019d).

Please refer to **Figure 3** below for the location of the cultural resources within and surrounding Hanscom AFB.

3.1.4.1 No Action Alternative

The No Action Alternative will not result in impacts to cultural resources within Hanscom AFB as no earthwork or excavating activities will be undertaken. Maintenance of the main base will continue as it does under existing conditions. If any cultural resources are identified during maintenance, the proper controls would be implemented to ensure the cultural resource was adequately contained and all applicable organizations would be notified.



3.1.4.2 Preferred Alternative (Alternative 1)

The Preferred Alternative is not anticipated to result in impacts to cultural resources, since activities are aimed at habitat management and enhancement efforts. Similar to the No Action Alternative, if a cultural resource were to be identified during the Preferred Alternative, the proposed work would cease, the site would be secured, and the applicable parties would be notified of the cultural resource in a prompt manner.

3.1.5 Reasonably Foreseeable Actions and Cumulative Effects

The cumulative effects of the Proposed Action are the impacts that can be expected to incrementally increase over time as the Proposed Action develops. Cumulative effects can also be considered the aggregate impact of individually minimal actions that result in substantial alterations. Implementation of the INRMP may result in minor temporary adverse environmental impact but it is not anticipated to create permanent negative or nuisance conditions for the natural environment and is anticipated to create long-term benefits to the habitat at Hanscom AFB.

3.1.6 Resources Not Carried Forward for Analysis

The following resources were not carried forward for analysis as their anticipated impact on Hanscom AFB and the surrounding area was determined to be negligible:

- ◆ Air Installations Compatible Use Zone (AICUZ) - Although Hanscom AFB is considered to be an AICUZ, the Proposed Action is not anticipated to result in any impacts to the AFB's operations and is not anticipated to impact any of the adjacent land uses that are considered compatible with the AFB. Therefore, this resource was not considered for analysis.
- ◆ Air Quality - The Proposed Action is not anticipated to create any nuisance conditions associated with air quality or any benefits to air quality when compared to the existing conditions. Therefore, this resource was not considered for analysis.
- ◆ Noise - The anticipated noise from the Proposed Action is not anticipated to exceed an ambient level due to the temporary use of equipment. The equipment necessary to complete the Proposed Action will not exceed noise levels currently experienced at the base from the existing operations. Therefore, this resource was not considered for analysis.
- ◆ Infrastructure, Utilities, and Transportation - The Proposed Action is not anticipated to impact any existing infrastructure, utilities, or transportation components within Hanscom AFB and is not anticipated to require the construction of any infrastructure. Therefore, this resource was not considered for analysis.

- ◆ Occupational Health and Safety - The Proposed Action is not anticipated to result in increased safety concerns associated with individuals, contractors, military personnel, or the local community. Additionally, it is not anticipated to hinder emergency response or introduce a health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place. Therefore, this resource was not considered.
- ◆ Socioeconomics and Environmental Justice - The Proposed Action would have no impacts on environmental justice and the socioeconomics of Hanscom AFB due to the nature of the actions. Additionally, the Proposed Action is only anticipated to preserve the natural resources within Hanscom AFB and is not anticipated to drive economic growth from the Proposed Action. Therefore, this resource was not considered for analysis.
- ◆ Soil and Geological Resources - The Proposed Action is not anticipated to result in subsurface activities that would require grading, excavating, or other earthwork projects that would impact the soil or geological resources at Hanscom AFB. Therefore, this resource was not considered for analysis.
- ◆ Environmental Restoration – The Proposed Action is not anticipated to result in any impacts to potential Environmental Restoration Program sites. Therefore, this resource was not considered for analysis.

3.2 Fourth Cliff

3.2.1 *Water Resources- Affected Environment*

The Fourth Cliff recreational annex is considered part of the South Coastal watershed. Within this watershed, there are two sub-watersheds, the North and South Rivers. Both of these watersheds share the same outlet to the Atlantic Ocean between Third and Fourth Cliff. The water surrounding Fourth Cliff is shallow, so the shoreline is subject to coastal storm flowage (Onderko 2019). Additional wetland resources exist within the site, including salt marsh, coastal dune, coastal bank, coastal beach, land under the ocean, rocky intertidal shores, barrier beach, and anadromous/catadromous fish run. These protected coastal resources extend throughout the Fourth Cliff site, particularly the eastern and southeastern lower-lying portions, placing a considerable constraint on further development outside of the limited upland areas. The site is located within a 100-year flood SFHA and coastal barrier resource area (FEMA 2022). As such, the surrounding coastal area is at a very high risk of flooding.

Due to the existing water and natural resources, Fourth Cliff is considered high-risk for climate related impacts throughout the site, with the greatest impact to Fourth Cliff being the existing erosion on the property's eastern cliffs. Coastal erosion will continue under multiple projected climate scenarios and increase with sea level rise and storm surges (MCZM 2013). The USAF issued a Finding of No Significant Impact and Finding of No Practicable Alternative to construct a sloping rip-rap revetment on the eastern cliffs, which would address the existing erosion problems and

projected increases in erosion for the foreseeable future (HAFB 2019c). However, the design approach was rejected by the Office of Coastal Zone Management, as they would not permit seaward construction and the proposed erosion control system went from stone armoring to a cobble berm. The cobble berm design approach is less expensive than the stone armoring, resulting in this project going from major military construction to unspecified minor military construction.

Sea level rise and increased storm surges will also impact the coastal barrier on the western beach of Fourth Cliff. The Massachusetts Office of Coastal Zone Management (MCZM) used National Oceanographic and Atmospheric Administration (NOAA) data to produce maps showing the extent of projected sea level rise, and it used United States Army Corps of Engineers (USACE) data to map potential storm surge areas for each hurricane category (one–four) under worst-case scenarios (MCZM 2021). These maps show that the coastal barrier could be inundated by four feet from sea level rise and the current storm surge from a category two, or greater, hurricane (MCZM 2013).

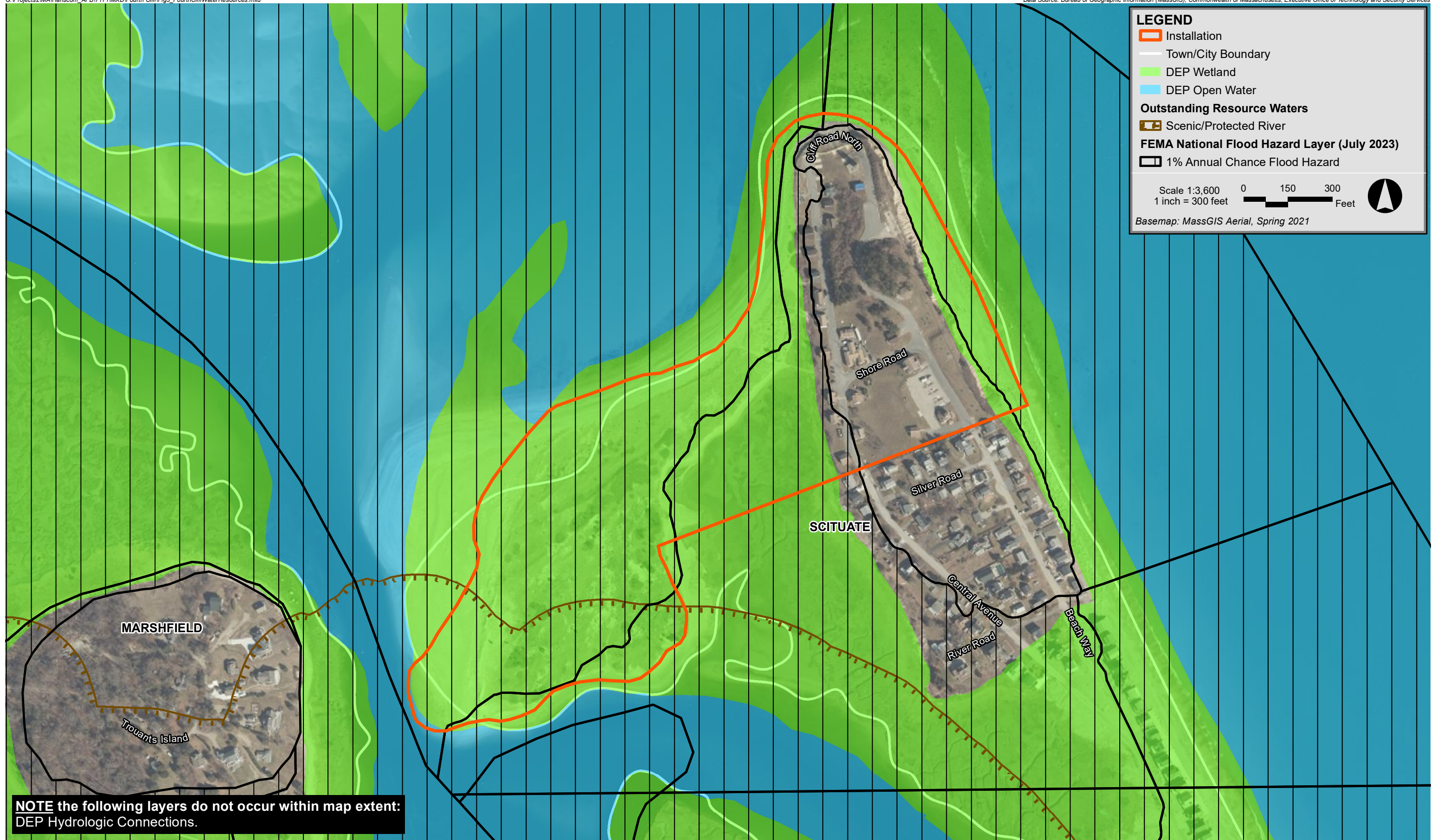
The water resources at Fourth Cliff also provide habitat for several species, including the Blue Mussel. The Blue Mussel is an important food source for shorebirds, including those listed as T&E under section 3.2.3. Blue Mussel beds have significantly declined in the North and South Rivers and may contribute to the significant decrease in rufa red knot numbers on Third and Fourth Cliff (Mass Audubon 2015). The Blue Mussel population is at risk from climate change due to the expected increase the frequency and intensity of severe weather, and inland and coastal flooding events which will in turn lead to a cascade of effects, including an increase in stormwater runoff and associated pollutants such as bacteria and sediment entering watersheds (HAFB INRMP 2023).

Please refer to **Figure 4** below for the water resources located within and surrounding Fourth Cliff.

3.2.1.1 No Action Alternative

Under the No Action Alternative, Fourth Cliff is anticipated to experience damage from climate change impacts due to its proximity to the ocean and the wetland resources that exist on-site. Climate change will increase in the frequency and intensity of severe weather and coastal flooding events. With the No Action Alternative considered, the site will be subject to the erosion constraints listed above that will continue to degrade the area. These conditions expected from climate change would directly and indirectly impact the environmental resources of Fourth Cliff. The No Action Alternative would not protect the water resources and the species that rely on the water resources for survival, including threatened and endangered species. Additionally, the conclusion determined by the studies referenced under section 3.2.1 determined the coastal barrier could eventually become unsuitable for any use, including current recreational uses, if no action is taken to curtail the erosion.

The No Action Alternative would also not include the Blue Mussel Restoration undertaking that provides a necessary food source for the birds that inhabit Fourth Cliff, specifically the rufa red



knot. The Federally Threatened rufa red knot had a high count of 2,800 in 1981 and in 2015 only 9 were observed between Third and Fourth Cliff. This is likely to be a result of the decline of blue mussel beds in the North and South Rivers (Mass Audubon 2015).

3.2.1.2 Preferred Alternative (Alternative 1)

The Preferred Alternative would provide support for the sensitive water and natural resources on Fourth Cliff from present and future climate conditions through various enhancements. Specifically, the Preferred Alternative would provide a Blue Mussel restoration demonstration project to enhance the population of the Blue Mussel at Fourth Cliff, which in turn would provide enhanced water quality at Fourth Cliff due to the mussel's water filtering properties while also providing an important food source for the shorebirds that inhabit the area.

Annual sediment monitoring surveys would also be conducted under the Preferred Alternative to monitor the effects of erosion and to determine whether sediment monitoring is needed. In addition to stabilizing the eastern cliffs at Fourth Cliff, sediment monitoring will minimize the amount of erosion materials entering the waters surrounding Fourth Cliff that result in an increase in stormwater runoff and associated pollutants such as bacteria and sediment.

3.2.2 Land Use- Affected Environment

Fourth Cliff comprises a 56-acre area located along the end of the Humarock Peninsula. There are 22 developed acres comprising open recreation areas, cottages, and roads on the upland section. The western edge and eastern end of the peninsula are composed of undeveloped beaches, salt marshes, and sandy flats (LEC Environmental Consultants, Inc., 2008a). Recreation is the primary use of Fourth Cliff. It provides cottages for rent, RV sites with electrical hookups, and tent camping sites. The site also provides passive enjoyment of the outdoors in a coastal setting, with access to beaches for walking, wildlife watching, swimming, and saltwater fishing.

The primary land constraint at Fourth Cliff is erosion that threatens some areas of the peninsula where the recreational facilities are located. The site has a series of cliffs undergoing erosion at a rate of up to one foot per year, which permanently limits opportunities for development and recreation on large sections of the peninsula and creates the need for continual erosion mitigation. Recent storm surges have increased the rate of erosion, with storms in 2016 and 2018 causing an additional ten feet of erosion, resulting in the collapse of the nearby road and destruction of subsurface utilities. This collapse resulted in loss of access to some camping opportunities (USAF 2019).

Under climate change, erosion is anticipated to increase as more frequent and intense storm surges as well as sea level rise may result in the loss of beach and recreational opportunities.

3.2.2.1 No Action Alternative

Under the No Action Alternative, the land, and subsequently the recreational opportunities associated with Fourth Cliff, are at an ever-increasing risk due to the rate of erosion experienced

under existing conditions. Without the annual sediment monitoring undertaking intervention, Fourth Cliff will continue to experience erosion that will threaten the recreational opportunities and natural resources of Fourth Cliff.

3.2.2.2 Preferred Alternative (Alternative 1)

Without the Preferred Alternative, the coastal erosion currently impacting Fourth Cliff will continue under projected climate change related impact scenarios. Sea level rise and increased storm surges will impact the coastal barrier on the western beach of Fourth Cliff as well as further degrade the cliff faces presently eroding. To mitigate the property's erosion concerns, the Preferred Alternative has proposed to conduct annual surveys/analysis of Fourth Cliff to monitor the effects of erosion and determine whether sediment monitoring is necessary. Furthermore, climate change is likely to cause longer and more frequent droughts, potentially making the ground less conducive to stormwater infiltration and causing vegetation die-off, which would exacerbate runoff velocity and expose soils directly to erosion. Undertaking F will directly enhance the Fourth Cliff recreational opportunities as the surveys and sediment monitoring are needed to address the erosion presently seen at Fourth Cliff to allow for the recreational uses to continue.

In addition to the erosion control needed, Fourth Cliff will also benefit from the other undertakings listed in the Proposed Action, specifically B, C, D, E, and G, to ensure the site is able to function at its intended capacity. Although these undertakings may not provide direct preservation of the land use at Fourth Cliff, these undertakings will allow for the site to provide extensive environmental management techniques to ensure all areas of the site are being utilized to the maximum extent possible and the land is maintained as it is intended.

3.2.3 Biological/Natural Resources- Affected Environment

The biological and natural resources at Fourth Cliff require careful management to protect the biodiversity that is present throughout, including the variety of habitats that have been designated as areas of importance for the several species that inhabit the site. Fourth Cliff is part of the designated Important Bird Area of North River which protects avian species observed in the coastal habitats of Fourth Cliff, including the common tern (*Sterna hirundo*), least tern (*Sternula antillarum*), piping plover (*Charadrius melodus*), and red knot (*Calidris canutus rufa*) (LEC Environmental Consultants, Inc., 2008a; HAFB 2014, 2019c Jorgenson et al. 2019), all of which have been determined to be a Massachusetts Species of Special Concern, a Federally Threatened Species, or a Federally Endangered Species. A list of all the threatened and endangered vertebrate species at Fourth Cliff has been provided in **Table 3**.

Table 3 Threatened and Endangered Vertebrate Species at Fourth Cliff

Species	Scientific Name	Listing Category	Status on Unit
Mammals			
Eastern small-footed bat	<i>Myotis leibii</i>	SE	Confirmed

Northern long-eared bat	<i>Myotis septentrionalis</i>	FT & FE	Potential
Tricolored bat	<i>Perimyotis subflavus</i>	SE & PE	Confirmed
Birds			
Common tern	<i>Sterna hirundo</i>	SSC	Confirmed
Least tern	<i>Sternula antillarum</i>	SSC	Confirmed
Piping plover	<i>Charadrius melodus</i>	FT	Confirmed
Rufa Red Knot	<i>Calidris canutus rufa</i>	FT	Confirmed
Roseate tern	<i>Sterna dougallii</i> <i>dougallii</i>	FE	Potential
Reptiles			
Eastern box turtle	<i>Terrapene carolina</i>	SSC	Potential
Marine Species			
Finback whale	<i>Balaenoptera physalus</i>	FE	Potential
North Atlantic right whale	<i>Eubalaena glacialis</i>	FE	Potential
Green turtle	<i>Chelonia mydas</i>	FE	Potential
Kemp's Ridley turtle	<i>Lepidochelys kempii</i>	FE	Potential
Leatherback turtle	<i>Dermochelys coriacea</i>	FE	Potential
Loggerhead turtle	<i>Caretta caretta</i>	FE	Potential
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	FE	Potential
Short nose sturgeon	<i>Acipenser brevirostrum</i>	FE	Potential

FE=Federally Endangered, FT=Federally Threatened, SE=State Endangered, ST=State Threatened, SSC=Massachusetts Species of Special Concern.

The Blue Mussel, an invertebrate found at Fourth Cliff, is an important food source for shorebirds, including those listed as T&E under section 3.2.3. Blue mussel beds have significantly declined in the North and South Rivers and may be a contributor to the significant decrease in rufa red knot numbers on Third and Fourth Cliff (Mass Audubon 2015). The Blue Mussel population is at risk from climate change as the increase in the frequency and intensity of severe weather, and inland and coastal flooding events, will likely lead to a cascade of effects, including an increase in stormwater runoff and pollutants such as bacteria and sediment entering watersheds (HAFB INRMP 2023).

Future climate change weather conditions may also result in non-native invasive species outcompeting native species due to shifting environmental conditions (Hellmann et al. 2008a).

Rising temperatures and changes in precipitation could increase the potential for outbreaks of infectious diseases such as white-nose syndrome and West Nile virus, which have caused declines to bat and avian communities, respectively (Pounds et al. 2006, Petersen and Hayes 2008, Süss et al. 2008, Rohr and Raffel 2010, Baylis 2017).

3.2.3.1 No Action Alternative

Under the No Action Alternative, biological resources at Fourth Cliff are threatened due to climate change, the eroding coastline, predation, and invasive species. The impacts of climate change on fish and wildlife at Fourth Cliff will depend on the flora and fauna's ability to adapt to extreme temperature fluctuations, possible changes in seasonal timing, altering vegetation communities, especially for specialist species that depend on native plants, and periods of water deficiency. Projected increases in temperature and precipitation may also pose indirect threats. Storm surges and sea level rise are anticipated to exacerbate existing erosion at Fourth Cliff and degrade species habitat due to vegetative or habitat loss.

3.2.3.2 Preferred Alternative (Alternative 1)

To address the natural resource related risks at Fourth Cliff, the Preferred Alternative has taken a comprehensive approach to limiting negative impacts to habitat to the maximum extent practicable.

Shorebirds

Hanscom AFB will work with Mass Audubon to conduct annual surveys for shorebirds at Fourth Cliff and implement the following habitat/species management techniques (Iglecia and Winn 2021) as appropriate:

- ◆ Shorebird nesting areas will be closed for access by vehicles and beach users in accordance with MassWildlife guidelines. Nesting areas will be closed to recreation, marked with multiple signs, and roped-off between the signs to clearly delineate closed areas. Adding rope between signs helps to clearly identify the areas closed and leads to greater compliance rates;
- ◆ Fourth Cliff visitors will be informed about the presence of federally listed shorebirds, segments of the beach under seasonal closures, and requirements to keep pets leashed to prevent disturbance or harm to shorebirds;
- ◆ Implementation of the HAFB Integrated Pest Management Plan to prevent populations of raccoons, skunks, and opossum from accessing food sources. Removal of predators (fox and coyote) may be conducted if needed to reduce predation on shorebirds. Predator control methods will adhere to the proper legislation, permits, and/or contracts as projects are developed; and

- ◆ HAFB will work with the North and South Rivers Watershed Association to restore blue mussels in the New Inlet estuary to benefit shorebirds, particularly rufa red knots.

Protected Marine Species

The NOAA Fisheries has identified the waters surrounding Fourth Cliff as being suitable for several protected marine species, listed under Table 3, that use these waters for feeding and migration. The following general management recommendations are provided to mitigate impacts to marine species (HAFB 2019c):

- ◆ Shallow-draft vessels will be used by the DAF to maximize the clearance between the vessel and the river bottom;
- ◆ When in areas where whales or marine turtles are expected, vessel speeds will not exceed 10 knots; and
- ◆ Observers will be present on vessels to identify whales and marine turtles; they will take action to avoid collisions when protected species are sighted. These sightings will be reported to NOAA Fisheries within 24-hours.

Manage Nuisance Wildlife and Predators

- ◆ HAFB will aim to reduce predation of shorebirds and their habitat through implementing a program (Capture or take) to address the predation concerns of the shorebirds and their habitat; and
- ◆ Identify and manage any nuisance wildlife that may impact the base operations, including Canada Geese populations in coordination with the USDA

Additional activities within the Proposed Action will build upon the biological management techniques mentioned above, including the Blue Mussel restoration demonstration project and the pollinator flyways. The Blue Mussel has been determined to be of significant importance to the shorebirds listed above as they provide a food source for the shorebirds that utilize Fourth Cliff. Establishing initial pollinator flyways will also support monarch butterflies and other important pollinators that have experienced recent population declines and are projected to be vulnerable to climate change, especially to changes in the timing of plant flowering, severe storms, and droughts. Monitoring for monarch butterflies, milkweed host plants, and other important pollinators is considered to be a high priority for Fourth Cliff.

Finally, Undertaking G - Habitat and Species Management will provide important techniques to manage avian and bat species habitat to ensure these species are protected from the negative climate-related changes to the environment. In 2017, little brown bat and tricolored bat were confirmed during acoustic surveys (Schwab 2018). It is likely that Fourth Cliff is used by bats for foraging and roosting. As of 2022, all bat species listed under the ESA or MESA, and known to occur in the area, have similar life histories and ecological requirements; therefore, an ecosystem-

based management strategy will be employed to conserve all listed bat species, including forested roosting habitat, and invertebrate prey sources. Management techniques for bat species include habitat protection and routine surveys to identify if any bat hibernacula are present at Fourth Cliff.

3.2.4 *Soil and Geological Resources- Affected Environment*

Bedrock and surficial geology and the geomorphology of the installation has been previously studied to understand depositional, erosional, and drainage patterns. Geological and geomorphological data were obtained from surveys conducted in the southeastern Massachusetts region. The soil survey for Plymouth County provides additional information concerning the description and distribution of soil types found within the project location.

Conditions at the Fourth Cliff area reflect the continuing erosion of the western peninsula and the cliffs on the eastern and western sides of the site. Erosion over the past 40 years has washed away and flooded infrastructure located on the western shore of Fourth Cliff. A severe coastal storm in 2018 (Onderko 2019) eroded 10 feet of the cliff face and caused extensive damage to the perimeter road and underground utilities. Ongoing erosion continues to damage the coastal embankment, parking areas, camping and picnic areas, and associated infrastructure; thus, addressing shoreline erosion from storm damage is necessary. The western peninsula appears to be expanding to the north and west as a result of deposited sand.

Most of the soil at lower elevations is subject to the effects of frequent flooding during at least half of the year. Soils on unprotected slopes are susceptible to significant erosion, especially during storm events. Additionally, climate change is anticipated to create an increase in the amount of stormwater runoff.

3.2.4.1 *No Action Alternative*

Under the No Action Alternative, Fourth Cliff would be at risk of continued erosion, at an increasing rate due to climate change, until the eventual collapse of the area would result in the installation becoming non-functional. Habitat for shoreline birds and other protected marine species would not be enhanced, and species would face additional pressures from predators and loss of nesting and foraging sites.

3.2.4.2 *Preferred Alternative (Alternative 1)*

Due to the condition of the soil and geological resources presented, the Preferred Alternative includes annual sediment surveys and potential sediment monitoring to mitigate the rate of erosion. Annual sediment monitoring would serve as the foundation for supporting the cliff face. Sediment monitoring under the Preferred Alternative would allow for habitat management and enhancements to reduce the rate of erosion through vegetative and ground cover plantings. In accordance with the Massachusetts Department of Environmental Protection, salt-tolerant plants with extensive root systems can help address coastal erosion problems as roots hold sediment in

place, helping to stabilize soils and by absorbing water, breaking the impact of raindrops or wave-splash, and physically slowing the speed and diffusing the flow of overland runoff.

3.2.5 Cultural Resources- Affected Environment

Fourth Cliff was originally developed as a summer resort community in the 1920s until it was annexed by the U.S. Army in 1940 for the development of a waterfront artillery battery as part of a national program for a coastal defense system. For concealment purposes, military facilities were designed to blend in with the existing cottage community. An underground bunker was landscaped, and the fire-control tower and station were concealed within false cottages. In 1992, Fourth Cliff was inventoried for cultural resources that satisfy the criteria for listing on the National Register of Historic Places (NRHP) and three of the buildings within Fourth Cliff met the NRHP criteria. NRHP-eligible buildings include a WWII bunker, and two observation towers. Currently, all but one of the original cottages and most of the WWII buildings have been removed or renovated, with the majority of structures and buildings having been built after 1979 (HAFB 2019d).

Please refer to **Figure 5** for the location of the cultural resources within and surrounding Fourth Cliff.

3.2.5.1 No Action Alternative

The No Action Alternative would result in the Fourth Cliff area remaining under existing conditions with no direct impact anticipated to the remaining cultural resources. However, the continued erosion of Fourth Cliff will present a risk to the cultural resources within the installation.

3.2.5.2 Preferred Alternative (Alternative 1)

Federal regulations and DAF policy require that the potential negative effects on cultural resources caused by mission activities be minimized or mitigated. This includes land-use activities related to natural resource management, such as T&E species management, erosion control, and other natural resource management techniques. Under Alternative 1, the Installation Cultural Resources Manager, and installation project managers and planners will work together to identify and manage potential impacts from INRMP activities. Adverse effects to cultural resources resulting from standard or routine natural resource management activities will be avoided or mitigated.

3.2.7 Reasonably Foreseeable Actions and Cumulative Effects

Implementation of the proposed INRMP could result in minor and temporary adverse environmental impacts. These impacts may be eliminated, avoided, or further reduced, through implementation of a variety of standard operating procedures and good engineering practices. Noise, fugitive dust, and engine exhaust emissions are anticipated during the sediment monitoring process at Fourth Cliff as the sand being deposited would require construction vehicles to haul and place sediment on-site. Additional environmental impacts anticipated relate to the



remaining undertakings including vegetation removal and soil disturbance for the invasive species control for species such as the Spotted Lanternfly, the initial pollinator flyways, and habitat and species management. For the Blue Mussel restoration demonstration project, temporary water turbidity could be anticipated for the proposed seeding of Blue Mussels in and around Fourth Cliff.

The positive cumulative effects of the Proposed Action are expected to incrementally increase over time as the Proposed Action is carried out. Cumulative effects also consider the aggregate impact of individually minimal actions that result in substantial alterations to Fourth Cliff. Generally, despite the mostly temporary impacts to Fourth Cliff from the Proposed Action, the substantial benefits to the area from sediment monitoring as well as enhancement to environmental resources due to habitat management can be expected to significantly outweigh the impacts from undertaking the Proposed Action.

3.2.8 *Resources Not Carried Forward for Analysis*

In addition to the resources listed above that are anticipated to be impacted by the Proposed Action and those with potentially significant environmental issues, in accordance with NEPA, CEQ, and 32 CFR Part 989, the EA should only focus on the resources that are pertinent to the Proposed Action. Therefore, the following resources were not carried forward for analysis:

- ◆ Air Installations Compatible Use Zone (AICUZ) – the Fourth Cliff as a GSU to Hanscom AFB is not considered to be an AICUZ, therefore this resource was not considered for analysis.
- ◆ Air Quality- The Proposed Action is not anticipated to result in increased emissions and subsequently reduce air quality over existing conditions. A temporary increase in emissions can be expected from the use of machinery for the Fourth Cliff annual sediment monitoring; however this temporary increase is not anticipated to exceed any of the National Ambient Air Quality Standards. Therefore, this resource was not considered for analysis.
- ◆ Noise- The Proposed Action is not anticipated to result in increased noise levels over existing conditions. A temporary increase in noise levels can be anticipated from the use of machinery for the annual sediment monitoring at Fourth Cliff; however these impacts are temporary and expected to be consistent with ambient noise levels within the coastal area. Therefore, this resource was not considered for analysis.
- ◆ Infrastructure, Utilities, and Transportation- The Proposed Action is not anticipated to result in any impacts to the existing infrastructure, utilities, or transportation components that Fourth Cliff utilizes, and no additional infrastructure will be constructed as a part of the INRMP. Therefore, this resource was not considered for analysis.
- ◆ Occupational Health and Safety- The Proposed Action is not anticipated to result in increased safety concerns associated with individuals, contractors, military personnel, or the local community. Additionally, it is not anticipated to hinder emergency response or

introduce a health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place. Therefore, this resource was not considered for analysis.

- ◆ Socioeconomic and EJ- The Fourth Cliff annex is strictly reserved for members of the military and their family and does not create an advantage or disadvantage for any populations. Additionally, the Proposed Action is only anticipated to preserve the natural and biological resources within Fourth Cliff and is not anticipated to drive economic growth from the Proposed Action. Therefore, this resource was not considered for analysis.
- ◆ Environmental Restoration- There are no environmental restoration, quality, or response programs located at Fourth Cliff and the Proposed Action is not anticipated to result in the creation or expansion of any environmental restoration sites. Therefore, this resource was not considered for analysis.

3.3 Sagamore Hill

3.3.1 Water Resources- Affected Environment

Sagamore Hill is within the Ipswich River watershed. This watershed covers all or part of 21 communities that rely on the streams and aquifers of this watershed for drinking water (Mass.gov 2021). This demand, along with land-use changes, creates low-flow conditions in sections of the Ipswich River, causing water-quality issues and reducing groundwater recharge. Stormwater flows from Sagamore Hill to Nicholas Brook and then to the mouth of the Ipswich River. Small wetlands present on Sagamore Hill, as shown in **Figure 6**, consist primarily of forested wetlands that occur to the east of the buildings and antenna structures (LEC Environmental Consultants Inc. 2008a).

Topographically, Sagamore Hill is characterized by little variation, but the vegetation that occurs in red maple swamp forests and other low-lying areas where groundwater levels are shallow is very different from the upland vegetation. Many of the wetlands have been reconfigured by human activities and all are in various stages of succession that range from wet meadows to mature, forested red maple swamps (LEC Environmental Consultants, Inc. 1999).

3.3.1.1 No Action Alternative

Under the No Action Alternative, the wetland resources would remain under their current conditions. All impairments and issues related to the wetland resource areas on and off-site will continue uninhibited. It is anticipated these impairments and issues would likely be exacerbated under climate change projections due to increased frequency and intensity of severe weather, and inland and coastal flooding events.



3.3.1.2 Preferred Alternative (Alternative 1)

The Preferred Alternative does not provide undertakings that will directly impact the wetland resources within Sagamore Hill. However, the Town of Hamilton has adopted a wetlands bylaw for alterations near wetland resource areas. The INRMP has the goal of complying with all federal and local laws that pertain to natural and cultural resources. As such, the management activities will include communication between Hanscom and the Town of Hamilton regarding activities such as tree removal and mowing of shrub layer within buffer zone areas that are anticipated to impact wetlands or regulatory areas. This management approach and communication will allow for a sustainable approach to the wetland resource areas without risk of further adverse impacts.

3.3.2 Land Use- Affected Environment

Sagamore Hill is primarily located within a rural, residential area in northeastern Hamilton, Massachusetts. The area is a 'glacial drumlin' with a maximum elevation of 187 feet. A long, bituminous concrete driveway extends easterly from Sagamore Street and provides access to the site. The southwestern portion of the site is dominated by structures, a parking area, and an entranceway, while the remainder of the site is comprised of forested uplands and wetland communities.

A network of bituminous concrete and gravel roadways and pathways interconnect the buildings and observation stations within the western portion of the facility. Some of the roadways within the eastern portion of the site are no longer in use and are in various stages of degeneration. An eight-foot chain-link fence surrounds the parcel. DAF personnel maintain an approximate 10-foot swath of vegetation that occurs parallel to the chain-link fence. Since the site is located on a glacial drumlin, the site's topography is generally flat, although portions of the landscape along the site's boundary slope downhill.

3.3.2.1 No Action Alternative

Sagamore Hill would remain operable under the No Action Alternative and would continue to serve as a solar observatory for the DAF. However, due to the existing vegetation and need for maintaining open space clear of vegetation surrounding the solar weather-monitoring equipment, the site will likely face an increased pressure from invasive species that will encroach upon the land use necessary to keep the critical equipment free of obstructions.

3.3.2.2 Preferred Alternative (Alternative 1)

Sagamore Hill would benefit greatly from the surveys that are anticipated under the Preferred Alternative as it would identify invasive species that threaten the open space within Sagamore Hill. Under the Preferred Alternative, the INRMP would identify invasive species within Sagamore Hill's boundary, provide annual invasive species control and eradication, establish initial pollinator flyways, and provide habitat and species management to ensure the operations are not impeded by the degradation of the open space surrounding the solar weather-monitoring equipment.

3.3.3 Biological/Natural Resources- Affected Environment

Sagamore Hill remains relatively undeveloped and is primarily dominated by forested uplands and forested swamps with species that are representative of the region, similar to what is found on the main base. It is more rural than the HAFB area, giving it connectivity to a larger area of undeveloped land and vegetation that likely supports a greater diversity of wildlife than HAFB. Vegetation is similar to HAFB, with the exception of the floodplain forest and pitch pine groups, which do not occur at Sagamore Hill.

The vegetation on-site has established in a variety of cover types including maturing, mixed hardwood, coniferous forests, fields, lawns and shrub communities along roadsides. Forested uplands contain areas with wetland vegetation found primarily along the northern, central, and eastern portions of the site. The remainder of the site is comprised of lawn areas and pathways and bituminous concrete roadways.

According to prior surveys, plant species identified in the forest areas at Sagamore Hill include the following shrubs and herbs: highbush and lowbush blueberry (*Vaccinium corymbosum* and *V. angustifolium*), swamp azalea (*Rhododendron viscosum*), sheep laurel (*Kalmia angustifolia*), Canada mayflower (*Maianthemum canadense*) wintergreen (*Gaultheria procumbens*), goldenrod (*Solidago* sp.), woodfern (*Dryopteris carthusiana*), and cinnamon fern (*Osmundia cinnamomea*) (LEC Environmental Consultants, Inc. 2008b).

Invasives Plant Species

Invasive plant species such as black swallowwort, spotted knapweed, Japanese knotweed, multi-flora rose, purple loosestrife, and common reed are present at Sagamore Hill CEMML (2022b). Prior surveys have identified 1.64 acres with presence of at least one invasive species (CEMML 2022b). Invasive species compete with native plants for resources, reducing habitat quality and some are toxic to wildlife, such as black swallowwort which is harmful to the monarch butterfly (*Danaus plexippus*), a candidate species for federal listing.

Animal Species

At Sagamore Hill, there are forest and wetland habitats similar to those at HAFB, but Sagamore Hill is located in a more rural area, where there is greater habitat connectivity to a larger, less-developed landscape. Small mammals, white-tailed deer, and several protected bats are present at Sagamore Hill, including the northern long-eared bat, and the little brown and tricolored bats. LEC Environmental Consultants, Inc., (2008b) conducted avian surveys on Sagamore Hill and detected several songbird species, ruffed grouse (*Bonasa umbellus*), and American woodcock (*Scolopax minor*).

Wetlands and adjacent forest at Sagamore Hill may provide suitable habitat for reptiles observed in the surrounding areas, including several snake and turtle species. Three species of salamander

are also potentially present at Sagamore Hill, including the state threatened blue-spotted salamander (LEC Environmental Consultants, Inc., 2008b; Town of Hamilton 2009).

Six federally- and state-listed species listed in **Table 4** are confirmed or have the potential to occur at Sagamore Hill. For species already described above in the HAFB section, only their presence and suitable habitat at Sagamore Hill will be discussed in this section. There are no state-designated “Priority Habitats” or “Estimated Habitats” at Sagamore Hill (MassGIS 2021).

Threatened and endangered species and species of special concern confirmed or potentially occurring at Sagamore Hill.

Table 4 Threatened and Endangered Vertebrate Species at Sagamore Hill

Species	Scientific Name	Listing Category ¹	Status on Unit
Mammals			
Northern long-eared bat	<i>Myotis septentrionalis</i>	FT & FE**	Confirmed
Little brown bat	<i>Myotis lucifugus</i>	SE & UR	Confirmed
Tricolored bat	<i>Perimyotis subflavus</i>	SE & PE	Confirmed
Birds			
Golden-winged warbler	<i>Vermivora chrysoptera</i>	SE & UR	Potential
Reptiles			
Blanding’s turtle	<i>Emydoidea blandingii</i>	ST & UR	Potential
Amphibians			
Blue-spotted salamander	<i>Ambystoma laterale</i>	SSC	Potential

¹ FE=Federally Endangered, FT=Federally Threatened, PE= Proposed Endangered, SE=State Endangered, ST=State Threatened, SSC= Massachusetts Species of Special Concern, UR= Under review for federal listing, **= Effective March 31, 2023.

Bats

In 2017, the northern long-eared bat, little brown bat, and tricolored bat (*Perimyotis subflavus*) were confirmed at Sagamore Hill (Schwab 2018) with acoustic monitoring stations placed in open areas adjacent to forested habitat throughout the center of Sagamore Hill (Schwab 2018). The nearest known northern long-eared bat hibernaculum is located approximately 14.5 miles to the southwest (NHESP 2021a).

The tricolored bat is state endangered and is proposed as federally endangered. Its life history is similar to that of northern long-eared bat and little brown bat. In summer, they roost in the canopy of forested areas, particularly among dead leaves on mature deciduous trees. They forage at the tree-top level, in open fields, over water courses, and along forest-field edges. In winter, they hibernate in high-humidity limestone caves and abandoned mines. There are known

hibernacula in Berkshire, Franklin, and Hampden counties of western Massachusetts, and these bats are known to travel up to 85 miles between summer roosting areas and winter hibernacula, but in summer they travel approximately 5 miles to forage.

Once the third most abundant bat species in Massachusetts, populations of tricolored bats declined following the start of pesticide use in the mid-1900s, but their populations were beginning to recover until outbreaks of white-nose syndrome began in 2007–2008; losses to white-nose syndrome in hibernacula have exceeded 90 percent (Kurta et al. 2007; Langwig et al. 2015a, 2016; NHESP 2015j). Additional causes of decline are collisions with wind turbines, habitat loss, pesticide use, and climate change (Arnett et al. 2008a; Center for Biological Diversity and Defenders of Wildlife 2016; Kunz et al. 2007; Langwig et al. 2015a; USFWS 2015c, 2018a)

Golden-Winged Warbler

The presence of golden-winged warbler (*Vermivora chrysoptera*) has not been confirmed at Sagamore Hill and suitable habitat at that site is limited; however, the species is observed infrequently in the town of Hamilton, which includes Sagamore Hill (Town of Hamilton 2009, NHESP 2021b). The golden-winged warbler is a migratory songbird that winters in Mexico and Central and South America, and breeds throughout the eastern U.S., including in Massachusetts. In the early part of the 20th century, golden-winged warbler numbers increased following the abandonment of agricultural land that become second-growth forest habitat, which the species uses for nesting (NHESP 2015d). Following further vegetation succession, this habitat favored the blue-winged warbler (*Vermivora cyanoptera*), a species that has been outcompeting and hybridizing with golden-winged warbler, resulting in golden-winged warbler population declines since the 1940s (NHESP 2015d). Full reasons for their decline are still not fully understood, as blue-winged warbler numbers also have been declining since the 1980s and suitable golden-winged warbler nesting habitat is not a limiting factor. It is possible that habitat declines in their wintering areas or cowbird parasitism could be part of the problem (NHESP 2015d).

Blanding's Turtle

Blanding's turtle has not been detected at Sagamore Hill, and the habitat is of marginal quality for this species; therefore, they are unlikely to breed on Sagamore Hill. Furthermore, they have not been detected within the town of Hamilton (Town of Hamilton 2009), and CEMML (2022b) did not detect any Blanding's turtle eDNA during surveys in 2022.

Blue-Spotted Salamander

CEMML (2022b) detected weak signs of blue-spotted salamander eDNA on Sagamore Hill; however, follow up surveys were not conducted due to resource limitations. MassWildlife (2021) reported that this species was last observed at Sagamore Hill in 1996. There is suitable wetland habitat throughout the site and additional cover object, or drift-fence surveys should be conducted to determine the presence of this species. In 2019, blue-spotted salamander was confirmed in the town of Hamilton (Town of Hamilton 2009, NHESP 2021b).

3.3.3.1 No Action Alternative

The No Action Alternative will leave the biological and natural resources to exist in their present condition and does not include surveys to confirm the presence of potential T&E species within Sagamore Hill. The T&E species will continue to face pressures from invasive species, grounds maintenance, and vegetation management surrounding the site's buildings and infrastructure with no support provided under the INRMP.

3.3.3.2 Preferred Alternative (Alternative 1)

HAFB implements an integrated Pest Management Plan for Sagamore Hill (HAFB 2020c). The integrated Pest Management Plan addresses control of insects, small vertebrates, large wild animals, flying pests, noxious weeds, and invasive species. A number of these pest species can affect natural resources, including populations of animals whose populations benefit from anthropogenic activities, such as coyotes, foxes, and raccoons, which consume T&E herptiles, as well as invasive plant species that degrade wetlands habitat. Invasive plant species also pose a problem and spread quickly, often forming dense monocultures that outcompete native plants and prevent native species from re-establishing (CEMML 2022b).

The integrated Pest Management Plan, coupled with the extensive surveys and undertakings proposed under the INRMP, will provide the best approach to managing the invasive species and the T&E species present at Sagamore Hill. Specifically, undertaking G will provide the following species management measures:

- ◆ Coordinate with the Integrated Pest Management team to further reduce the use of chemicals, particularly pesticides, herbicides, and fungicides, which would benefit all invertebrates;
- ◆ Increase abundances of native flowering plants on a landscape scale, with emphasis on spring-flowering plants, but also including plants that flower throughout summer and fall to benefit bumble bees, including the state-listed and federal-candidate species, the yellow-banded bumble bee (Carvel et al. 2017);
- ◆ Protect water sources from pollution, invasive aquatic plants or algae, and rising temperatures due to climate change to protect dragonflies, damselflies, shrimp, and other aquatic invertebrates;
- ◆ Work with grounds maintenance personnel to prevent mowing to protect butterfly and moth larvae from being destroyed by lawn mowers. In areas where mowing must occur, ensure a mower height of no less than four–six inches to preserve larvae nesting;
- ◆ Reduce the use of nitrogen fertilizers to allow more diverse plant communities to thrive; and

- ◆ Support a diverse array of plants (e.g., flowers, shrubs, trees, grasses, etc.) rather than monocultures (e.g., lawns) to create more natural habitat.

3.3.4 Cultural Resources- Affected Environment

Sagamore Hill was surveyed in 1994, and the majority of the facility was designated as having low potential for archaeological resources, see **Figure 7**. The exception was discovery of a burial site adjacent to the southern boundary of the facility, where impacts of construction will be avoided (HAFB 2019d).

3.3.4.1 No Action Alternative

The No Action Alternative will not result in impacts to cultural resources within Sagamore Hill as no earthwork or excavating activities are anticipated. Maintenance of the property will continue as it does under existing conditions. Under the event a cultural resource was to be identified during maintenance, the proper controls would be implemented to ensure the cultural resource was adequately contained and all applicable organizations would be notified.

3.3.4.2 Preferred Alternative (Alternative 1)

The Preferred Alternative is not anticipated to result in impacts to cultural resources, since activities are aimed at habitat management and enhancement efforts. Similar to the No Action Alternative, if a cultural resource were to be identified during the Preferred Alternative, the proposed work would cease, the site would be secured, and the applicable parties would be notified of the cultural resource in a prompt manner.

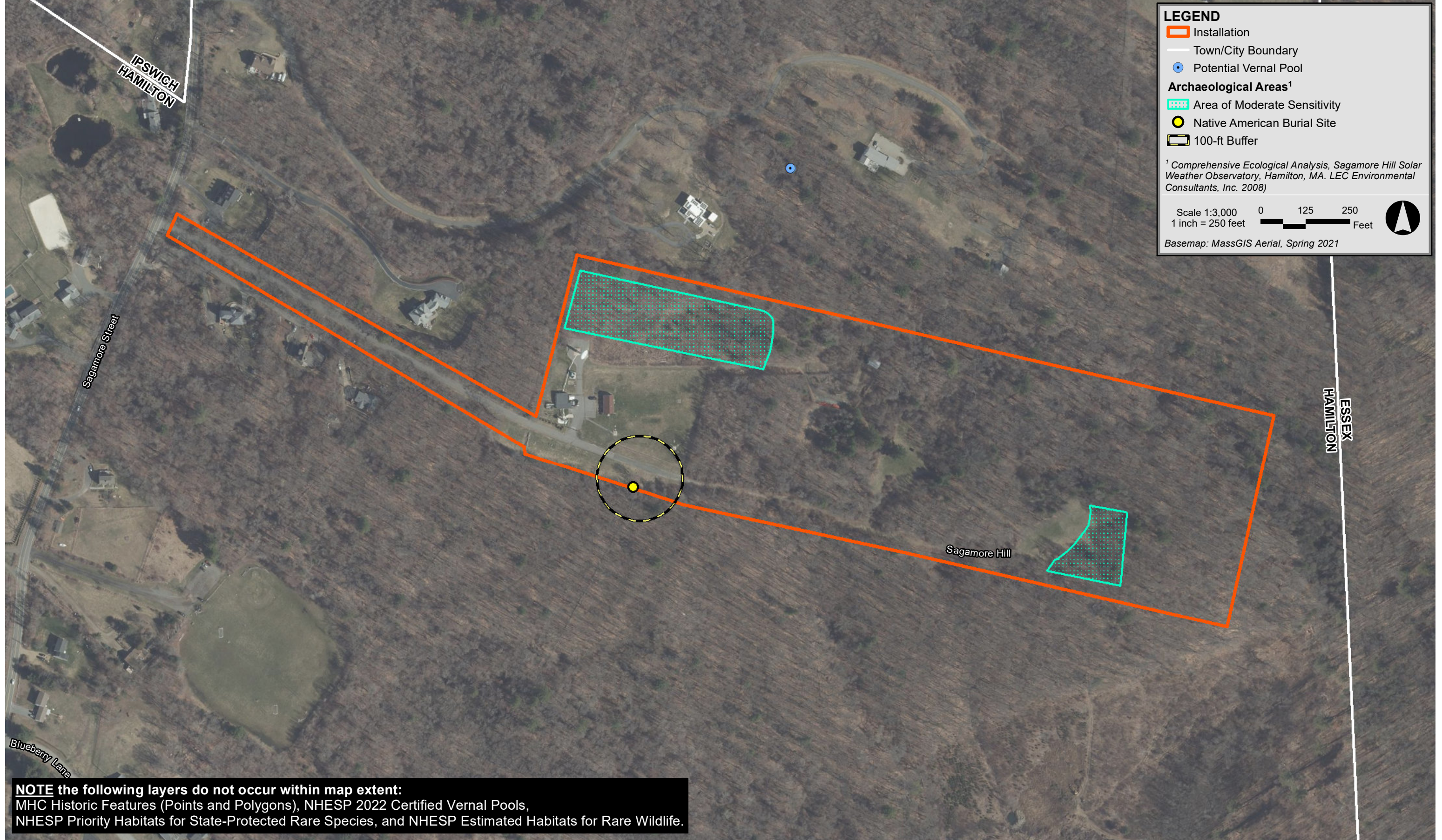
3.3.5 Reasonably Foreseeable Actions and Cumulative Effects

The cumulative effects of the Preferred Alternative are the impacts that can be expected to incrementally increase over time as the Proposed Action develops. Cumulative effects can also be considered the aggregate impact of individually minimal actions that result in substantial alterations. Implementation of the proposed INRMP may result in minor temporary adverse environmental impacts but it is not anticipated to create permanent negative or nuisance conditions.

3.3.6 Resources Not Carried Forward for Analysis

In addition to the resources listed above that are anticipated to be impacted by the Proposed Action and those with potentially significant environmental issues, in accordance with NEPA, CEQ, and 32 CFR Part 989, the EA should only focus on the resources that are pertinent to the Proposed Action. Therefore, the following resources were not carried forward for analysis:

- ◆ Air Installations Compatible Use Zone (AICUZ) - Sagamore Hill is a geographically separate unit to Hanscom AFB and is not anticipated to result in any impacts to the AFB's operations. Therefore, this resource was not considered for analysis.



- ◆ Air Quality- The Proposed Action is not anticipated to result in increased emissions and subsequently reduce air quality over existing conditions. Therefore, this resource was not considered for analysis.
- ◆ Noise- Similar to air quality, the Proposed Action is not anticipated to result in increased noise levels over existing conditions. Therefore, this resource was not considered for analysis.
- ◆ Infrastructure, Utilities, and Transportation- The Proposed Action is not anticipated to result in any impacts to the existing infrastructure, utilities, or transportation components that the Sagamore Hill Observatory utilizes, and no additional infrastructure will be constructed as a part of the INRMP. Therefore, this resource was not considered for analysis.
- ◆ Soil and Geological Resources- The Proposed Action is not anticipated to result in subsurface activities that would require grading, excavating, or other earthwork projects that would impact the soil or geological resources at Sagamore Hill. Therefore, this resource was not considered for analysis.
- ◆ Occupational Health and Safety- The Proposed Action is not anticipated to result in increased safety concerns associated with individuals, contractors, military personnel, or the local community. Additionally, it is not anticipated to hinder emergency response or introduce a health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place. Therefore, this resource was not considered for analysis.
- ◆ Socioeconomic and EJ- The Sagamore Hill Observatory is used for military purposes and does not create an advantage or disadvantage for any populations. Additionally, the Proposed Action is only anticipated to preserve the natural and biological resources within the Sagamore Hill Observatory site and is not anticipated to drive economic growth from the Proposed Action. Therefore, this resource was not considered for analysis.
- ◆ Environmental Restoration- The Proposed Action is not anticipated to result in the creation or expansion of any environmental restoration sites. Therefore, this resource was not considered for analysis.

3.4 Patriot Golf Course

3.4.1 Water Resources- Affected Environment

Patriot Golf Course contains a northerly-flowing intermittent stream and wetland system located within the south/central portion of the golf course. Wetland resource areas associated with the stream include Bordering Vegetated Wetlands (BVW), stream bank, and Land Under Water (LUW), see **Figure 8**. Additional resource areas associated with the stream are state and local 100-foot Buffer Zones considered subject to jurisdiction under Massachusetts Wetlands Protection Act and the Town of Bedford Wetland Protection Bylaw (2016). Relevant areas of the Patriot Golf site with environmental concerns addressed under the INRMP (flooding, invasives, and impacted waterways) are documented in **Appendix E** based on field investigations (Epsilon Associates, 2024). Additional information pertaining to the wetland resources are further described below:

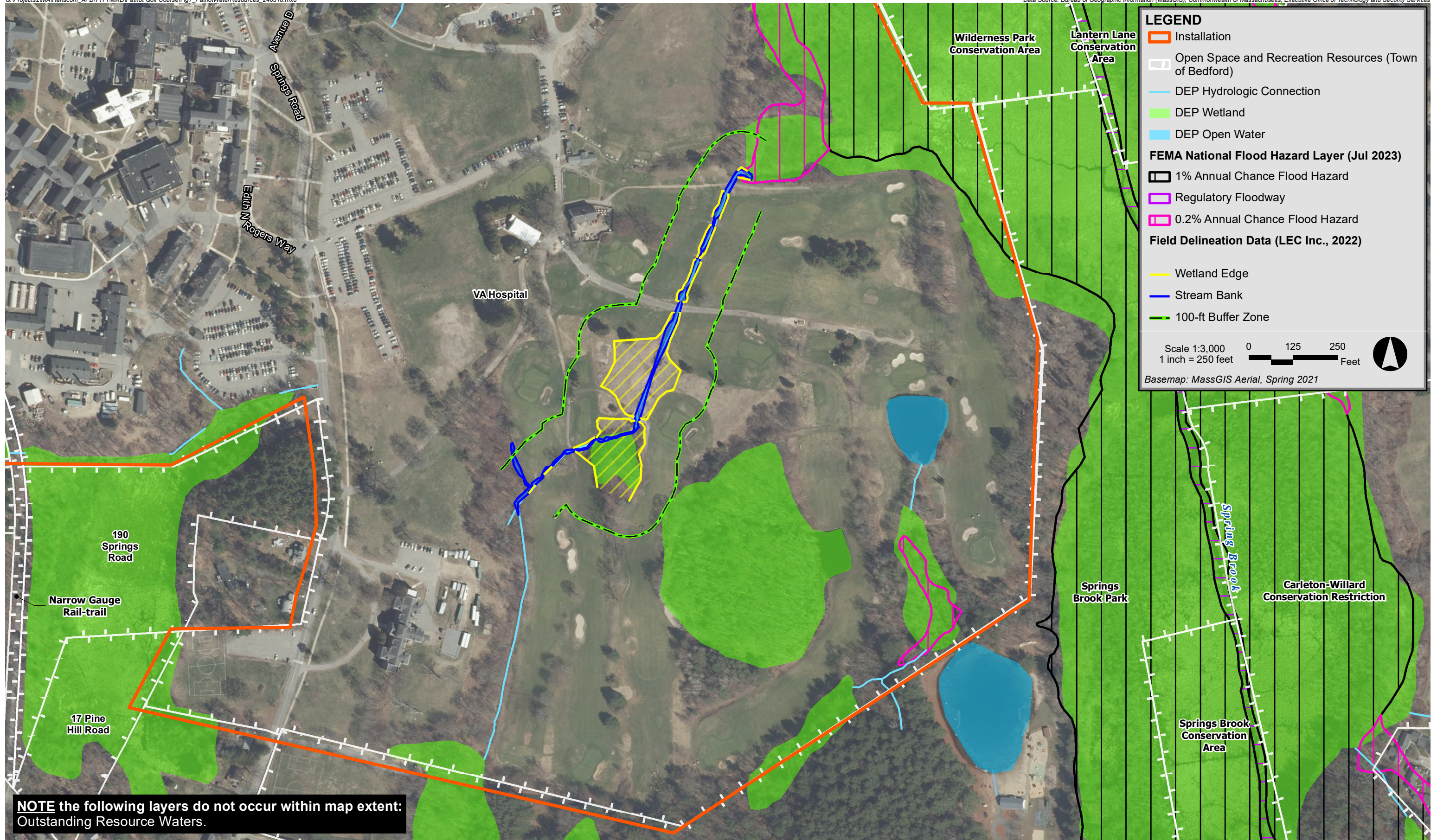
Bordering Vegetated Wetlands: wetlands which border on creeks, rivers, streams, ponds, and lakes. In these areas soils are saturated or inundated such that they support a predominance of wetland indicator plants. The boundary of BVW is the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.

According to recent wetland investigations, the BVW within the site is characterized as a scrub-shrub wetland and wet meadow. The following plant species within the shrub layer consist of glossy buckthorn (*Frangula alnus*), elderberry (*Sambucus* sp.), speckled alder (*Alnus incana*), redosier dogwood (*Cornus sericea*), and northern arrowwood (*Viburnum dentatum*). Groundcover includes cattail (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*), blue vervain (*Verbena hastata*), blueflag iris (*Iris versicolor*), sedges (*Carex* sp.), common rush (*Juncus effuses*), climbing nightshade (*Solanum dulcamara*), sensitive fern (*Onoclea sensibilis*), American bur-reed (*Sparganium americanum*), and arrowleaf tearthumb (*Polygonum sagittatum*) (LEC 2023).

Bank: Bank is the portion of the land surface which normally abuts and confines a water body, occurring between a water body and a vegetated bordering wetland and adjacent flood plain, or between a water body and an upland. The upper boundary of a Bank is the first observable break in the slope or the mean annual flood level, whichever is lower. The lower boundary of a Bank is the mean annual low flow level.

Land Under Water (LUW): In Massachusetts, state wetland regulations¹ identify LUW as the land beneath any creek, river, stream, pond or lake. This area may be composed of organic muck or peat, fine sediments, rocks or bedrock. The boundary of Land under Water Bodies and Waterways is the mean annual water level.

¹ 310 CMR 10.56(2)



Previous wetland studies have located both Bank and Land Under Water associated with the intermittent stream on-site as part of a project to replace stream crossings and culverts. In segments of the stream, the Bank is comprised of mucky/mineral substrate and vegetated with wetland plants or maintained grass with other areas comprised of small boulders or culverts. The Bank generally exhibits a gradual to abrupt transition from the stream channel to the upland and/or wetland area. The height of Bank varies from roughly 3 to 12 inches (LEC 2023).

HAFB recently undertook a separate project to remove and replace undersized stream crossings (for golfers and carts) and culverts throughout the stream channel on the course that had resulted in restricted flow and flooding in several areas. In this project, permitted separately from the INRMP projects, five existing stream crossings were improved, of which two existing stream crossings were replaced, two were removed without replacement, and one was repaired.

Wetland resource area mitigation associated with the bridge/crossing replacement project includes creation and/or restoration of new stream channel segments and wetland along the stream. Buffer Zone plantings are proposed to provide restoration to previously disturbed areas adjacent to the stream, along with the removal of gravel and/or asphalt path surfaces within the Buffer Zone to grass surfaces.

3.4.1.1 No Action Alternative

Under the No Action Alternative, the wetland and water resources would remain in their current conditions. Impairments to wetland resource areas would continue unaddressed. Flooding issues experienced at the golf course would be exacerbated under future climate-related storms as the flooding events would increase in frequency and intensity.

Under the no action alternative, improvements to the wetland and stream systems, and pollinator habitats at Patriot Golf Course would not be improved. Annual wetland rehabilitation projects included in the INRMP to improve stream continuity and flow and to mitigate flooding from the stream on-site would not take place. Without these improvements users of the course would continue to experience periodic and disruptive flooding events that limit access throughout the golf course.

3.4.1.2 Preferred Alternative (Alternative 1)

The INRMP management activities for the Preferred Alternative will address future wetland restoration/enhancement needs of Patriot Golf Course. Management activities proposed are aimed at addressing threats to wetland and stream resources from invasive species, vegetation overgrowth, and to restore and enhance habitat within the waterway and Buffer Zone for the wildlife species in the area. Restoration activities under the INRMP also include the establishment of pollinator habitat enhancement to the course.

Under the Preferred Alternative 1, the INRMP would develop a natural resources management program for the Patriot Golf Course and incorporate the following management and maintenance projects:

INRMP Project 1.4.1: Evaluate which natural resource categories (wetlands, T&E species, invasive species etc.) should be prioritized at Patriot Golf Course for programming detailed surveys.

INRMP Project 1.4.2: Using the results from project 1.4.1, conduct natural resource surveys at Patriot Golf course.

INRMP Project 1.4.3: Determine the feasibility of implementing a ‘monarchs in the rough’ program, which plants native species to support pollinators — including the monarch butterfly in the semi-improved and unimproved areas of the golf course.

INRMP Project 1.4.4: Incorporate the results of projects 1.4.1 – 1.4.3 into the INRMP. Develop management plans for any key habitats identified in the surveys for HAFB and its GSUs. Management plans should incorporate regional strategies to provide habitat variability and connectivity that may be crucial for species adapting to climate change

Under Preferred Alternative 1, HAFB will work with grounds maintenance and golf course managers to evaluate landscaping activities and determine whether there are opportunities to incorporate native species into planting plans, add no-mow areas to the golf course, and reduce the use of pesticides to the extent possible to protect invertebrate resources, such as pollinators.

The INRMP includes wetland rehabilitation as part of the effort to reduce flooding within portions of the golf course greens adjacent to waterways as part of the 5-Year action plan. It is anticipated that HAFB will undertake, as part of the INRMP, long-term wetland rehabilitation efforts (e.g., removal of invasives, creation of pollinator habitat, and buffer zone plantings) to restore the site stream’s water quality and flow over current conditions. As appropriate, these activities will be permitted separately under applicable state and federal regulations to address flooding due to lack of a defined channel and overgrown vegetation and undersized culverts.

The INRMP management activities proposed under the Preferred Alternative will address future wetland restoration needs of Patriot Golf Course. Management activities proposed will address damage to wetland and stream resource areas from invasive species, vegetation overgrowth, and to restore and enhance habitat within the waterway and Buffer Zone for the wildlife species in the area. Restoration activities under the INRMP also include the establishment of pollinator habitat enhancement to the course.

3.4.2 *Land Use- Affected Environment*

The Patriot Golf Course is located off of Springs Road in Bedford, MA and is adjacent to the Veterans Affairs Medical Center and related buildings on the west side of Springs Road. Open space areas such as Springs Brook Park, Fawn Lake, Murray York Conservation Area, and Wilderness Conservation Area surround the course. Residential developments exist beyond the open space areas. The Patriot Golf Course is a public nine-hole golf course with scattered landscaping features, club house/pro shop, maintenance buildings, parking areas, cart paths, fairways, tees, greens, and hazards.

Several conservation areas exist within the Town of Bedford surrounding the Patriot Golf Course to the north, east and south. These areas provide for the connectivity of wetland resources and wildlife habitat within Patriot Golf Course. The following conservation areas are in the vicinity of the course and provide connectivity to the area for wildlife movement and habitat areas:

Wilderness Park Conservation Area: is a large woodland and wetland area directly to the north of the Patriot Golf Course, providing habitat for a wide variety of wildlife. Its location north of the VA Hospital grounds and within the Springs Brook corridor results in a rich combination of diverse habitats and edge areas. This large conservation area supports a varied wildlife population, including pileated woodpeckers, barred owl and fisher.

Cappadona Conservation Area: is a 12.5-acre property situated adjacent to Wilderness Park along Springs Brook.

Springs Brook: is a 20.5-acre property south of Wilderness Park and Cappadona. Located next to the Springs Brook Park recreation area, it provides additional passive recreational opportunities as well as a buffer to Springs Brook.

Other areas on the golf course contain forested uplands, wetlands, and intermittent streams. The perennial waterway, Springs Brook, occurs east of the site. Numerous pedestrian/golf cart crossings over intermittent streams provide access throughout the golf course.

3.4.2.1 No Action Alternative

Implementation of the No Action Alternative would not result in a change in land use or impacts on the existing conditions. The land would remain unaffected and the current conditions would continue to exist.

3.4.2.2 Preferred Alternative (Alternative 1)

The Preferred Alternative is limited to ecological and environmental enhancements to the golf course areas and would not result in a change of land use. The implementation of the Proposed Action would result in minor changes to the land in the form of environmental management and enhancement activities.

3.4.3 Biological/Natural Resources- Affected Environment

In addition to fairways and greens, the golf course contains forested uplands, wetlands, and intermittent streams. The perennial waterway, Springs Brook, occurs east of the course property. Within the course, the Springs Brook segment is traversed by several pedestrian and golf cart crossings to access different holes. While the site is a maintained golf course, there are wooded areas on the property that may provide habitat for wildlife. Patriot Golf Course is bordered to the north by a wilderness park and to the south by Springs Brook Park, which can potentially provide habitats for wildlife.

The wetlands and streams on-site can also provide potential habitats. Common wildlife observed at the property include deer, rabbits, coyotes, and geese. During prior field investigations songbirds, frogs, and turtles were observed on-site as well. According to the Massachusetts NHESP, eighteen state-protected rare species (threatened, endangered, special concern) have been observed in the town of Bedford.

Prior consultation with the NHESP found that no mapped Priority or Estimated Habitat or new state-listed species information are present.

3.4.3.1 No Action Alternative

The No Action Alternative will leave the biological and natural resources to exist as they presently do and will not result in surveys to confirm the presence of potential T&E species within Patriot Golf Course. Biological and natural resources will continue to face pressure from the urban and industrialized environment within and surrounding the course with no support provided under the INRMP.

3.4.3.2 Preferred Alternative (Alternative 1)

The Preferred Alternative will present an approach to enhance the biological and natural resources at Patriot Golf Course. Preferred Alternative 1 includes Undertaking G to directly address habitat and species management to provide support for the various species that inhabit the site. Specifically, undertaking G will provide species management in the form of:

- Monarch Butterfly habitat enhancement
- Creation of Pollinator Habitat;
- Avian species habitat protection and enhancement;
- Bat species habitat protection and enhancement; and
- Wetland restoration.

In addition to the species management techniques listed above, supplemental support for the species will be provided in the form of annual invasive species control and eradication and establishment of initial pollinator flyways that will create an increasingly native and natural environment for the T&E species within the Site.

3.4.4 Soil and Geological Resources- Affected Environment

Patriot Golf Course is located in the Nashoba zone within the Merrimack Belt. The underlying geology at Patriot Golf Course is Shawsheen Gneiss from the Ordovician or Proterozoic era. The property is generally flat with a gentle slope toward Spring Brook located approximately 300 feet east of the property and varies no more than 13 feet in elevation across the golf course.

3.4.4.1 No Action Alternative

Under the No Action Alternative, the Patriot Golf Course would continue to function as it has under existing conditions. The wetland surrounding the course would not be restored by enhancement actions and restoration plantings. The soil and geological resources would remain as it currently does.

3.4.4.2 Preferred Alternative (Alternative 1)

Under the Preferred Alternative, Patriot Golf Course would conduct wetland rehabilitation efforts designed to enhance their function, which may result in temporary soil impacts to the soil surrounding the stream as the work would require temporary site disturbances. However, the Preferred Alternative is anticipated to reduce flooding events that currently impact the soil on-site. The geological resources that exist on-site are anticipated to be improved by the Preferred Alternative.

3.4.5 Cultural Resources- Affected Environment

Cultural resources are associated with many heritage-related resources such as prehistoric and historic sites, buildings, structures, districts, artifacts, or any other physical evidence of human activity that is considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can provide insight into practices of previous civilizations and/or can also retain religious significance to modern groups.

The Patriot Golf Course is a non-contributing resource to the Bedford Veterans Administration Hospital Historic District, which was listed in the National Register of Historic Places in 2012. The district is significant at the statewide level under Criterion A in the Area of Politics and Government and the Area of Health and Medicine and under Criterion C in the Area of Architecture. The property is an excellent example of a “Second Generation Veterans Hospital,” which refers to the federal government’s construction of hospitals and medical facilities to care for World War I veterans between c. 1919 and 1950. The district includes examples of patient wards and treatment buildings, medical staff quarters, and administration and secondary outbuildings. The period of significance for the district is 1927 to 1950. The Patriot Golf Course was developed in 1953, outside the period of significance, and does not contribute to the district’s thematic areas of significance. All historic properties on or in the vicinity of the project site are shown in **Figure 9**.

The proposed activities at the Patriot Golf Course are not anticipated to have an adverse effect on the historic district. The Patriot Golf Course is a non-contributing resource to the historic district that has not gained historic significance in its own right in the 12 years since the property was listed in the National Register. Additionally, the golf course is not known to contain historically or culturally significant landscape features or plantings or other significant features that would be adversely impacted by the proposed alternative.



3.4.5.1 No Action Alternative

Under the No Action Alternative, the Patriot Golf Course would continue to function as it has under existing conditions, therefore the cultural resources associated with site would not be affected.

3.4.5.2 Preferred Alternative (Alternative 1)

Under this alternative, activities proposed will address damage to wetland and stream resource areas from invasive species, vegetation overgrowth, and to restore and enhance habitat throughout the site. Historical properties are not anticipated to be impacted from the Proposed Action.

3.4.6 Reasonably Foreseeable Actions and Cumulative Effects

The cumulative effects of the Proposed Action are the impacts that can be expected to incrementally increase over time as the Proposed Action develops. Cumulative effects can also be considered the aggregate impact of individually minimal actions that result in substantial alterations. Implementation of the proposed INRMP on the Patriot Golf Course is anticipated to result in temporary impacts, however, the project is anticipated to result in an overall betterment to the site from enhanced and restored wetland areas. The Proposed Action is not anticipated to create permanent negative or nuisance conditions for the natural environment and is anticipated to create long-term benefits to the habitat at the Patriot Golf Course.

3.4.7 Resources Not Carried Forward for Analysis

- ◆ Air Installations Compatible Use Zone (AICUZ) - Patriot Golf Course is not considered to be an AICUZ, therefore, this resource was not considered for analysis.
- ◆ Air Quality - The Proposed Action is not anticipated to create any nuisance conditions associated with air quality or any benefits to air quality when compared to the existing conditions. Therefore, this resource was not considered for analysis.
- ◆ Noise - The anticipated noise from the Proposed Action is not anticipated to exceed an ambient level due to the temporary use of equipment. The equipment necessary to complete the Proposed Action will not exceed noise levels currently experienced at the golf course from the existing operations. Therefore, this resource was not considered for analysis.
- ◆ Infrastructure, Utilities, and Transportation - The Proposed Action is not anticipated to impact any existing infrastructure, utilities, or transportation components within the Patriot Golf Course and is not anticipated to require the construction of any infrastructure. Therefore, this resource was not considered for analysis.

- ◆ Occupational Health and Safety - The Proposed Action is not anticipated to result in increased safety concerns associated with individuals, contractors, military personnel, or the local community. Additionally, it is not anticipated to hinder emergency response or introduce a health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place. Therefore, this resource was not considered.
- ◆ Socioeconomics and Environmental Justice - The Proposed Action would have no impacts on environmental justice and the socioeconomics of the Patriot Golf Course due to the nature of the actions. Additionally, the Proposed Action is only anticipated to preserve the natural resources within the Patriot Golf Course and is not anticipated to drive economic growth from the Proposed Action. Therefore, this resource was not considered for analysis.
- ◆ Environmental Restoration – The Proposed Action is not anticipated to result in any impacts to potential Environmental Restoration Program sites. Therefore, this resource was not considered for analysis.

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5 LIST OF PREPARERS

This EA has been prepared under the direction of the Environmental Office (66ABG/CEIE), along with Epsilon Associates to fulfill the requirements of NEPA for Hanscom AFB, MA.

The following persons authored and provided direct oversight for the preparation of this EA:

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Howe, Jennifer, PE, SMMA, Boston, Massachusetts. B.S. in Environmental Engineering; As the Project Director, Ms. Howe, with over 25 years of experience, provided management oversight for preparation of this environmental assessment.

Santamaria, Austin, SMMA, Boston, Massachusetts. B.S. in Finance. Mr. Santamaria assisted with Project Management for the preparation of this environmental assessment.

TASK LEADER

Sheehan, Scott. E.I.T.; 66 ABG/CEIE; B.S. in Civil Engineering. Mr. Sheehan, as the task leader for this effort, provided technical analysis and editing and daily oversight for preparation of this environmental assessment.

Maravelias, James P., 66 ABG/CEIE. Mr. Maravelias provided technical analysis and editing support for preparation of this environmental assessment.

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DRAFT ENVIRONMENTAL ASSESSMENT

Environmental Assessment

Integrated Natural Resources Management Plan

Appendices

Hanscom AFB, Massachusetts

APPENDIX A

List of Parties Contacted and Correspondences



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSKOM AIR FORCE BASE MASSACHUSETTS**

APPENDIX A: CONSULTATION RECIPIENT LIST

Federal

- Environmental Protection Agency (EPA) Region 1
- FAA New England Region
- U.S. Fish and Wildlife Service (USFWS) - Section 7
- Minute Man National Historic Park

Tribal/State

- Massachusetts Historical Commission (MHC) State Historic Preservation Office (SHPO) – Section 106
- Section 106 –Wampanoag Tribe of Aquinnah, Mashpee Wampanoag
- MassPort

Local

- Town of Bedford (Select Board, Town Manager, Conservation Commission)
- Town of Hamilton (Select Board, Planning Board, Conservation Commission)
- Town of Scituate (Select Board, Planning and Development, Coastal Management and Flood Hazard Mitigation, Conservation Commission)
- Hanscom Area Towns Committee (Bedford, Lincoln, Concord, and Lexington)



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Lorraine Devin, Executive Assistant
Town of Scituate, Select Board
600 Chief Justice Cushing Highway
Scituate, MA 02066

Dear Lorraine,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

The Proposed Action includes undertakings associated with the management of the natural environment and protected species, and includes, but is not limited to, the following projects:

- ◆ Predation Control at Fourth Cliff to protect ESA listed shorebird species;
- ◆ Fourth Cliff Blue Mussel restoration demonstration project;
- ◆ Annual invasive species control and eradication;
- ◆ Establishment of initial pollinator flyways;
- ◆ Annual sediment supplementation at Fourth Cliff; and
- ◆ Habitat and Species Management.

HAFB is submitting an EA for the INRMP under the Sikes Act Improvement Act of 1997, as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which governs the planning and implementation of conservation programs on military installations. This is Hanscom's first fully Sike Act-compliant INRMP. It was negotiated with and jointly approved by the DAF, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Department of Fish and Wildlife (MassWILDLIFE) in February 2024. The INRMP and its supporting goals and projects are currently not open for review as they have been approved by all three parties. For this step, HAFB is assessing the potential environmental effects of those goals and projects. By design, we, the USFWS and MassWILDLIFE anticipate that all projects will have a beneficial impact to the environment and protect species. INRMP projects are not subject to review under the Massachusetts Environmental Protection Act (MEPA).

As part of the NEPA process, we are required to notify potential interested parties early in the process and seek any input you may have to help, or wish us to consider, to assist the DAF in fully developing the range of issues to consider in the environmental assessment. If you wish to provide input, we request you respond within 30 days from receipt of this letter. Note that we will use any input you provide in developing our assessment, but we will not be responding directly to input received except through the publication of the Draft Environmental Assessment which will be available for a 30-day public review period, currently anticipated in the spring/summer of 2024. If you have questions or recommendations on which you would like us to engage or respond, please contact our Natural Resources Manager, Mr. Scott Sheehan at 781-367-7168 or at scott.sheehan.1@us.af.mil, outside of this current process.

For NEPA purposes, any written input you may have at this time can be e-mailed to james.maravelias.1@us.af.mil or mailed to:

Mr. Jim Maravelias, NEPA/EIAP Program Manager
66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

A handwritten signature in black ink, appearing to read 'C. Strickland III', written over a horizontal line.

CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

1. Proposed Action Location Map
2. List of Parties Contacted



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Corey Miles
Town of Scituate
Coastal Management and Flood Hazard Mitigation
600 Chief Justice Cushing Highway
Scituate, MA 02066

Dear Corey,

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For NEPA purposes, any written input you may have at this time can be e-mailed to james.maravelias.1@us.af.mil or mailed to:

Mr. Jim Maravelias, NEPA/EIAP Program Manager
66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely



CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

1. Proposed Action Location Map
2. List of Parties Contacted



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Mr. Frank Snow, Chair
Town of Scituate, Conservation Commission
600 Chief Justice Cushing Highway
Scituate, MA 02066

Dear Frank,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

The Proposed Action includes undertakings associated with the management of the natural environment and protected species, and includes, but is not limited to, the following projects:

- ◆ Predation Control at Fourth Cliff to protect ESA listed shorebird species;
- ◆ Fourth Cliff Blue Mussel restoration demonstration project;
- ◆ Annual invasive species control and eradication;
- ◆ Establishment of initial pollinator flyways;
- ◆ Annual sediment supplementation at Fourth Cliff; and
- ◆ Habitat and Species Management.

HAFB is submitting an EA for the INRMP under the Sikes Act Improvement Act of 1997, as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which governs the planning and implementation of conservation programs on military installations. This is Hanscom's first fully Sike Act-compliant INRMP. It was negotiated with and jointly approved by the DAF, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Department of Fish and Wildlife (MassWILDLIFE) in February 2024. The INRMP and its supporting goals and projects are currently not open for review as they have been approved by all three parties. For this step, HAFB is assessing the potential environmental effects of those goals and projects. By design, we, the USFWS and MassWILDLIFE anticipate that all projects will have a beneficial impact to the environment and protect species. INRMP projects are not subject to review under the Massachusetts Environmental Protection Act (MEPA).

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For NEPA purposes, any written input you may have at this time can be e-mailed to james.maravelias.1@us.af.mil or mailed to:

Mr. Jim Maravelias, NEPA/EIAP Program Manager
66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

A handwritten signature in dark ink, appearing to read 'C. N. Strickland III', written in a cursive style.

CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

1. Proposed Action Location Map
2. List of Parties Contacted



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Laurie Wilson, Assistant to Town Manager
Town of Hamilton, Select Board
Town Offices of Patton Homestead
650 Asbury Street P.O. Box 429
Hamilton, MA 01936

Dear Laurie,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Kristan Farr, Coordinator
Town of Hamilton, Conservation Commission
Town Offices of Patton Homestead
650 Asbury Street, P.O. Box 429
Hamilton, MA 01936

Dear Kristan,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

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2. List of Parties Contacted



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Linda Escobedo,
Hanscom Area Towns Committee
Town House
22 Monument Square
Concord, MA 01742

Dear Linda,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Margot R. Fleischman, Chair
Town of BedfordSelect Board
10 Mudge Way
Bedford, MA 01730

Dear Margot,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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HAFB:

- ◆ Annual invasive species control and eradication;
- ◆ Establish initial pollinator flyways; and
- ◆ Habitat and Species Management.

Patriot Golf Course:

- ◆ Annual invasive species control and eradication;
- ◆ Establish initial pollinator flyways;
- ◆ Habitat and Species Management; and
- ◆ Golf course wetland rehabilitation.

HAFB is submitting an EA for the INRMP under the Sikes Act Improvement Act of 1997, as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which governs the planning and implementation of conservation programs on military installations. This is Hanscom's first fully Sike Act-compliant INRMP. It was negotiated with and jointly approved by the DAF, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Department of Fish and Wildlife (MassWILDLIFE) in February 2024. The INRMP and its supporting goals and projects are currently not open for review as they have been approved by all three parties. For this step, HAFB is assessing the potential environmental effects of those goals and projects. By design, we, the USFWS and MassWILDLIFE anticipate that all projects will have a

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Hanscom AFB, MA 01731-1910

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSKOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Mr. Jeffrey Summers, Administrator
Town of Bedford, Conservation Commission
10 Mudge Way
Bedford, MA 01730

Dear Jeffrey,

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Hanscom AFB, MA 01731-1910

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Chief, Installation Management Flight

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCom AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Suzanne Barry,
Hanscom Area Towns Committee
Lexington Town Office Building
1625 Massachusetts Avenue
Lexington, MA 02420

Dear Suzanne,

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66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

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Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Mr. Jonathan Dwyer,
Hanscom Area Towns Committee
16 Lincoln Road
Lincoln, MA 01773

Dear Jonathan,

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Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Emily Mitchell,
Hanscom Area Towns Committee
10 Mudge Way
Bedford, MA 01730

Dear Emily,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

The Proposed Action includes undertakings associated with the management of the natural environment and protected species, and includes, but is not limited to, the following projects:

HAFB:

- ◆ Annual invasive species control and eradication;
- ◆ Establish initial pollinator flyways; and
- ◆ Habitat and Species Management.

Patriot Golf Course:

- ◆ Annual invasive species control and eradication;
- ◆ Establish initial pollinator flyways;
- ◆ Habitat and Species Management; and
- ◆ Golf course wetland rehabilitation

HAFB is submitting an EA for the INRMP under the Sikes Act Improvement Act of 1997, as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which governs the planning and implementation of conservation programs on military installations. This is Hanscom's first fully Sike Act-compliant INRMP. It was negotiated with and jointly approved by the DAF, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Department of Fish and Wildlife (MassWILDLIFE) in February 2024. The INRMP and its supporting goals and projects are currently not open for review as they have been approved by all three parties. For this step, HAFB is assessing the potential environmental effects of those goals and projects. By design, we, the USFWS and MassWILDLIFE anticipate that all projects will have a

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For NEPA purposes, any written input you may have at this time can be e-mailed to james.maravelias.1@us.af.mil or mailed to:

Mr. Jim Maravelias, NEPA/EIAP Program Manager
66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

A handwritten signature in black ink, appearing to read 'C. N. Strickland III', with a stylized flourish at the end.

CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

1. Proposed Action Location Map
2. List of Parties Contacted



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Mr. Douglas M. Lucente, Chair
Town of Lexington, Select Board
1625 Massachusetts Avenue
Lexington, MA 02420

Dear Douglas,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

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Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Mr. Philip K Hamilton, Chair
Town of Lexington, Conservation Commission
1625 Massachusetts Ave
Lexington, MA 02420

Dear Phillip,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

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Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Kim Bodnar, Chair
Town of Lincoln, Select Board
16 Lincoln Road
Lincoln, MA 01773

Dear Kim,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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CHARLES N. STRICKLAND III, P.E.
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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Michele Grzenda, Administrator
Town of Lincoln, Conservation Commission
16 Lincoln Road
Lincoln, MA 01773

Dear Michele,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

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Sincerely

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CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Colleen D'Alessandro, Regional Administrator
FAA New England Region
1200 District Avenue
Burlington, MA 01803-5299

Dear Colleen,

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Amber Goodspeed, Manager
MassPort. L.G. Hanscom Field
Civil Air Terminal
200 Hanscom Drive, Suite 214
Bedford, MA 01730

Dear Amber,

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Simone Monteleone, Park Superintendent
Minute Man National Historic Park
174 Liberty St.
Concord, MA 01742

Dear Simone,

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**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Ms. Mary Hartman, Chair
Town of Concord, Select Board
P.O. Box 535
Concord, MA 01742

Dear Mary,

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- ◆ Establish initial pollinator flyways; and
- ◆ Habitat and Species Management.

HAFB is submitting an EA for the INRMP under the Sikes Act Improvement Act of 1997, as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which governs the planning and implementation of conservation programs on military installations. This is Hanscom's first fully Sike Act-compliant INRMP. It was negotiated with and jointly approved by the DAF, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Department of Fish and Wildlife (MassWILDLIFE) in February 2024. The INRMP and its supporting goals and projects are currently not open for review as they have been approved by all three parties. For this step, HAFB is assessing the potential environmental effects of those goals and projects. By design, we, the USFWS and MassWILDLIFE anticipate that all projects will have a beneficial impact to the environment and protect species. INRMP projects are not subject to review under the Massachusetts Environmental Protection Act (MEPA).

As part of the NEPA process, we are required to notify potential interested parties early in the process and seek any input you may have to help, or wish us to consider, to assist the DAF in fully developing the range of issues to consider in the environmental assessment. If you wish to provide input, we request you respond

within 30 days from receipt of this letter. Note that we will use any input you provide in developing our assessment, but we will not be responding directly to input received except through the publication of the Draft Environmental Assessment which will be available for a 30-day public review period, currently anticipated in the spring/summer of 2024. If you have questions or recommendations on which you would like us to engage or respond, please contact our Natural Resources Manager, Mr. Scott Sheehan at 781-367-7168 or at scott.sheehan.1@us.af.mil, outside of this current process.

For NEPA purposes, any written input you may have at this time can be e-mailed to james.maravelias.1@us.af.mil or mailed to:

Mr. Jim Maravelias, NEPA/EIAP Program Manager
66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

A handwritten signature in black ink, appearing to read 'C. Strickland III', followed by a small flourish.

CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

1. Proposed Action Location Map
2. List of Parties Contacted



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS**

2 July 2024

Mr. Charles N. Strickland III, P.E.
Chief, Installation Management Flight
120 Grenier Street
Hanscom AFB, MA 01731-1910

Mr. Edward Nardi, Chair
Town of Concord, Conservation Commission
141 Keyes Road
Concord, MA 01742

Dear Edward,

In accordance with the National Environmental Policy Act of 1969 (NEPA) and the Air Force Environmental Impact Analysis Process (32 Code of Federal Regulations 989 et seq.), the Department of the Air Force (DAF) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with implementing the installation's newly developed Integrated Natural Resources Management Plan (INRMP) at the Hanscom Air Force Base (HAFB) (the "Proposed Action"). The INRMP addresses management of resources at HAFB's main base in Bedford, Lexington, and Lincoln, MA, as well as the installation's geographically separated areas of Sagamore Hill in Hamilton, MA and Fourth Cliff in Scituate, MA.

The Proposed Action includes undertakings associated with the management of the natural environment and protected species, and includes, but is not limited to, the following projects:

- ◆ Invasive species control and eradication;
- ◆ Establish initial pollinator flyways; and
- ◆ Habitat and Species Management.

HAFB is submitting an EA for the INRMP under the Sikes Act Improvement Act of 1997, as amended through 2010 (16 United States Code [U.S.C.] 670a et seq.), which governs the planning and implementation of conservation programs on military installations. This is Hanscom's first fully Sike Act-compliant INRMP. It was negotiated with and jointly approved by the DAF, the U.S. Fish and Wildlife Service (USFWS), and the Massachusetts Department of Fish and Wildlife (MassWILDLIFE) in February 2024. The INRMP and its supporting goals and projects are currently not open for review as they have been approved by all three parties. For this step, HAFB is assessing the potential environmental effects of those goals and projects. By design, we, the USFWS and MassWILDLIFE anticipate that all projects will have a beneficial impact to the environment and protect species. INRMP projects are not subject to review under the Massachusetts Environmental Protection Act (MEPA).

As part of the NEPA process, we are required to notify potential interested parties early in the process and seek any input you may have to help, or wish us to consider, to assist the DAF in fully developing the range of issues to consider in the environmental assessment. If you wish to provide input, we request you respond

within 30 days from receipt of this letter. Note that we will use any input you provide in developing our assessment, but we will not be responding directly to input received except through the publication of the Draft Environmental Assessment which will be available for a 30-day public review period, currently anticipated in the spring/summer of 2024. If you have questions or recommendations on which you would like us to engage or respond, please contact our Natural Resources Manager, Mr. Scott Sheehan at 781-367-7168 or at scott.sheehan.1@us.af.mil, outside of this current process.

For NEPA purposes, any written input you may have at this time can be e-mailed to james.maravelias.1@us.af.mil or mailed to:

Mr. Jim Maravelias, NEPA/EIAP Program Manager
66 ABG/CEIE
120 Grenier Street, B1825
Hanscom AFB, MA 01731-1910

If you have any questions, please feel free to contact Mr. Jim Maravelias at (781) 225-6209 or james.maravelias.1@us.af.mil.

Sincerely

A handwritten signature in black ink, appearing to read 'C. N. Strickland III', with a stylized flourish at the end.

CHARLES N. STRICKLAND III, P.E.
Chief, Installation Management Flight

Attachments:

1. Proposed Action Location Map
2. List of Parties Contacted

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Notice of Availability and Comment Letters

PUBLIC NOTICE
NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT AND
PROPOSED FINDING OF NO SIGNIFICANT IMPACT
FOR THE INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
FOR HANSCOM AIR FORCE BASE, MASSACHUSETTS

The Department of the Air Force (DAF) announces the availability of a draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for the Integrated Natural Resources Management Plan for Hanscom Air Force Base (AFB).

The EA, prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and Department of Air Force Instructions implementing NEPA, evaluates potential impacts of the Proposed Action and Alternatives on the environment including the No Action Alternative.

Based on this analysis, the DAF has prepared a proposed Finding of No Significant Impact. The DAF seeks public comments on the draft EA and draft FONSI and will consider all input received before reaching a final decision.

Copies of the draft EA and draft FONSI are available for review and can be downloaded at the following link:

<https://www.hanscom.af.mil/About-Us/Fact-Sheets/Display/Article/379486/civil-engineering>.

Civil engineering officials recommend individuals without internet access visit a local library or town hall for assistance in downloading the document. Requests for hard copies will be considered on a case-by-case basis.

For further information, contact the Hanscom AFB Environmental Office on 781-367-7168.

Written comments will be received through xxx, 2024 and may be either emailed to Jim Maravelias at james.maravelias.1@us.af.mil or mailed to 66 ABG/CEIE; 120 Grenier Street, Hanscom AFB, MA 01731-1910.

PRIVACY ADVISORY NOTICE

Public comments on this draft EA are requested pursuant to NEPA, 42 United States Code 4321, et seq. All comments received during the comment period will be made available to the public and considered during the final EA preparation. Providing private address information with your comment is voluntary and such personal information will be kept confidential unless release is required by law. However, address information will be used to compile the project mailing list and failure to provide it will result in your name not being included on the mailing list.

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INRMP List of Projects by Year

APPENDIX C: INRMP PROJECTS AND YEAR

The table below presents a more detailed breakout of the goals and objectives in the INRMP from which the proposed actions and alternatives were derived.

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Standard Title*	Description
Mgt, Habitat Mgt	1	1.4	Annual	2024	66 ABG/CEIEA	Management, Habitat	Conduct annual survey/analysis of shorebird habitat at Fourth Cliff, including sediment transport, to monitor effects of erosion and erosion control project; necessary to determine if sediment supplementation is needed
T & E Species, Species Mgt, Habitat Mgt	2	2.1	One time	2024	66 ABG/CEIEA	Management, Species	Conduct follow up BSS surveys in wetland habitats at HAFB and Sagamore Hill, focusing on the presence, location, and identification of genetically-pure forms.
T & E Species, Species Mgt,	2	2.1	One time	2024	66 ABG/CEIEA	Management, Species	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	2.1	One time	2024	66 ABG/CEIEA	Management, Species	Conduct 5-year update of the acoustic bat surveys in forest habitats on the installation to determine presence and location of NLEBs, LBBs, tricolored bats, and eastern small-footed bats.
T & E Species, Species Mgt, Habitat Mgt	2	2.1; 2.5	Annual	2024	66 ABG/CEIEA	Management, Species	Conduct shorebird surveys on the barrier beach at 4th Cliff to determine the location and recovery statistics of piping plovers; red knots; and least, common, and roseate terns. Efforts to include blue mussel monitoring.
T & E Species, Species Mgt, Habitat Mgt	2	2.1	One time	2024	66 ABG/CEIEA	Management, Species	Conduct surveys to determine the presence and location of wood turtles and eastern box turtles (at HAFB) and Blanding's turtles (at HAFB and Sagamore Hill). If present, develop future projects for management.

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Standard Title*	Description
Invasive Species Mgt	4	4.1	One time	2024	66 ABG/CEIEA	Management, Invasive Species	Survey HAFB 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.
Wetland Mgt	4	4.1	One time	2024	66 ABG/CEIEA	Management, Wetlands / Floodplains	Golf course wetland rehabilitation, phase 1 (of 3)

Invasive Species Mgt	4	4.2	One time	2024	66 ABG/CEIEA	Management, Invasive Species	Fully survey HAFB and its GSUs for all invasive insect species, particularly the spotted lantern fly (<i>Lycorma delicatula</i>), and map potential habitat and locations of host species. Include a report on develop control strategies and/or early-detection protocols.
Nuisance Species Mgt, T&E Species Mgt	6	6.1	Annual	2024	66 ABG/CEIEA	Management, Nuisance Wildlife	Predation control at Fourth Cliff to protect ESA listed shorebird species
T & E Species, Species Mgt, Habitat Mgt	1	1.4	Annual	2025	66 ABG/CEIEA	Management, Habitat	Conduct annual survey/analysis of shorebird habitat, including sediment transport, to monitor effects of erosion and erosion control project; necessary to determine if sediment supplementation is needed
T & E Species, Species Mgt, Habitat Mgt	2	2.1	Annual	2025	66 ABG/CEIEA	Management, Species	Conduct shorebird surveys on the barrier beach at 4th Cliff to determine the location and recovery statistics of piping plovers; red knots; and least, common, and roseate terns.
T & E Species, Species Mgt,	2	2.1	One time	2025	66 ABG/CEIEA	Management, Species	Conduct IFS surveys in vernal pool habitats at HAFB. If present, develop future projects for management.
T & E Species, Species Mgt,	2	2.1	One time	2025	66 ABG/CEIEA	Management, Species	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	2.2	Annual	2025	66 ABG/CEIEA	Management, Species	Develop and manage species identified in the surveys conducted in preceding years
T & E Species, Species Mgt, Habitat Mgt	2	2.5	Annual	2025	66 ABG/CEIEA	Management, Habitat	Forth Cliff Blue Mussel restoration demonstration project
Wetland Mgt	4	4.1	One time	2025	66 ABG/CEIEA	Management, Wetlands / Floodplains	Golf course wetland rehabilitation, phase 2 (of 3)
Invasive Species Mgt	4	4.1	Annual	2025	66 ABG/CEIEA	Management, Invasive Species	Annual invasive species control and eradication

Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Standard Title*	Description
Species Mgt, Habitat Mgt	5	5.1	One-time	2025	66 ABG/CEIEA	Management, Habitat	Establish initial pollinator flyways at HAFB properties. To be maintained in the future through volunteer efforts
Nuisance Species Mgt, T&E Species Mgt	6	6.1	Annual	2025	66 ABG/CEIEA	Management, Nuisance Wildlife	Predation control at Fourth Cliff to protect ESA listed shorebird species
T & E Species, Species Mgt, Habitat Mgt	1	1.4	Annual	2026	66 ABG/CEIEA	Management, Habitat	Conduct annual survey/analysis of shorebird habitat, including sediment transport, to monitor effects of erosion and erosion control project; necessary to determine if sediment supplementation is needed
Wetland Mgt	1	1.4	One time	2026	66 ABG/CEIEA	Management, Wetlands / Floodplains	Implement Phase 2 Erosion Control Project at Fourth Cliff (northern tip of property)
T & E Species, Species Mgt, Habitat Mgt	2	2.1	Annual	2026	66 ABG/CEIEA	Management, Species	Conduct shorebird surveys on the barrier beach at 4th Cliff to determine the location and recovery statistics of piping plovers; red knots; and least, common, and roseate terns.
T & E Species, Species Mgt,	2	2.2	Annual	2026	66 ABG/CEIEA	Management, Species	Develop and manage species identified in the surveys conducted in preceding years
T & E Species, Species Mgt,	2	2.1	One time	2026	66 ABG/CEIEA	Management, Species	Conduct avian point-count surveys to determine the presence and location of grasshopper sparrows, eastern meadowlarks, upland sandpipers, and sedge wrens (at HAFB) and golden-winged warblers (at Sagamore Hill). If present, develop future projects for management.
T & E Species, Species Mgt,	2	2.1	One time	2026	66 ABG/CEIEA	Management, Species	Conduct bridle shiner surveys in waterways and wetlands at HAFB and GSUs. If present, develop future projects for management.
T & E Species, Species Mgt, Habitat Mgt	2	2.5	Annual	2026	66 ABG/CEIEA	Management, Habitat	Forth Cliff Blue Mussel restoration demonstration project
Wetland Mgt	4	4.1	One time	2026	66 ABG/CEIEA	Management, Wetlands / Floodplains	Golf course wetland rehabilitation, phase 3 (of 3)
Invasive Species Mgt	4	4.1	Annual	2026	66 ABG/CEIEA	Management, Invasive Species	Annual invasive species control and eradication

Nuisance Species Mgt, T&E Species Mgt	6	6.1	Annual	2026	66 ABG/CEIEA	Management, Nuisance Wildlife	Predation control at Fourth Cliff to protect ESA listed shorebird species
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Resource Category	Goal	Objective	Occurrence	FY	Office of Primary Responsibility	Standard Title*	Description
T & E Species, Species Mgt, Habitat Mgt	1	1.4	Annual	2027	66 ABG/CEIEA	Management, Habitat	Conduct annual survey/analysis of shorebird habitat, including sediment transport, to monitor effects of erosion and erosion control project; necessary to determine if sediment supplementation is needed
T & E Species, Species Mgt, Habitat Mgt	2	2.1	Annual	2027	66 ABG/CEIEA	Management, Species	Conduct shorebird surveys on the barrier beach at 4th Cliff to determine the location and recovery statistics of piping plovers; red knots; and least, common, and roseate terns.
T & E Species, Species Mgt,	2	2.2	Annual	2027	66 ABG/CEIEA	Management, Species	Develop and manage species identified in the surveys conducted in preceding years
Invasive Species Mgt	4	4.1	Annual	2027	66 ABG/CEIEA	Management, Invasive Species	Annual invasive species control and eradication
Nuisance Species Mgt, T&E Species Mgt	6	6.1	Annual	2027	66 ABG/CEIEA	Management, Nuisance Wildlife	Predation control at Fourth Cliff to protect ESA listed shorebird species

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APPENDIX D

ESA "No Effect" Determination



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS

29 Sep 2023

MEMORANDUM FOR RECORD

SUBJECT: Extension of ESA "No Effect" Determination for the NLEB at Hanscom AFB

1. On 2 Oct 2018, Hanscom AFB (HAFB) had determined that proposed undertakings within the boundaries of Hanscom AFB main base and within the boundaries of Fourth Cliff in Scituate, Massachusetts will have "no effect" on the federally listed Northern Long-eared Bat (*Myotis septentrionalis*) (NLEB). This determination was effective for a period of 5 years and valid for undertakings which commenced on or after 2 Oct 2018 and were completed on or prior to 1 Oct 2023.
2. HAFB conducted updated bat surveys during the active season in calendar year 2023. As of the date of this memo, results of those surveys have not yet been compiled. It is expected that results will be available in early 2024.
3. The active bat season at HAFB occurs between April and October. Seeing as the season is quickly coming to an end, HAFB is extending the original determination of No Effect through March 2024, at which time data from recent surveys should be available for analysis. A "No Effect" determination remains appropriate through March 2024.
4. This determination is not applicable to geographically separated areas of Hanscom AFB that include FAMCAMP (which has not been surveyed) or Sagamore Hill (which has documented the presence of the NLEB).
5. If further information is needed, please contact me at (781) 225-6144, scott.sheehan.1@us.af.mil

SCOTT E. SHEEHAN, GS-12, DAF
Hanscom AFB Natural Resources Manager

Attachment:
2 Oct 2018 No Effect Determination



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS 66TH AIR BASE GROUP
HANSCOM AIR FORCE BASE MASSACHUSETTS

2 Oct 2018

MEMORANDUM FOR RECORD

SUBJECT: ESA "No Effect" Determination for the NLEB at Hanscom AFB

1. Upon review of the best available science, Hanscom AFB has determined that proposed undertakings within the boundaries of Hanscom AFB main base and within the boundaries of Fourth Cliff in Scituate, Massachusetts will have "no effect" on the federally listed Northern Long-eared Bat (*Myotis septentrionalis*) (NLEB). This determination is effective for a period of 5 years and is valid for undertakings which commence on or after 2 Oct 2018 and are completed on or prior to 1 Oct 2023 unless subsequently rescinded based on newly acquired science or information. A "No Effect" determination is appropriate because:

a. Recent acoustical surveys conducted in 2018 have failed to indicate presence of the NLEB within the areas of Hanscom AFB main base and Fourth Cliff. Results of this study, "*Natural Resource Program, Multiple Installations, U.S. Air Force Bat Acoustic Survey Project AFCE50979317*" are on file at Hanscom AFB, 66 ABG/CEIE Administrative Record File number 14-1-2018-0901-01.

b. Undertakings in these areas do not have the potential to remove any trees within an area known to provide habitat for the NLEB nor within the vicinity of any known maternity roost trees or hibernaculum for the species (reference: <https://www.mass.gov/service-details/the-northern-long-eared-bat>).

2. This determination is not applicable to geographically separated areas of Hanscom AFB that include FAMCAMP (which has not been surveyed) or Sagamore Hill (which has documented the presence of the NLEB).

3. If further information is needed, please contact me at (781) 225-6144, scott.sheehan.1@us.af.mil.

SCOTT E. SHEEHAN, GS-12, DAF
Hanscom AFB Natural Resources Manager

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APPENDIX E

Patriot Golf Course Site Photos



Photo 1: Course Conditions Along Stream Segments with Erosion of Soils Due to Flooding. Invasive Phragmites australis Observable in the Background.



Photo 2: Small Cluster of Invasive Species Phragmites australis in Wetland Areas



Photo 3: Wetlands / Stream Segment Adjacent to Cart Crossing in Sections of the Course Prone to Flooding, Looking West



Photo 4: Central Wetland Resource Area Prone to Flooding, Looking South



Photo 5: Dense Vegetation Within Stream Channel / Central BVW Prone to Flooding, Looking North



Photo 6: Central Wetland Resource Areas Prone to Flooding, Looking Northwest



Photo 7: Obstructed and Undersized Stream Crossing in Central Wetland Resource Area, Looking North



Photo 8: Corrugated Metal Culvert Connecting to Extensive Offsite Wetland System with Stream Flowing in a Northerly Direction